DEVELOPING COMPOSITE AREA-LEVEL INDICATORS OF SOCIOECONOMIC POSITION FOR PITTSBURGH, PENNSYLVANIA

by

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Objective: To develop a process to construct composite area-level indicators of socioeconomic position (SEP) from existing SEP measures and examine how well they predict the proportion of low birth weight (LBW) infants in Pittsburgh, Pennsylvania.

Methodology: Twelve existing measures of SEP were derived from U.S. Census 2000 and constructed at block group (BG) and neighborhood (NB) levels. Geocoded individual-level LBW data were obtained from Allegheny County Birth Registry (2003-2006) and aggregated to BG level for Pittsburgh. The indicator development process included multilevel data exploration (boxplots, variance decomposition, mapping, and examining correlations), exploratory multilevel factor analysis (MFA), and model selection. Multilevel linear regression (MLR) and diagnostic tests were used to examine whether indicators of SEP predicted LBW.

Results: MFA identified two BG-level factors: "material and economic deprivation" (MED_{ij}, mean=29.8, variance=184.8), representing percentage of individuals or households not owning a car, renting their residence, in poverty, receiving public assistance, and earning low income; and "concentrated disadvantage" (CD_{ij}, mean=15.7, variance=164.4), representing percentage of Blacks, single-headed families, having family members under 18 years old, and receiving public assistance. At NB level, all 12 SEP measures were captured in one factor, "overall neighborhood deprivation" (OND_j, mean=29.3, variance =115.9). MLR identified significant associations between both OND_j and MED_{ij} and LBW: a unit increase in OND_j was associated with 0.003

increase in LBW infants ($p<0.001$), and a unit increase in MED_{ij} was associated with 0.0018 increase ($p<0.01$). The association between CD_{ij} and LBW was moderated by OND_j ($p=0.017$): in NBs with high OND_j, LBW increased as CD_{ij} increased, while in NBs with low OND_j, LBW decreased as CD_{ij} increased. This result suggests that lower levels of OND_j may ameliorate the effects of high CD_{ij} at the BG level in Pittsburgh.

Conclusion: The study outlines a novel approach to examining area-level associations between SEP and health by utilizing MFA to develop BG and NB composite SEP measures; this approach has not been reported in previous neighborhood research. An important public health implication is that these methods facilitate a closer examination of the mechanisms by which SEP at different area-levels could impact health.

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1.0 INTRODUCTION

Exploring the relationship between where one lives and health outcomes is not new in public health. In the mid-1800s, John Snow, the father of epidemiology, mapped out locations of cholera cases and discovered that location of residence was associated with mortality due to cholera in London, England. Households whose water source was the Broad Street pump had relatively more cases of cholera. To prevent further cases, Snow broke off the water pump handle; his efforts stopped the further spread of cholera (Gordis, 1996). Almost 150 years later, attention continues to focus on the relationship between residential environment and health outcomes (Diez Roux, 2001, 2004; Kawachi & Berkman, 2003), especially in relation to health disparities. Some local residential areas demonstrate clustering of social problems, concentration of poverty, and paucity of resources, and these characteristics may be associated with local area-level differences in health outcomes (such as cardiovascular disease, self-reported health status, pre-term birth), risk factors (obesity, smoking), and behaviors (physical activity and diet) (Diez-Roux, 2000; Farley, et al., 2006; Morenoff, 2003; Sampson, Raudenbush, & Earls, 1997). Current thinking in public health has recognized that there are social determinants of health, and factors at multiple levels, ranging from the individual to the global, that contribute to health. This thinking, coupled with the improved accessibility of powerful statistical software, has augmented researchers' capability to examine more closely the contextual factors that are associated with health status (Diez-Roux, et al., 2001; Gee & Payne-Sturges, 2004; Schulz & Northridge, 2004).

Similar to efforts employed by John Snow, examining differences between local areas as well as individual-level factors may eventually lead to the formulation of more effective interventions and policies that reduce social inequalities in health.

However, despite the need for and improved feasibility of examining health issues from a contextual perspective, definitions of the “local area” and selection of the measures used to measure socioeconomic position (SEP) have been inconsistent in the literature (Diez Roux, 2001). To examine these methodological issues more closely, this paper summarizes area-level SEP domains, methods to combine socioeconomic domains into composite indicators of SEP, recent health studies that have constructed composite indicators, the U.S. Census (a commonly used source of data for SEP in the United States), ways of measuring associations between SEP measures, and studies that have compared SEP measures at local area levels. In addition, to add to the area of research examining neighborhood-level factors and health outcomes, we use an innovative statistical approach to develop composite indicators of SEP at two area levels to examine the ability of the composite indicators to predict an outcome of public health importance, the proportion of infants born at low birth weight (LBW). LBW is a leading cause of infant mortality in the United States (Centers for Disease Control and Prevention, 2007, 2008).

To illustrate the approach of constructing composite indicator of SEP, Pittsburgh, Pennsylvania was selected as an example because it is one of the few cities in the United States where administratively defined areas (i.e. census block groups and census tracts) have been mapped to meaningfully-defined Pittsburgh neighborhoods. These SEP indicators will be constructed using multilevel factor analysis (MFA), a method that combines individual SEP measures into a factor that takes into account the nested structure of the data. This method is a novel approach to construct area-level factors at different levels, and may provide insight on different mechanisms by which SEP is associated with health in Pittsburgh.

Specifically, this paper will:

1) compare individual SEP measures across different area levels (i.e., census block group, census tract, neighborhood),

2) assess the variance contribution across levels,

3) assess the correlations between SEP measures within each level,

4) construct composite indicators of SEP at different levels,

5) examine the association between composite indicators of SEP and LBW, a health outcome of particular concern in Pittsburgh.

The paper will conclude with a discussion of the results, implications of the findings for public health, and recommendations for next steps.

2.0 REVIEW OF THE LITERATURE

2.1 AREA-LEVEL SEP

According to Krieger and colleagues (1997), SEP is

> "An aggregate concept that includes both resource-based and prestige-based measures as linked to both childhood and adult social class position. Resource-based measures refer to material and social resources and assets, including income, wealth, educational credentials; terms use to describe inadequate resources include 'poverty' and 'deprivation.' Prestige-based measures refer to individual's rank or status in a social hierarchy, typically evaluated with reference to people's access to consumption of goods, services and knowledge, as linked to their occupational prestige, income, and education level."

Examining SEP provides a way to contextualize risk factors, provides a deeper understanding of why certain subpopulations are more likely to be unhealthy, and further elucidates the fundamental causes of disease (e.g., access to resources, specifically money, knowledge, power, prestige, and social connections) that contribute to health disparities (Link & Phelan, 1995). One way to examine this context is to examine area-level measures of SEP. Area-based measures, obtained by grouping individual-level measures of SEP into the geographic area of interest (e.g., such as census blocks, census tracts, or zip codes), can reflect single indicators of SEP (e.g., occupation class, education, income, wealth, poverty, housing) or combinations of these indicators (e.g., social and/or economic deprivation).

2.1.1 Domains of SEP

Krieger and colleagues (1997) and Galobardes and colleagues (2007; 2006a, 2006b) provide overviews of these domains. These are summarized below.

2.1.1.1 Occupation Class

Primarily used in the United Kingdom, occupation represents the social standing within a society that is based on one's employment and position within that employment. A higher occupation may be interpreted as having a higher income and easier access to resources such as health care and education. Limitations include whether occupation adequately captures differences in SEP (e.g., an executive secretary versus manager in a mid-size company) and excludes individuals outside the labor force (e.g., unemployed workers, retirees).

2.1.1.2 Education

Education represents the knowledge one may have to understand health messages and access to health services, as well as one's potential employment and income. Education can be measured continuously or categorically. As a continuous measure, more years of education suggest better health; as a categorical measure, groupings represent achievements that may represent higher SEP (e.g., professional/graduate degrees high school degrees versus).

Limitations include changes in education attainment over time, such as birth cohort effects where older generations may be classified as less educated. Advantages are high response rates, ease in measurement, and inclusion of individuals not in the labor force.

2.1.1.3 Income

Income represents monetary resources available. Income may represent the ability to purchase direct/indirect health-related services and/or products (e.g., education, health insurance, gym membership) that would affect health and/or health behaviors. Income can be measured at the individual-level or at the household level. Limitations are that income is a sensitive topic and may yield low response rates. A strength is that income is considered the "best single indicator of material standards" (Galobardes, Shaw, Lawlor, Lynch, & Davey Smith, 2006).

2.1.1.4 Wealth

Wealth represents the accumulation of assets. Wealth may include savings, inheritance, and home and/or car ownership. Limitations are the low response rates and the feasibility of obtaining wealth information. Similar to income, wealth is "a direct measure of material circumstances" (Galobardes, et al., 2006, p. 58).

2.1.1.5 Poverty

Poverty is another dimension of SEP that is a relative measure of income: poverty is a normative construct judged to be the minimum income level at which one could survive. One limitation of this dimension is that dichotomizing income into either below or above the poverty level may mask the gradient of inequalities. Another way of measuring poverty is by relative need, i.e., the distance by which a family is below or above the poverty line. Limitations are that this measure fails to capture the dynamic experience of being in poverty (one may not be in poverty all the time) and is a subjective state.

2.1.1.6 Housing Characteristics and Housing Amenities

In addition to home ownership (included in the wealth dimension), another related dimension is housing conditions, specifically overcrowding (i.e., housing units with >1 person per room, not including kitchens or bathrooms) (Galobardes, Lynch, & Smith, 2007). Overcrowding of households may indicate inadequate economic resources. Housing amenities include the presence of refrigerators, indoor plumbing, and telephones, which may reflect material circumstances. A limitation is the difficulty in conducting comparisons, such as within the United States, where most of the population will have a refrigerator and indoor plumbing. Advantages include ease of data collection.

2.2 COMPOSITE INDICATORS

A broader approach to understanding the associations between SEP and health is to examine composite indicators, such as area-level economic deprivation or disadvantage. Deprivation indicators are comprised of a variety of measures representing several socioeconomic domains. The following section describes statistical methods to construct composite indicators and examples of three indicators used in health research studies: Townsend Index of Material Deprivation (Townsend, Phillimore, & Beattie, 1988), the Concentrated Disadvantage Index (Sampson, Raudenbush, & Earls, 1997), and the Neighborhood Deprivation Index (Messer, Laraia, et al., 2006).

2.2.1 Statistical Methods to Develop Composite Indicators

Folwell (1995) summarized the main methodological approaches that have been used to create composite indicators. He categorized these approaches as simple additive indices, weighted index, and multivariate techniques.

2.2.1.1 Simple Additive Index

A simple additive index is created by standardizing the individual SEP measures (z_i) by subtracting off the mean, dividing this difference by the standard deviation, and summing the standardized values to create a z-score index, where

$$z_i = \frac{x_i - \overline{x}_i}{sd_i} \tag{2.1}$$

$$\text{Z-score index} = \sum_{i=1}^{n} z_i \tag{2.2}$$

Although the additive index is of a simple construction, it is difficult to interpret (Folwell, 1995). Measures that are combined to create an index contribute equally to the composite index. The equal weighting "…hides information rather than illuminates it." (Folwell, 1995, p. S5).

2.2.1.2 Weighted Index

A weighted index is similar in construction to the simple additive index, except that the standardized scores are multiplied by weights. Weights represent the relative contributions of measures to the index score: measures that are considered "more important" have larger weights than those deemed to be of less importance. The scores are summed to construct the weighted index:

$$\text{Weighted Index} = \sum_{i=1}^{n} w_i z_i \tag{2.3}$$

A limitation of this measure is the subjective nature of the weighting scheme. For example, in creating a deprivation index that includes several SEP measures, it is unclear how one would weight one measure (e.g., unemployment) over another (e.g., education).

2.2.1.3 Multivariate Methods: Principal Component Analysis and Exploratory Factor Analysis

Composite indicators also can be created through two types of multivariate techniques: principal component analysis (PCA) and exploratory factor analysis (FA). Both methods are used to examine correlations between variables in a set and to form subsets that are relatively independent from each other (Tabachnick & Fidell, 2007). Combining variables within subsets reduces a large number of variables into a few factors (in FA) or components (in PCA) that are linear combinations of the original variables. Both techniques extract subsets of correlated variables to form factors or components. However, they differ mathematically and in the use of theory to form their construction (Fabrigar, 1999; Tabachnick & Fidell, 2007). Mathematically, PCA analyzes all of the variance in the variables. In contrast, FA analyzes only the shared variance among the variables and not variance due to error or that is unique to a specific variable. In PCA, variables are combined on the basis of empirical correlations to form components; there is no underling theory to explain the observed associations. In FA, the analyst examines combinations of variables and considers the theory that helps explain why certain variables are associated with each other. If theory suggests that an underlying factor represents a selected group of correlated variables, FA may be a more appropriate method to extract interpretable factors, especially in creating composite indicators that reflect underlying concepts like SEP.

In FA, several methodological decisions need to be made (Fabrigar, 1999; Tabachnick & Fidell, 2007). After measuring a set of variables and constructing the correlation matrix of these variables, a set of factors that represent a subset of correlated variables are extracted. The first decision is to select an extraction method. Several extraction methods exist, and one widely used and preferred method is maximum likelihood factoring (a summary of other extraction techniques, such as principal factors and principal components, can be found in Tabachnick and Fidell (2007, p. 633)). A special feature of maximum likelihood factoring is the ability to test whether factors are significant, which is useful in confirmatory factor analysis, a more advanced type of factor analysis that involves theory testing (Tabachnick & Fidell, 2007). The second decision is to choose the number of factors to be extracted; the goal is a parsimonious and interpretable solution. One statistical approach to assess the number of factors is by examining a scree plot, a graph of the number of factors versus the corresponding eigenvalue (or variance of the factor). The scree plot usually is decreasing, and the optimal number of factors is based on where the slope of the line changes. For example, if a shift in the slope occurs after the first three factors, then three factors are extracted. In addition to the scree plot, the number of extracted factors should be interpretable (Fabrigar, 1999). Factor interpretation is easier when a factor has several variables correlated to it, and when those variables are correlated with only one factor. Variables that are correlated with more than one factor are considered "complex items" and are more difficult to interpret. In addition to interpretability, factors should make sense based on previous research and theory (Fabrigar, 1999; Tabachnick & Fidell, 2007). Third, if two or more factors are extracted, the solution is rotated. Rotation improves the interpretability of the factors. There are two types of rotations, depending on whether or not the factors are correlated. For factors that are not correlated, an orthogonal rotation is applied. An orthogonal rotation of the factors produces a loading matrix, where factors are not correlated. A common and widely used orthogonal rotation is varimax rotation. For correlated factors, an oblique rotation is applied. The loading matrix in factors that are rotated obliquely also is called the pattern matrix. Unlike the loading matrix of factors that are orthogonally rotated, the pattern matrix represents the unique relationships between each factor and each variable, ignoring the shared variance among correlated factors (Tabachnick & Fidell, 2007). One commonly used family of oblique rotations is direct oblimin, which allows for different degrees of correlation among factors (see p. 639 for additional techniques (Tabachnick & Fidell, 2007). In software statistical packages, a variable, delta, specifies the degree of correlation among factors. Values that are less than 0 become increasingly orthogonal; values that are zero or higher indicate correlation among the factors. Most programs default with a delta equaling zero.

Variables with loadings ≥0.30 from both rotations are interpreted (Comrey & Lee, 1992). Squaring the factor loading can provide a crude index of how much the variable's variance overlaps with the factor. For example, a variable with a factor loading of 0.30 had about 9 percent of its variance in common with the factor. Comrey and Lee (1992) suggest cutoffs to help interpret factor loadings: factor loadings >0.71 are excellent, >0.63 are very good, >0.55 are good, >0.45 are fair, and >0.32 are poor. Variables with factor loadings ≥0.30 are then summed together to create factor scores (Tabachnick & Fidell, 2007).

2.2.2 Examples of Composite Indices of SEP

Several composite indicators of area-level SEP have been used, especially in the United Kingdom, to help guide public policies and allocate public funding (e.g., Carstairs Deprivation

Index, Jarman Underpriveleged Area Score (Shaw, 2007)). For the purposes of developing a deprivation index relevant to LBW, the following three are described because of their wide recognition and use in health research (Townsend Index of Material Deprivation (Townsend, et al., 1988)), incorporation of racial/ethnic composition of an area (Concentrated Disadvantage Index (Sampson, et al., 1997)), and development specific to adverse birth outcomes (Neighborhood Deprivation Index (Messer, Laraia, et al., 2006)) (Shaw, 2007). An advantage of composite indices is that they acknowledge the multi-faceted aspects of SEP; however, a limitation is that the number of variables used to create the index may make it difficult to identify the true target of subsequent policies.

The Townsend Index of Material Deprivation is widely used in the United Kingdom to reflect "material deprivation," defined as lacking "goods, services, resources, amenities, and physical environment which are customary, or at least widely approved in the society under consideration." ((Shaw, 2007; Testi, Ivaldi, & Busi, 2004; Townsend, et al., 1988). The measure is a simple additive index and sums together the following percentages: unemployed, do not own a car, do not own a home, and overcrowded households.

Concentrated Disadvantage reflects the concept that economic changes in urban cities (e.g., Detroit and Pittsburgh) have contributed to the concentration of residents in areas with high levels of poverty, higher proportion of racial minorities and families headed by single females (Sampson, et al., 1997). Using FA with an oblique rotation, variables used to construct Concentrated Disadvantage were percentage below the poverty line, percentage on public assistance, percentage of female-headed families, percentage unemployed, percentage children, and percentage Black. This measure was developed to reflect disadvantage in Chicago neighborhoods (defined by researchers as aggregates of census tracts).

Variables used to construct the Neighborhood Deprivation Index were selected based reported associations between neighborhood SEP factors, racial disparities, and adverse birth outcomes (Messer, Laraia, et al., 2006). Because their interest was to summarize the total variance at the neighborhood level empirically rather than to confirm a factor that represents the measures, Messer and colleagues (2006) used PCA to construct their composite index of SEP. Of the 20 measures initially included in the analysis, eight factors were included in the final score. These are percent of males in management and professional occupations, percent crowded housing, percent of households under the poverty level, percent of female-headed households, percent of households receiving public assistance, percent of households earning less than $30,000 per year, percent with less than a high school education, and the percent unemployed. Item loadings were used to weight each measure to calculate the summary score, and the score was then standardized and divided into quartiles. The measure was used to examine how area-level measures were associated with adverse birth outcomes for census tracts in Baltimore City, Baltimore County, Montgomery County, and Prince Georges County in Maryland.

These three indices, Townsend Index, Concentrated Disadvantage, and the Neighborhood Deprivation Index, differ in the measures included to construct the measures and the statistical methods by which these indices were developed. The only common measure across the indices was percent unemployed. Percent crowding was included in both the Townsend and Neighborhood Deprivation Indices. The Concentrated Disadvantage and Neighborhood Deprivation Indices included percent in poverty, percent on public assistance, and percent female-headed households. The three indices were based on a total of 12 unique census measures.

2.3 THE U.S. CENSUS

2.3.1 Description and Datasets

Many health studies examining the association between area-level factors and health have utilized the U.S. Census as a source of data on SEP. The following section provides a general description of the U.S. Census, including a summary of four main datasets, describes corresponding SEP indicators found in the datasets, and examines different local area-levels (block group, census tract, and zip code) at which data can be aggregated.

The U.S. Census is a collection of data that provides characteristics on the U.S. population, including socioeconomic data. The U.S. Constitution mandates enumeration of the population every 10 years; the last U.S. census was obtained in 2000. Data from the U.S. Census have been used for congressional redistricting, allocating government funds, transportation planning, and informing the public about the area in which they live. In public health, many studies have used the U.S. Census to examine the relationship between local area level SEP and a variety of health behaviors (e.g., early sexual onset, violence, cigarette/alcohol use) and health outcomes (e.g., depression, cardiovascular mortality, adverse birth outcomes) (Browning, Leventhal, & Brooks-Gunn, 2004; Cutrona, et al., 2005; Diez Roux, Borrell, Haan, Jackson, & Schultz, 2004; Foshee, et al., 2008; Messer, Kaufman, Dole, Savitz, & Laraia, 2006).

The U.S. Census data are collected through two surveys: the short form and the long form (U.S. Census Bureau, 2002). The short form was administered to 5 of 6 households. The long form asked additional questions on a sample of the U.S. population (on average 1 in 6 households). Sampling units were housing units. Several sampling rates were applied based on the size of the smallest number of housing units in a specified census area (e.g., counties, cities, school districts, American Indian reservations). Sampling rates were 1-in-2, 1-in-4, 1-in-6, and 1-in-8 with an average sampling rate of 1-in-6. Sampling rates were applied in the following way: if an area included less than 800 housing units in a block, then the sampling rate for the housing units in the blocks of that area was 1-in-2. A sampling rate of 1-in-4 was applied when areas were composed of 800 to 1200 housing units in a block. If a block was not part of areas of either size, a 1-in-8 sampling rate was applied. For blocks that did not meet any of these categories, a 1-in-6 sampling rate was applied to housing units. Sample data collected from the long form are extrapolated to the population level using iterative ratio estimation. The estimation procedure was applied to "geographically defined weighting areas," which are areas within counties that are connected with each other and have least 400 people. For the sample of people, weights were adjusted in four stages to account for type of households (family with dependents, family no dependents, other housing units, people in group quarters), sampling rate, householder status, and age/sex/race/and Hispanic origin. For housing units, weights were adjusted in four stages to account for number of individuals in occupied housing units, sampling rate, race and Hispanic origin of householder/tenure, and the number of vacant housing units for rent or sale.

The four major datasets are: 1) Summary File 1 (SF1) (U.S. Census Bureau, 2001b). Based on the short form, data reflect responses to questions asked of the total population and all housing units. Data include sex, age, race/ethnicity, household relationship (family household residents versus non-relatives in the households), and housing information (occupancy status, owner/renter). 2) Summary File 2 (SF2)(U.S. Census Bureau, 2001a). Based on the short form, data reflect responses to questions asked of the total population and all housing units. In addition to the measures in SF1, the SF2 data include sex by age, average household size, household type, and housing characteristics (tenure) overall and for 250 population groups sub-defined by race/ethnicity. 3) Summary File 3 (SF3)(U.S. Census Bureau, 2002). Based on the long form, data reflect responses to questions asked of a sample of the total population and a sample of housing units. Data include population totals, educational attainment, employment status, occupation, income, and poverty status. Housing data include household size, the number of available vehicles, and home value. 4) Summary File 4 (SF4)(U.S. Census Bureau, 2003). Based on the long form, data reflect responses to questions asked of a sample of the total population and a sample of housing units. In addition to the data in SF3, SF4 data also include the same measures for 336 population sub-groups defined by race/ethnicity.

2.3.2 Local Area Levels

Census data are aggregated into different area levels from blocks all the way to the entire nation (See Figure 2-1). The smallest level at which socioeconomic data can be aggregated (from SF3) is at the block group level. Health studies examining local area levels have employed data at the block group level, and also the census tract level, and zip code level. Other studies have aggregated together block groups or census tracts to form “neighborhoods.”

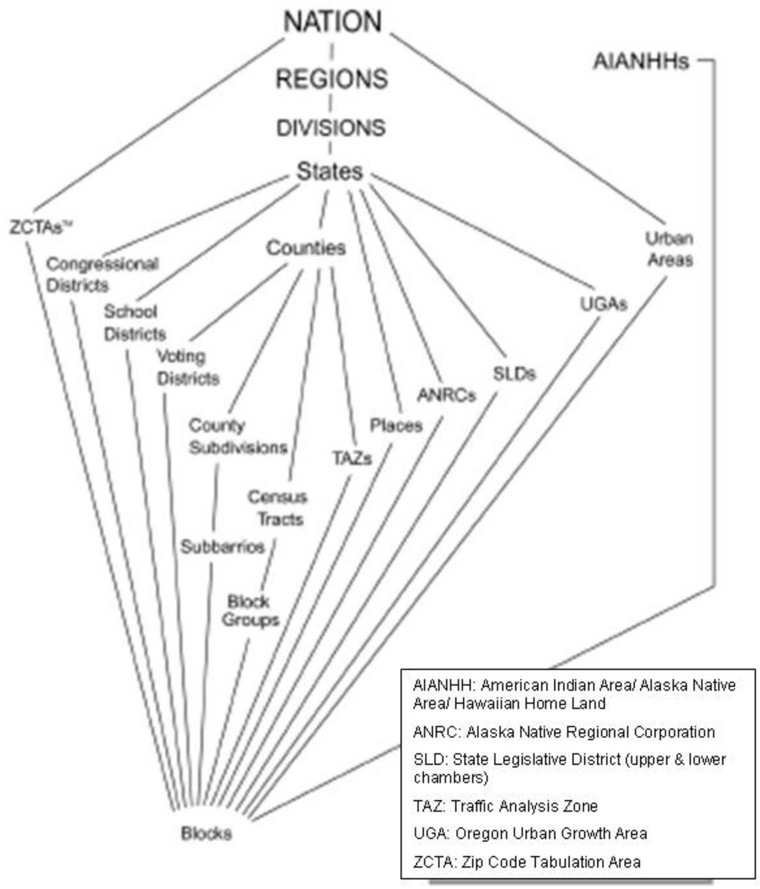

Figure 2-1 Standard Hierarchy of Census Geographic Entities (U.S. Census, 2000)

Understanding the differences between census tracts, census blocks, and zip codes can help determine the advantages and disadvantages of their use (Messer & Kaufman, 2006; U.S. Census Bureau, 2002). In general, census-defined areas are preferred to those defined by zip codes. Census tracts are defined by local or regional data users based on U.S. Census Bureau guidelines, contain an average of 4000 individuals (between 1,000 to 8,000 people) and are designed to contain units that are homogeneous. Boundaries can be geographic, legal, or defined by the government. Census tracts are an area with public health policy implications. To increase the availability of low-income housing in deprived census tracts, the Qualified Census Tract administered by the U.S. Department of Housing and Urban Development examines census tract household income to determine whether low-income housing in the census tract qualifies for tax credits. In addition, the Health and Resources Services Administration can designate census tracts as medically underserved areas that targets for the Health Professional Shortage area program and location for Community Health Centers ((Department of Housing and Urban Development, 2006; Health Resources and Services Administration, 1995; Krieger, 2006).

Within census tracts are census blocks, which contain an optimal size of 1,500 individuals (between 600 and 3000 people). *Block groups* are a cluster of blocks, whose boundaries are streets, railroad tracks, streams, administrative boundaries (e.g., county lines). Block groups never cross census tract, state, county, or city boundaries. Block groups are identified with four numbers, with blocks in the same block group having the same first digit (e.g., Block group 3 has blocks of numbers from 3000 to 3999). Making up block groups are census *blocks*, which contain on average 75 individuals and are the smallest level at which data are collected. Boundaries include not only legal, geographic, or governmental boundaries, but also streets, roads, and railroad tracks. However, because of their small size, census blocks are more homogeneous than census tracts but, due to confidentiality issues, socioeconomic data are not available (Krieger, et al., 1997).

Zip code is another way to define the local area, but they are larger areas that contain up to 30,000 people. Zip codes are designed for mail delivery, not by population homogeneity. Zip codes are created by the U.S. Postal Service, and they do not have corresponding census-defined regions (Krieger, et al., 2002). However, in 2000 the U.S. Census created zip code tabulation areas (ZCTAs) to approximate U.S. Postal Service zip code areas (U.S. Census Bureau, 2000). ZCTAs are clusters of addresses in census blocks where the majority has the same zip code. However two major differences exists between ZCTAs and zip codes: zip codes are based on delivery routes along street networks or boundaries that may follow property lines or blocks, and may divide census blocks, and ZCTAs do not include most zip codes of P.O. boxes or companies that have been assigned their own dedicated zip codes. Approximately 10,000 zip codes are not included as ZCTAs (U.S. Census Bureau, 2001c). Zip codes should be considered a last resort for examining neighborhood socioeconomic factors (Krieger, et al., 2002).

2.4 MEASURES OF ASSOCIATION

2.4.1 Types of Measures of Association

To understand the nature of the SEP data, several types of associations among the measures can be examined within and between levels. Associations include how related SEP measures are to one another, how areas neighboring each other are similar to each other, and how areas nested within a larger area are similar to each other. The Pearson correlation coefficient and the Spearman rank correlation coefficient measures the association between measures at a given level. The Pearson correlation coefficient ($r_{x,y}$) measures the linear association between two measures (e.g., x and y) (Vittinghoff, 2005).

$$r_{x,y} \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}} \qquad (2.4)$$

Values range from -1 to +1 where a value of -1 means a negative association between the x and y (y increases as x decreases). A value of 0 means there is no association between the two variables, and a value of +1 means a positive association between x and y (y increases as x increases). The Spearman rank correlation coefficient (R_s) is a non-parametric (distribution-free) alternative to the Pearson correlation (Bain & Engelhardt, 1992; Vittinghoff, 2005). Values of x and y are ranked separately then compared to each other to calculate the difference in rank between the two. More specifically, x_i values are ordered from lowest to highest, and ranked, with 1 indicating the lowest rank. Then, values for y_i which correspond to x_i are also ranked from lowest to highest. Ranks of x_i are then subtracted from y_i to result in the difference (d_i). The difference is used to calculate R_s.

$$R_s = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \tag{2.5}$$

where $d_i = rank\ of\ y_i - rank\ of\ x_i$

R_s also ranges from -1 to 1. When ranks between x and y are in agreement, there is no difference between the ranks, d_i is 0, and R_s is 1. When there is disagreement, R_s is -1. Cohen (1988) suggests that correlations with a value of 0.30 or more have at least a medium effect and can be interpreted.

Spatial similarity between neighboring areas, such as neighborhoods, can be measured by an autocorrelation statistic. One common autocorrelation statistic is the Moran's I statistic (Bailey & Gatrell, 1995; Chaix, Merlo, & Chauvin, 2005; Pfeiffer, 2008):

$$I = \frac{N\sum_{i=1}^{N}\sum_{j=1}^{N} w_{ij}(y_i - \bar{y})(y_j - \bar{y})}{\left(\sum_{i=1}^{N}(y_i - \bar{y})^2\right)\left(\sum_{i=1}^{N}\sum_{j=1}^{N} w_{ij}\right)} \tag{2.6}$$

$where\, i \neq j$

In this formula (using neighborhoods as an example), N represents the number of neighborhoods, $y_i - \bar{y}$ is the neighborhood-level residual, and w_{ij} is a weight that depends on the distance between neighborhood i and neighborhood j. The weight provides greater value to areas that are closer in distance to each other than those areas that are farther away from each other (Pfeiffer, 2008). A commonly used weight is "queen contiguity" which puts more weight on areas that share a border or corner with each other. The statistic is similar in interpretation to a Pearson's correlation coefficient: 0 indicates no clustering, +1 indicates positive spatial autocorrelation (adjacent areas cluster and are similar), and -1 indicates negative spatial autocorrelation (adjacent areas are dissimilar). Significance is estimated using Monte Carlo randomization.

For multilevel data, where data is available on more than one level (e.g., block groups at the first level nested within neighborhoods, at the second level), an intraclass correlation coefficient (ICC) measures the contribution of the variance between neighborhoods to the total variance at the neighborhood and block group levels (Hox, 2002):

$$ICC = \frac{\tau^2_{neighborhoods}}{\tau^2_{neighborhoods} + \sigma^2_{block\ groups}} \tag{2.7}$$

In the formula, $\tau^2_{neighborhoods}$ is the between neighborhood variance, $\sigma^2_{block\ groups}$ is the block group variance. Together they sum to the total variance. The ICC can range from zero to one (Reise, Ventura, Nuechterlein, & Kim, 2005). For example, in a two-level analysis with block groups and neighborhoods, an ICC of 0 means that all of the variation is occurring between block groups within neighborhoods, but not between neighborhoods. On the other hand, an ICC of 1 means that all of the block group variation is due to neighborhood differences. A z-test statistic can be used to assess the significance of the variances at each of the levels.

2.4.2 Comparative Studies

To our knowledge, few studies have compared results at different levels of "area." We identified two studies conducted in the United States that compared socioeconomic measures across different areas (Diez-Roux, et al., 2001; Krieger, et al., 2003) . These studies explore the data at different area levels using box plots, matrices of correlation coefficients, and/or ICC.

Krieger and colleagues (2003) used boxplots and the R_s to compare percent below poverty level, percent of homes >$300,000 (representing extreme wealth), percent working class, and percent with less than high school diploma at the block group, census tract, and zip code level. Overall, researchers found that the medians across the different area levels to be similar, although less variability was observed at the zip code level (given the wider area encompassed by zip codes); this was more apparent with percent poverty than with extreme wealth. For percent poverty, numerous block groups and census tracts had percent below the poverty line greater than 50%, but percent poverty for zip codes had a maximum of 46%. In contrast, the variability of percent with homes >$300,000 at the block group, census tract, and zip code level were similar. Krieger concluded that "aggregation by zip code preserved the full range of values for indicating extreme wealth, but extreme poverty appears to be smoothed out (Krieger, et al., 2003, p. 168). Additionally, R_s was used to examine the bivariate associations between SEP measures. Researchers interpreted correlations with values >0.60, and categorized correlations into two cluster by the type of domains each variable represented. Using correlations found at the census tract level, one cluster seemed to represent economic resources (income and poverty) and the second cluster seemed to represent wealth and social class. No additional analyses are provided to further compare the differences in SEP measures across levels. However, in a series of papers that examined the association between various area-based socioeconomic measures on various health outcomes, Krieger and colleagues (2002) demonstrated that the socioeconomic gradient for census blocks and census tracts were similar, but that gradients at the zip code-level either did not detect a similar gradient or provided contrary findings.

Diez-Roux and colleagues (2001) also found that census tracts and census blocks were comparable. Census tracts and census block groups were located in the following cities: Birmingham, Alabama; Chicago, Illinois, Minneapolis, Minnesota; Oakland, California; Forsyth County, North Carolina; Jackson, Mississippi; northwestern suburbs of Minneapolis, Minnesota; Washington County, Maryland; Sacramento County, California, and Pittsburgh, Pennsylvania, which were sites of three large-scale epidemiologic studies: Coronary Artery Disease Risk Development in Young Adults Study, Atherosclerosis Risk in Communities Study, and the Cardiovascular Health Study. Several SEP domains were examined, including income/wealth (e.g., median household income, percentage of persons below poverty), education (e.g., percentage of individuals with less than a high school education), and occupation/employment (percentage unemployed, percentage in an executive, managerial, or professional occupation). Another domain, which the researchers called "socioenvironmental," was also examined. This domain included the following measures: percentage of unoccupied or boarded up housing, percentage of crowded households, and percentage of residents living in the same house for more than 5 years. Researchers examined the correlation between the SEP measures using 1) R_s; 2) a measure of agreement between the block group measure and the census tract measure; and 3) the ICC for census tracts. For the second measure, a value close to one suggests strong agreement between the block group and census tract measures. Researchers found a high correlation ($R_s = 0.5$ to 0.8) among the following measures: wealth/income, education, and occupation.

Percentage of owned housing units was less correlated with education and occupation ($R_s < 0.4$) and was weakly correlated with house value ($R_s = 0.1$). Residing the same house for the last 5 years were not as correlated with other measures ($R_s <$ 0.2), except for owned housing units ($R_s = 0.5$). The correlation for the other SEP measures, owned housing units, boarded up housing units, and crowded households) were moderately correlated among each other ($R_s = 0.3$-0.6). Correlations for census tracts were similar, but stronger than correlations among measures at the block group level. Using FA, they found that six of the SEP measures (median household income, median value of housing units, percentage of household units receiving interest/dividend/net rental income, percentage of adults who completed high school, percentage of adults who completed college, and percentage in executive, managerial, and professional occupations) loaded onto an area-level SEP factor. Measures comprising the factor were standardized, and then summed together.

The area-level SEP factor at the block group level was highly correlated with the score on the census tract level (R_s> 0.85). In addition, the agreement between block groups and census tracts was 0.94, suggesting a strong agreement between block group and census tract measures of SEP. The ICC was 0.86, suggesting that 86 percent of the variability between blocks groups was due to variability between census tracts. The authors concluded that the variation of block groups within census tracts was not as large compared to variation between census tracts, suggesting that census tracts were more heterogeneous than the block groups within census tracts.

2.5 POTENTIAL FALLACIES INVOLVING AGGREGATION

In interpreting results that represent data on multiple levels, two fallacies may occur. The first type of fallacy is the ecological fallacy, where higher level results are interpreted at the individual level. For example, block group data are aggregated to the neighborhood level to examine neighborhood differences in SEP. Interpretation of the aggregated data must be made at the neighborhood level, not at the block group level. Aggregating the data results in decreased power given that some information is lost when block group data are aggregated to the neighborhood level (Tabachnick & Fidell, 2007). Another fallacy is the atomistic fallacy, where lower level results are interpreted at the higher level. For example, block group results cannot be interpreted at the neighborhood level.

2.6 MULTILEVEL ANALYSIS

2.6.1 Multilevel Analysis

One method to take into account multiple area levels of the census data and to reduce the likelihood of committing the aforementioned fallacies is multilevel analysis (Tabachnick & Fidell, 2007). In a two-level study, for example, parameters at level 1 (the lower level at which data are available, e.g., block groups) and parameters at level 2 (higher level at which data are available, e.g., neighborhoods) are analyzed simultaneously to predict health outcomes. Typical equations for multilevel analysis look like the following.

At level 1, the equation is:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij}) + \varepsilon_{ij} \tag{2.8}$$

where,

i is level 1 data (e.g., block group level data) and *j* is level 2 data (e.g., neighborhood level data).

Y_{ij} = The dependent variable at level 1 for the jth group
X_{ij} =The independent variable or predictor at level 1 for the jth group.
β_{0j} = The intercept for the dependent variable in group j.
β_{1j} = The slope or the relationship between the independent variable and the dependent variables within group j.
ε_{ij} = Random error, which is assumed to be independently and normally distributed with a constant variance of σ^2 [$\varepsilon_{ij} \sim N(0, \sigma^2)$]

At level 2, the equations are:

$$\begin{aligned} \beta_{0j} &= \gamma_{00} + \gamma_{01} z_j + u_{0j} \\ \beta_{1j} &= \gamma_{10} + u_{1j} \end{aligned} \tag{2.9}$$

γ_{00} = The grand mean of the dependent variable across all groups when predictors are zero.
γ_{01} = The overall regression coefficient for the relationship between the level 2 predictor and the dependent variable
γ_{10} = The overall regression coefficient for the relationship between level 1 predictor and the dependent variable
z_j = The predictor at level 2
u_{0j} = The random error for the deviation of the intercept of level 2 from the overall intercept
u_{1j} = The deviation of the group slopes from the overall slope.

Combining these two levels, the final model would look like the following:

$$Y_{ij} = \gamma_{00} + \gamma_{01} z_j + \gamma_{10} * x_{ij} + u_{0j} + u_{1j} * x_{ij} + \varepsilon_{ij} \tag{2.10}$$

2.6.1.1 Model Selection

Assessment of the relative contribution of level-1 and level-2 predictors in the model, can be based on standard maximum likelihood estimation method. A likelihood ratio test can be used to compare a simpler model nested within more complex models. A chi-square test statistic with a p-value less than a designated critical value indicates a significant predictor that would be retained in the model. Other predictors can be retained in the model based on non-statistical criteria, i.e., predictors of a priori importance or important potential confounders.

Other statistics quantify how much of the variation in the outcome is explained by the model. One such statistic is the squared multiple correlation coefficient, R^2, which quantifies the proportion of the variance explained by the predictor variables (Snijders & Bosker, 1999). R_1^2 (level-1) and R_2^2 (level-2) are calculated separately.

$$R_1^2 = 1 - \frac{\mathrm{var}(Y_{ij} - \sum_h \gamma_h X_{hij})}{\mathrm{var}(Y_{ij})} \tag{2.11}$$

R_1^2 is defined as the proportional reduction in the mean squared prediction error in the prediction of the level-1 outcome, by adding in the predictor variables in the model (Snijders & Bosker, 1999). In equation 2.11 the denominator is the mean squared prediction error for the outcome at level-1 with no explanatory variables included in the model, and the numerator is the mean squared prediction error for the outcome at the level-1 with explanatory variables.

$$R_2^2 = 1 - \frac{\mathrm{var}(\overline{Y}_{.j} - \sum_h \gamma_h \overline{X}_{h.j})}{\mathrm{var}(\overline{Y}_{.j})} \tag{2.12}$$

R_2^2 is defined as the proportional reduction in the mean squared prediction error in the prediction of mean of the outcome at level-2. In equation 2.12, the denominator is the mean squared error for mean outcome at level 2 with no explanatory variables, and the numerator is the mean squared prediction error for the mean outcome at level 2 with explanatory variables.

Finally, Akaike's information criterion (AIC) also can be used to help select a "best" model. The criterion is composed of two terms, one that rewards models with small sum of squares error terms and one that penalizes models with a large number of estimated parameters (Johnson & Wichern, 2007). In comparing the fit of alternative models (that do not have to be nested), models with relatively smaller AIC values are preferred.

2.6.1.2 Multilevel Studies Examining Area-Level Context and Health Outcomes

Multilevel analysis has been used to examine area-level factors and health outcomes. Pickett and Pearl (2001) reviewed 25 multilevel studies that examined associations between area-level context and various health outcomes, including all-cause mortality, infant and child health, chronic disease, and mental health. Of these studies, 23 identified statistically significant associations between neighborhood factors and health, after adjusting for individual-level factors, demonstrating that area-level factors are associated with these health outcomes. Although studies have employed a multilevel approach to adjust for the nesting of individuals within geographical areas, there are inconsistencies in the definition of the area-level used (e.g., census block groups, census tracts, zip codes) and the SEP measures (e.g., family income, education, occupation). These inconsistencies make it difficult to ascertain the appropriate area-level at which to implement effective health policies, what aspect(s) of SEP may affect health, and the mechanisms by which SEP could contribute to health disparities.

2.7 MULTILEVEL FACTOR ANALYSIS

A multilevel approach also can be applied to factor analysis, also known as multilevel factor analysis (MFA). The approach is similar to one-level factor analysis (described in section 2.2.1.3), but factors are created for both level-1 and level-2. Reise and colleagues (2005) outline steps to conduct multilevel factor analysis: 1) conduct FA of the correlation matrix, or the total correlation matrix, to explore the data's factor structure when ignoring the multilevel nature of the data, 2) examine the ICC to estimate the extent of clustering of each SEP measure and assess whether to conduct MFA, and 3) separate the total correlation matrix into the within correlation matrix (the correlation matrix of level-1 data), and the between correlation matrix (the correlation matrix of level-2 data).

Equations for the covariance matrix of total (S_{Total}), within (S_{within}), and between neighborhoods ($S_{Between}$) are included below, and the corresponding correlation matrix is derived from each covariance matrix. The correlation is calculated by dividing the covariance by the square root of the product of variances from each matrix. For example, for a total correlation matrix, a covariance from a total covariance matrix is divided by the square root of the product of the variances. The correlation matrices are square and symmetric with each row representing a different variable, and each column representing the variables in the same order that they are presented across the rows. Where the row and columns meet is the correlation between two variables. For example, if the percentage of unemployment is represented by row 2 and percentage with low income is represented by column 3, the cell where unemployment and low income intersect contains the correlation between the two variables. Along the diagonal of the matrix are the correlations between the same variables, which are all ones.

$$S_{Total} = \frac{\sum_{i=1}^{I}\sum_{j=1}^{J_i}\left(x_{ij} - \overline{x}\right)\left(x_{ij} - \overline{x}\right)'}{\left(N - 1\right)} \tag{2.13}$$

$$S_{Within} = \frac{\sum_{i=1}^{I}\sum_{j=1}^{J_i}\left(x_{ij} - \overline{x}_i\right)\left(x_{ij} - \overline{x}_i\right)'}{\left(N - 1\right)} \tag{2.14}$$

$$S_{Between} = \frac{\sum_{i=1}^{I} J_i\left(\overline{x}_i - \overline{x}\right)\left(\overline{x}_i - \overline{x}\right)'}{(I - 1)} \tag{2.15}$$

where (using block groups as level 1 and neighborhoods as level 2 as an example),

I is the number of neighborhoods

J is the number of block groups in the neighborhood

N is the total number of block groups

x_{ij} is the vector of SEP variables of block group i in neighborhood j

$\overline{x}$ is the grand mean, and

$\overline{x}_i$ is the neighborhood mean

Although studies on neighborhoods and health have applied a multilevel approach in understanding health outcomes and have used FA to create composite indicators of SEP, studies have not used MFA to create composite indicators of SEP. Given the complexities in understanding the mechanisms by which SEP at various area levels contributes to health outcomes, MFA may be an approach to help understand these mechanisms.

2.8 LOW BIRTH WEIGHT

LBW is an important public health problem. LBW can contribute to infant mortality and children's health and development. Nationally, 8.3% of all live births were LBW, with a higher proportion of Black births having LBW (13.6%), compared to White births (7.2%) (Martin, et al., 2009). The Allegheny County Health Department (2006) report higher percentages compared to national data: 11.4% of total live births in Pittsburgh, Pennsylvania in 2003 were LBW. More so, the difference in percentage of LBW infants between Blacks and Whites was wide: 8.4% of LBW infants were born to White mothers, whereas 16.0% of LBW infants were born to Black mothers in 2003. Although several studies have linked individual-level risk factors, such as, maternal age, marital status, and maternal smoking, to increased risk of having a LBW infant, a few recent studies have examined area-level factors that may be contributing to LBW (Buka, Brennan, Rich-Edwards, Raudenbush, & Earls, 2003; Grady, 2006; Messer, Laraia, et al., 2006; Morenoff, 2003; Pearl, Braveman, & Abrams, 2001; Pickett, Collins, Masi, & Wilkinson, 2005; Rauh, Andrews, & Garfinkel, 2001; Rich-Edwards, Buka, Brennan, & Earls, 2003). Table 2-1 summarizes the area level of analysis and SEP measures used in these 8 studies. Similar to the general neighborhood and health literature, these studies varied in the area level at which the analysis was conducted and the SEP indicators examined. First, studies used different area levels: one study used census block groups, three used census tracts, and four used neighborhoods which were defined as comprising more than one census. Second, studies used various SEP measures. Two studies used composite indicators of SEP. The most commonly used SEP measure was percent poverty (seven studies used this measure), followed by percent unemployment (three studies used this measure), followed by percent with a high school education and percent African American (two used studies used these measures). Overall, these studies reported significant associations between area-level factors and LBW, more specifically that areas with lower SEP were associated with higher risk of LBW infants.

Table 2-1 Studies Examining SEP and Birth Weight

Author	Area Level of Analysis	Local Area-Level SEP measures	Main Finding
(Buka, et al., 2003)	Neighborhood clusters comprised of 1 or more census tracts	*Economic Disadvantage* proportion residents below poverty proportion receiving public assistance proportion unemployed	For African-American women only, mean birth weight decreased significantly as neighborhood economic disadvantage increased
(Grady, 2006)	Census tracts	% families below poverty	Higher neighborhood poverty was significantly associated with higher LBW after controlling for race and residential segregation
(Messer, Laraia, et al., 2006)	Census tracts	*Neighborhood Deprivation* % males in professional and management occupations % crowded housing % households in poverty % female-headed households % households on public assistance % households earning >$30,000/year % earning less than a high school education % unemployed	Increasing percentages of LBW associated with increasing deprivation
(Morenoff, 2003)	Neighborhood clusters comprised of 1 or more census tracts	% African American % Mexican origin % poor families % residents who lived at same location for at least 5 years % of owned homes	African-American, poor families, and residential stability were significantly associated with LBW, except when after individual factors were added to the model
(Pearl, et al., 2001)	Census block groups	% family income below poverty level % males 16 years or older who were unemployed % individuals over age 25 with less than a high school education	High levels of poverty or unemployment can result in LBW infants for Black and Asian women
(Pickett, et al., 2005)	Census tracts	Positive income incongruity* % African American	For women living in predominantly black census tracts, positive income incongruity was associated with lower risk of LBW. For women living in mixed areas, positive income incongruity was not associated with LBW.
(Rauh, et al., 2001)	Health areas composed of 4-6 census tracts	% of residents below poverty level	African American women in poorer communities were at higher risk for giving birth to infants with moderately LBW
(Rich-Edwards, et al., 2003)	Neighborhood clusters comprised of 1 or more census tracts	% households below poverty level	Neighborhood poverty was a significant moderator of age in predicting LBW. LBW was higher in communities with higher percentage of households in poverty and with older women.

*positive income incongruity measures “whether or not African-American women were living in a wealthier census tract than might be expected”

3.0 METHODS

3.1 DATA FOR PITTSBURGH, PENNSYLVANIA

3.1.1 Units of Analysis

Three levels of geographic areas are analyzed: census tracts and census block groups, as defined in the U.S. Census, and neighborhoods, which are combinations of census tracts defined by the City of Pittsburgh. A total of 90 neighborhoods exist in Pittsburgh, Pennsylvania (see Appendix A for map of Pittsburgh and Appendix B for the link between census tracts and Pittsburgh neighborhoods) and are used by the City of Planning Department for planning purposes. These neighborhoods are comprised of 140 census tracts, which are then composed of 343 block groups (see Figure 3-1). For example, four of the 90 neighborhoods in Pittsburgh are West Oakland, North Oakland, Central Oakland, and South Oakland. One to two census tracts and one to four census block groups make up these neighborhoods. For this paper, levels in the analysis are defined as in the following: three-level analysis encompasses block groups at level 1, census tracts at level 2, and neighborhoods at level 3. Two-level analysis encompasses block groups at level 1, and neighborhoods at level 2.

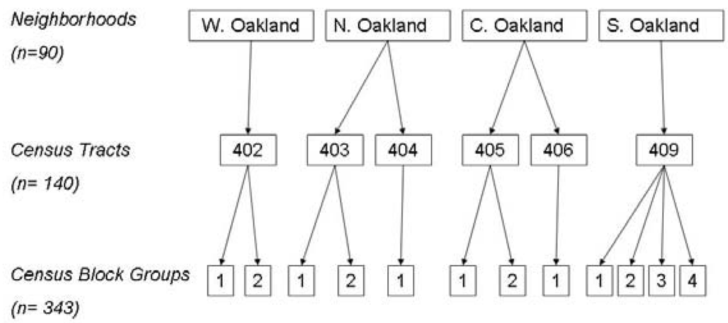

Figure 3-1 Example of Area Levels in Pittsburgh, Pennsylvania

3.1.2 Socioeconomic Position

To obtain SEP data on Pittsburgh, Pennsylvania, U.S. Census data at the census block group level were extracted for Allegheny County (in which Pittsburgh is located) from the U.S. Census 2000 SF3 file. These SEP measures were based on those included in the Neighborhood Deprivation Index, Concentrated Disadvantage, and Townsend Material Deprivation Index collectively (see Table 3-1 for additional description of these measures). Measures are percentages of individuals or households with the following characteristics: are unemployed, do not own a car, are living in crowded households, are renters, are professionals, are in poverty, are in female-headed households, receive public assistance, earn low income, have a low education, are Black, or are under 18 years of age. Raw data at the block group level were summed to create corresponding measures at the census tract and neighborhood levels (i.e., census sampling weights were ignored). The linkage between census block groups and census tracts were provided in the U.S. Census data. The linkage between census tracts and neighborhoods is defined by the city (City of Pittsburgh Department of City Planning, 2000) (see also Appendix B). All analyses are limited to data for Pittsburgh, Pennsylvania. The calculation of these variables is described in Appendix C and Appendix D.

Table 3-1 Description of Variables Included in the Townsend Material Deprivation Index, Concentrated Disadvantage, and Neighborhood Deprivation Index

Variable	Description
Unemployment	% unemployed individuals
Lack of car ownership	% housing with no car
Crowded households	% crowded housing
Renters	% renters
Professionals	% of males in management and professional occupations
Poverty	% of households in poverty
Female-headed households	% of female headed households with dependents
Public Assistance	% of households on public assistance
Low income	% of households earning less than $30,000/year
Low education	% with less than a high school education
Black Proportion	% of residents who are Black
Under 18 years of age	% of residents who are under 18 years of age

3.1.3 LBW

LBW proportion was defined as the number of LBW infants divided by the total number of singleton births. Geocoded birth data were obtained from Allegheny County Birth Registry Data for 2003 to 2006. LBW is defined as weight less than 2500g. Data points were excluded if birthweight was missing or there were multiple births. Individual data were aggregated to census block group level. Because no birth data were available for Chateau neighborhood (which includes one census block and one census tract) and for one census tract and block group in the Marshall-Shadeland neighborhood, these areas were excluded from the final analysis. The final analysis included data on 341 block groups, 139 census tracts, and 89 neighborhoods.

3.2 STATISTICAL METHODS

We follow the data analysis strategy described by Krieger and colleagues ((2003), i.e., data exploration, model building, and confirmatory analysis. The data exploration steps provide an understanding of the SEP data, including comparisons of the data distribution across area levels using box plots, bivariate correlation analysis, Brown and Forsythe's test for homogeneity of variances, and spatial autocorrelation analysis. Given the nested structure of the dataset, multivariate correlations are more formally evaluated by conducting a MFA, as outlined by Reise and colleagues (2005). The factors extracted through MFA are used to construct factor scores that represent the SEP measures. In model building, we examine how much the factor scores improve the fit of the model. Finally, regression analysis examines how factor scores at the block group and neighborhood levels predict the LBW at the block group level. This data analysis strategy includes five steps: comparing SEP variables across the area levels, examining the variance contribution of each SEP variables at each level, assessing the correlation of SEP variables with each other, creating a composite indicator of SEP, and assessing model fit and the predictive power of these factors to estimate LBW. Model diagnostics were also conducted to check model assumptions, possible outliers, and the data structure. The codes and annotated output are included in Appendix E and F.

3.2.1 Comparing SEP Measures at Each Area Level

In the data exploration step, box plots of each of the SEP measures were compared at each level of aggregation (i.e., from block group to census tract to the neighborhood level). In addition, maps of SEP measures were created for census block groups, census tracts, and neighborhoods of Pittsburgh, Pennsylvania. Using ArcGIS software, Pittsburgh shapefiles obtained from the U.S. Census that indicated geographic boundaries of Pittsburgh and corresponding block groups and census tracts were merged with birth and SEP datasets. Maps depicted quintiles of each SEP measure at the block group, census tract, and neighborhood level, with lighter shades of color representing lower quintiles and darker shades representing higher quintiles. Color scheme was based on Color Brewer (Brewer, 2008).

3.2.2 Brown and Forsythe's Test of Homogeneity

Differences in neighborhood variances were also examined and tested using the Brown and Forsythe's Test for homogeneity of variances. An alternative to Levene's Test, Brown and Forsythe's Test uses deviation from the median, instead of the mean, given the skewed nature of the data (StataCorp LP, 2007). A $p<0.05$ was used to indicate that the variances among neighborhoods were significantly different. No adjustments were made for multiple comparisons. To examine differences in the variances among neighborhoods, the neighborhood median of the each SEP measure was plotted against the corresponding neighborhood variance. These graphs of the medians show the differences in SEP measures between neighborhoods, and the graphs of the variances depict how varied SEP values are within neighborhoods.

3.2.3 Spatial Autocorrelation

GeoDa 0.9.5-I was used to calculate Moran's I statistic for block groups, census tracts, and neighborhoods. Queen contiguity was used as the weight matrix, and inferences were based on Monte Carlo simulation with 999 permutations and $p<0.05$ as indicating statistical significance (Anselin, 2004).

3.2.4 Assessing the Variance Contribution of SEP Across Levels

The variances of SEP measures at each of the area-levels were examined using MlWin 2.10 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). First, variances of each SEP measure were examined in a three-level model with block groups, census tracts, and neighborhoods. Preliminary results based on a three-level model indicated that census tract-level measures did not contribute significantly to the total variance, so subsequent analyses included only block group and neighborhood-level data. Variances were standardized into z-test statistics, with a p-value <0.05 considered to be statistically significant. An ICC also was calculated for each measure at the block group and neighborhood levels to examine their relative contribution to the total variance.

3.2.5 Assessing the Correlations of SEP Measures with Each Other

To examine the bivariate associations between measures, correlation matrices of the total correlation matrix, the within neighborhoods (specifically, between block groups within neighborhoods) correlation matrix, and the between neighborhoods correlation matrix were created using EQS v 6.1 (Bentler, 2006). Correlations with values ≥0.30 were interpreted. The number of correlations with values ≥0.30 were compared across the three matrices. To examine more closely the differences in the bivariate correlations between and within neighborhoods, East Liberty, Garfield, Shadyside, and Squirrel Hill North were chosen because of their relative diversity. In addition, three scatterplots were created using data from these neighborhoods. One graph, demonstrating strong correlations within and between neighborhoods plotted percent households with no car against percent with income less than $30,000. Another graph, demonstrating weak correlations within and between neighborhoods plotted percent renters against percent with a high school education. The third graph, demonstrating weak correlation within neighborhoods and strong correlation between neighborhoods plotted percent with less than a high school education against percent on public assistance.

3.2.6 Multilevel Factor Analysis

FA was conducted on each of the correlation matrices created in section 3.2.5 using STATA 9.2 (StataCorp LP, 2007). Factor analysis of the total correlation matrix resulted in factors representing factors at the block group level only. Factor analysis of the within correlation matrix represented factors at the block group level, taking into account the neighborhoods that block groups are a part of. Factor analysis of the between correlation matrix represented factors at the neighborhood level, taking into account block group level data. The maximum likelihood extraction method was used. Scree plots helped ascertain the number of factors to extract. Factor analysis was run on the number of factors suggested by the scree plot and also on one less and one more than the suggested number of factors. Before finalizing the number of factors to be extracted, resulting factors were evaluated to determine their interpretability. For example, if many measures loaded onto more than one factor (also known as a complex item), the factor was considered not interpretable. Finally, an oblique rotation, specifically direct oblimin, was applied to allow for correlations among the extracted factors.

Variables with factor loadings ≥0.30 were interpreted and used to calculate factor scores, or linear combinations of predictors. To calculate factor scores, variables with negative factor loadings were reverse coded. For within neighborhood factor scores, raw values of the SEP variables whose factor loadings were ≥0.30 were added together then divided by the number of variables with factor loadings ≥0.30. For between neighborhood factor scores, computations were similar to within neighborhood factor score computations, but with an additional step: the mean of SEP variables was calculated for each neighborhood to create between neighborhood factor scores.

3.2.7 Examining the Association between SEP and LBW

To assess whether within neighborhoods and between neighborhoods factor scores predict the proportion of infants born with LBW at the block group level, multilevel linear regression models were fit using maximum likelihood estimation. Likelihood ratio tests were employed to compare simpler models with more complex ones, with p-values <0.05 indicating significant predictors. First, the null model (intercept only model, model 1) was run, followed by a model with level-1 effects only (model 2) and another model with level-2 effects only (model 3). These models were then compared to the null model to assess if these main effects contributed significantly to the fit of the model. If the effects at each level were found to be significant, then the next model (model 4) tested the significance of including both levels of effects in the model. This model was then compared to model 2 and model 3 separately to assess whether adding effects on both levels improved the fit of the model. If model 4 fit significantly improved these other models, the cross-level interaction term was added. This interaction term allows level-1 effect to be moderated by level-2 effect. Cross-level interactions are created by multiplying level-1 and level-2 factors together. R^2 for level-1 and level-2 were calculated. AIC also was used to compare the fit of the models. Table 3-2 shows the models that were considered.

Table 3-2 Steps for Exploratory Model Building

Model #	Models
1	Null model (intercept-only)
2	Model with level-1 effects
3	Model with level-2 effects
4	Model with level-1 and level-2 effects
5	Model with level-1 effects, level-2 effects, and interaction effects between level 1 and level 2

To understand the components of the model, the linear mixed model with effects on level-1 are presented, followed by the effects on level-2. This section concludes with a presentation of the full model (model 5) that incorporates both main effects on level-1 and level-2 and interaction terms of factor scores between the two levels. Level-1 model is written as follows:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(X_{1ij} - \overline{X}_{2j}) + \beta_{2j}(X_{2ij} - \overline{X}_{2j}) + \varepsilon_{ij} \tag{3.1}$$

where Y_{ij} is the proportion of infants with a LBW for block group *i* in neighborhood *j*; β_{0j} is the intercept; β_{1j} and β_{2j} are the slopes for the relationship in neighborhood *j* between the outcome and two block group factor scores. More specifically, β_{1j} is the association between the first within neighborhood factor score and LBW for block groups within a neighborhood; β_{2j} is the association between the second within neighborhood factor score and LBW for block groups within a neighborhood. X_{1ij} and X_{2ij} are the values of the block group covariates or within neighborhood factor scores. The block-group specific error term ε_{ij} is assumed to be independently, normally distributed with a constant variance σ^2.

Within neighborhood predictors were group mean centered around the neighborhood mean that the block group was a part of. Within neighborhood factor scores were centered by taking the factor score of a block group within a neighborhood and subtracting from that value the mean neighborhood within factor score that the block group is a part of. Because the predictors are centered, Y_{ij} is the LBW proportion for block groups with an average deprivation score.

The neighborhood level equations are written as follows:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} * (Z_j - \overline{Z}) + \mu_{oj} \tag{3.2}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} * (Z_j - \overline{Z}) + \mu_{1j} \tag{3.3}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{22} * (Z_j - \overline{Z}) + \mu_{2j} \tag{3.4}$$

where, γ_{00} is the average proportion LBW for neighborhoods with an average deprivation score; γ_{01} is the regression coefficient of overall neighborhood deprivation predicting LBW; γ_{10} and γ_{20} are the average regression coefficients of within factor scores with the proportion of LBW at the mean overall neighborhood deprivation across neighborhoods; γ_{11} and γ_{22} quantify the extent to which neighborhood deprivation moderates the association between block group level factor scores and LBW; μ_{oj} is the random deviation of a neighborhood's intercept from the overall intercept; μ_{1j} and μ_{2j} is the random deviation of neighborhood-specific slope from the overall slope. The variances of these random effects are τ_{00} , τ_{11}, and τ_{22}, respectively. The covariance matrix of these random effects had an independent structure where covariances are assumed to be zero. Between neighborhood factor scores were grand mean centered by subtracting the mean between factor score for all neighborhoods from the between factor scores of each block group.

The full model is

$$\begin{aligned} Y_{ij} &= \gamma_{00} + \gamma_{01} * (Z_j - \overline{Z}) + \gamma_{10} * \left(X_{1ij} - \overline{X}_{1j}\right) + \gamma_{20} * \left(X_{2ij} - \overline{X}_{2j}\right) + \gamma_{11} * \left(Z_j - \overline{Z}\right) * \left(X_{1ij} - \overline{X}_{1j}\right) + \\ &\gamma_{22} * \left(Z_j - \overline{Z}\right) * \left(X_{2ig} - \overline{X}_{2j}\right) + \mu_{oj} + \mu_{1j} * X_{1ij} + \mu_{2j} * X_{2j} + \varepsilon_{ij} \end{aligned} \tag{3.5}$$

3.2.8 Diagnostics

To address possible convergence problems, several steps were conducted to check the structure of the data, influential points, and the effect of indicating a factor as a random effect. First, to examine the data structure, neighborhoods comprised of 1 block group were identified, and their raw and centered values for neighborhood and block group factor scores were examined. Then, we ran multilevel regression model that included only those neighborhoods comprised of more than 1 block group.

Second, the residuals of the model were checked. Assumptions of normality were evaluated using histogram, boxplot, a kernel density plot, and a quantile of the residuals versus the normality quantiles (Q-Q plot), and assumptions of homoscedasticity were evaluated by plotting standardized model residuals 1) versus predicted LBW and 2) versus centered predictors. Standardized residuals that were in comparison higher than other block groups and >|3.3| were considered outliers (Tabachnick & Fidell, 2007). We ran a multilevel regression model that excluded outliers from the analysis.

Sensitivity analysis was then conducted by comparing regression results from the original model to a) model that included only neighborhoods comprised of >1 block group; b) model that excluded outliers; c) model that indicated factor scores were a fixed effect, not a random effect; d) model with only main effects. Coefficients and standard errors of fixed effect parameters, and estimates and standard errors of random effects parameters were compared across the five models to examine whether there were large differences in these estimates. The predicted LBW proportion (taking into account both fixed and random effects) for model 6 was plotted against predicted LBW for each of the four comparison models.

3.2.9 Model Interpretation

To better understand the association between the predictors and the predicted LBW proportion, graphs plotting a) predictors versus predicted LBW proportion and b) observed LBW proportion versus predicted LBW proportion were created for all of Pittsburgh and/or for selected neighborhood (East Liberty, Garfield, Shadyside, and Squirrel Hill North). Selected neighborhoods were also used as examples to understand how each predictor was associated with increases or decreases in the predicted LBW proportion. Finally, to examine further the interaction term, a graph was created that plotted the predicted LBW proportion versus the CD of block groups in neighborhoods with a) a high level of OND_j (1 standard deviation (SD) above the mean OND_j), b) the mean level of OND_j, and c) a low level of OND_j (1 SD below the mean).

4.0 RESULTS

4.1 SEP MEASURES ACROSS AREA LEVELS

4.1.1 Boxplots and Maps

The distributions of each of the 12 measures vary across the different levels (343 block groups, 139 census tracts, and 89 neighborhoods). Figure 4-1 depicts boxplots of each measure, and includes summary data on the mean, median, and variance. For example, percent unemployment (see first row and first column in Figure 4-1) data were shown at the census block group, census tract, and neighborhood level. At the census block group level, the median was 6.77, mean was 9.00, and the variance was 77.86. At the census tract level, the median was slightly higher at 7.23, mean is at 10.14, and variance is at 88.76, At the neighborhood level, the median 7.79, the mean was 10.84, and the variance was 69.48. Box-plots are generally similar across the different area levels for each measure, especially between the 25th and 75th percentile, except possibly percent Black. However, within each of these measures at each level, there is slight positive skewness in the data with the mean being greater than the median. For example, at the census block group level, the mean percent unemployment is 6.8, but the median percent is slightly higher at 9.0. The slight positive skewness in the distribution is apparent in the other SEP measures but is most pronounced in the distribution of the percent Black measure. At the census block group level, the median percent Black is 10.4. In contrast, the mean percent is 27.3. Similar differences are observed at the census tract and at the neighborhood level for this measure.

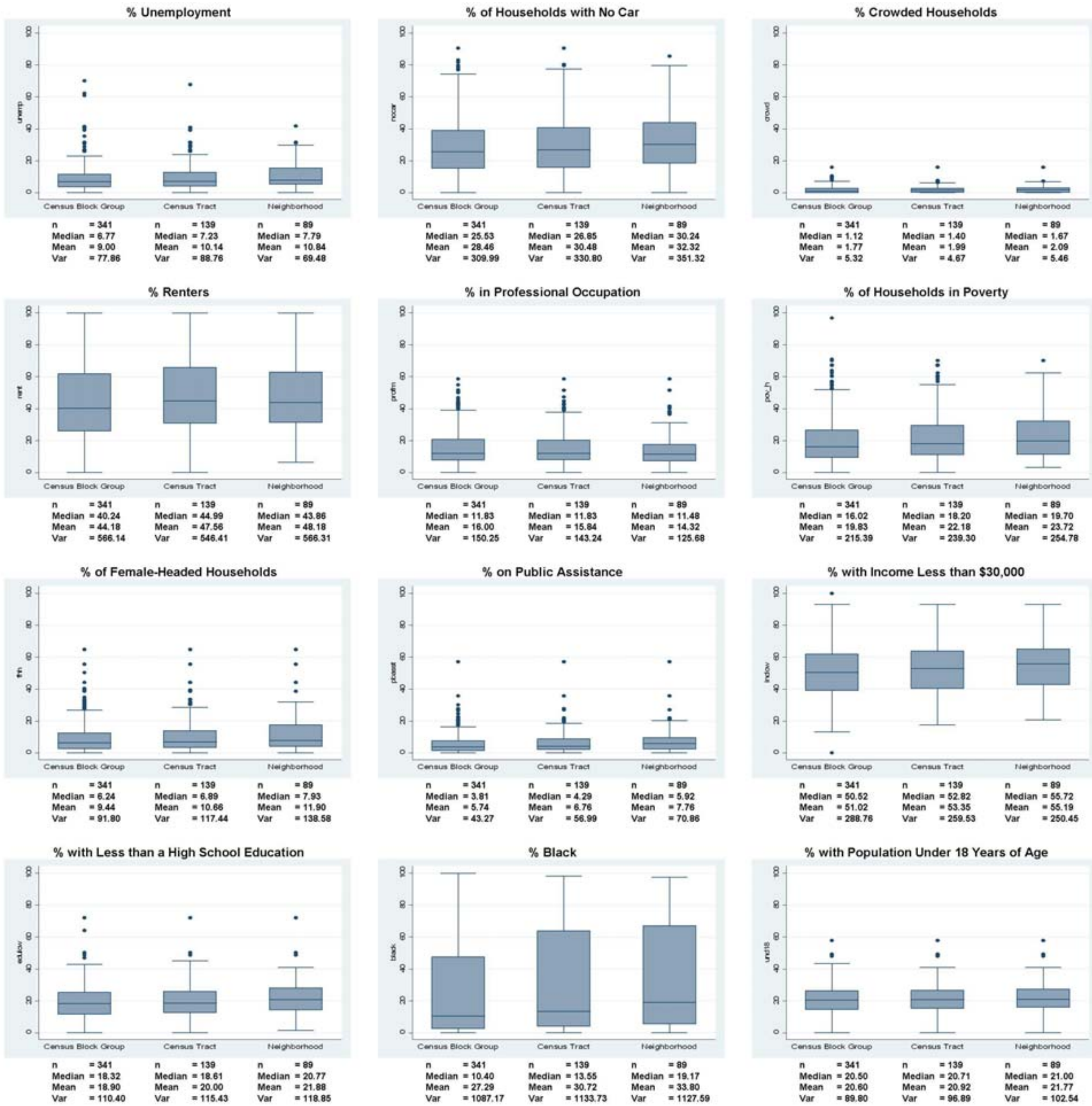

Figure 4-1 Boxplots and Summary Measures of SEP Variables by Area Level

Another way to depict the effects of aggregation is to examine differences in maps of socioeconomic measures at each of the three levels. Appendix G includes maps of each of the 12 socioeconomic measures at each area level (Figures G-1 to G-12). The maps show quintiles of each of the measures, with the lightest shade (first quintile) representing the lowest (or least deprived) quintile and the darkest shade (fifth quintile) representing the highest (or most deprived) quintile. One way to examine the effects of aggregation is to follow a neighborhood and examine how the quintiles of the SEP measure changes from the block group, census tract, to neighborhood levels. Because of their relative diversity, East Liberty and Squirrel Hill North are chosen to illustrate how each SEP measure changes at each of the levels.

The neighborhood of East Liberty (number 28 on the map), located in the East End of Pittsburgh, is composed of two census tracts (1113 and 1115), each of which include four census block groups. Table 4-1 summarizes the quintiles of each measure at each level and shows the number of block groups, census tracts, and neighborhoods in each quintile for each SEP measure. Diversity occurs at the block group level, specifically for percent crowded households, percent in professional occupations, percent of households in poverty, percent with less than a high school education, and percent under 18 years of age. For example, the percent of crowded households in East Liberty block groups ranges from the lowest quintile to the highest quintile. One block group is in the first quintile, two block groups in the second quintile, one block group in the third quintile, three block groups in the fourth quintile, and one block group in the fifth quintile. At the census tract level, one census tract is in the fourth quintile while the other is in the fifth. Aggregated to the neighborhood level, percentage of crowded households falls in the fourth quintile. Most of the neighborhood level SEP measures for East Liberty fall at the fourth or fifth quintiles, indicating that this neighborhood may be more socioeconomically deprived than many other Pittsburgh neighborhoods.

Table 4-1 Socioeconomic Position Measures at Each Level in East Liberty Neighborhood, by Quintiles

	Quintiles				
	1 (Lowest)	***2***	***3***	***4***	***5 (Highest)***
% Unemployment					
Block group			2	3	3
Census tract				2	
Neighborhood				1	
% of Households with No Car					
Block group				3	5
Census tract				1	1
Neighborhood					1
% of Crowded Households					
Block group	1	2	1	3	1
Census tract				1	1
Neighborhood				1	
% Renters					
Block group				1	7
Census tract					2
Neighborhood					1
% in Professional Occupations					
Block group	2	2	1	3	
Census tract			2		
Neighborhood			1		
% of Households in Poverty					
Block group		1	1	4	2
Census tract			1		1
Neighborhood				1	
% of Female-Headed Households					
Block group			3		5
Census tract				2	
Neighborhood				1	
% on Public Assistance					
Block group			3	1	4
Census tract				1	1
Neighborhood				1	
% with Income < $30K					
Block group			3		5
Census tract			1		1
Neighborhood				1	
% with < HS Education					
Block group	2		2	1	3
Census tract			1	1	
Neighborhood			1		
% Black					
Block group				3	5
Census tract				1	1
Neighborhood				1	
% Under 18 years of Age					
Block group	2	1		1	4
Census tract			1	1	
Neighborhood			1		

Squirrel Hill North also is located on the East End of Pittsburgh and is composed of three census tracts (1401, 1402, and 1403). These three census tracts are comprised of 3, 2, and 4 census block groups respectively. In contrast to East Liberty, Squirrel Hill North appears to be experiencing lower socioeconomic deprivation. Table 4-2 summarizes the quintiles of each measure at each level for Squirrel Hill North. Squirrel Hill North demonstrates diversity in the SEP measures at the block group level, especially for percent crowded households, percent renters, and percent of households in poverty. However, unlike East Liberty, as data are aggregated to the neighborhood level, most of the SEP measures fall in the first or second quintile, indicating that Squirrel Hill North overall is less deprived than East Liberty.

Table 4-2 Socioeconomic Position Measures at Each Level in Squirrel Hill North Neighborhood, by Quintiles

	Quintiles				
	1 (Lowest)	*2*	*3*	*4*	*5 (Highest)*
% Unemployment					
Block group	6		2		1
Census tract	1		1		1
Neighborhood					1
% of Households with No Car					
Block group	7	2			
Census tract	3				
Neighborhood	1				
% of Crowded Households					
Block group	4	1	2	2	
Census tract		1	1		1
Neighborhood			1		
% Renters					
Block group	2	2	2	3	
Census tract	1		1	1	
Neighborhood			1		
% in Professional Occupations					
Block group					9
Census tract					3
Neighborhood					1
% of Households in Poverty					
Block group	4	1	2	2	
Census tract	1		2		
Neighborhood		1			
% of Female-Headed Households					
Block group	5	4			
Census tract	3				
Neighborhood	1				
% on Public Assistance					
Block group	7	1	1		
Census tract	3				
Neighborhood	1				
% with Income < $30K					
Block group	7	2			
Census tract	2	1			
Neighborhood	1				
% with < HS Education					
Block group	9				
Census tract	3				
Neighborhood	1				
% Black					
Block group	2	5	2		
Census tract	2	1			
Neighborhood	1				
% Under 18 years of Age					
Block group	2	5	1		1
Census tract	2		1		
Neighborhood	1				

4.1.2 Brown and Forsythe's Test of Homogeneity

There were 64 Pittsburgh neighborhoods comprised of more than one block group (a total of 316 block groups in these neighborhoods). Brown and Forsythe's F statistic was calculated separately for each SEP measure to quantify differences among neighborhood SEP variances. Table 4-3 shows that most of the SEP measures differed significantly among the neighborhoods. For example, based on the Brown and Forsythe's F test statistic, the variance of percent of households with no car was statistically significant among neighborhoods. The table also shows the neighborhoods that represent the minimum and maximum variances for each SEP. For percent of households with no car, for example, Manchester had a variance <0.001 (with a median percentage of 39.95), suggesting that block groups were very similar in Manchester. In contrast, Fineview had a variance of 747.08, suggesting that block groups within Fineview were heterogeneous. Table 4-4 includes the 25th, the 50th and 75th percentiles for the measures at the block group level within neighborhoods. Dramatic differences within neighborhood were seen. For example, at the 25th percentile, the variance for percent black was at 8.91, but at the 75th percentile the variance was much higher at 209.76. An example neighborhood with a variance within the 25th percentile was Central Lawrenceville, whose variance for percent black was 8.87. Percent black for block groups within Central Lawrenceville ranged from 0.98% to 9.02%. On the other hand, an example neighborhood around the 75th percentile was Morningside with a variance for percent black of 235.48. The percent Black in block groups for this neighborhood ranged from 0 to 31.72%. The median for percent of households with no car was 55.1% which was higher than the median percentage reported for Manchester and Fineview. Although Manchester and Fineview had relatively lower percentage for households with no car, the diversity of the block groups within these two neighborhoods differed. In Figures 4-2 to 4-13, each graph shows the median plotted against the variance for a specific SEP measure. For example, Figure 4-2 shows the median versus the variance for percent unemployment. The graph shows a wide range in the median and variances across the neighborhoods. Several neighborhoods are outliers. Terrace Village had a high median percent and a relatively large variance while Golden Triangle and North Oakland had moderate medians but large variances. Squirrel Hill North had a low median but moderately high variance. Terrace Village was an interesting neighborhood in that for several SEP measures (percent with no car, percent renters, percent poverty, percent female-headed households, percent low income, percent low education, percent Black, and percent under 18 years of age) the median was one of the highest, yet the variance was relatively narrow, suggesting this neighborhood may be experiencing a clustering of high deprivation.

Table 4-3 Test of Homogeneity of Variance Results and Neighborhoods with Minimum and Maximum Variance

Variable	Overall Median of Neighborhoods	Overall Variance of Neighborhoods	Brown and Forsythe's Test Statistic, df (88,252)	p-value	Minimum Variance			Maximum Variance		
					Neighborhood	***Median***	***Variance***	***Neighborhood***	***Median***	***Variance***
% Unemployment	7.70	51.31	0.92	0.67	Westwood	3.91	0.09	North Oakland	10.38	821.04
% of Households with No Car	29.42	355.39	1.77	<0.001	Manchester	39.88	0.00	Fineview	45.74	747.08
% of Crowded Households	0.94	6.07	1.31	0.05	Fineview	0.00	0.00	East Allegheny	5.72	25.15
% Renters	41.74	591.80	1.55	<0.01	Lower Lawrenceville	61.10	0.76	North Oakland	57.15	2293.61
% in Professional Occupation	10.46	130.10	1.33	<0.05	Middle Hill	9.88	1.54	Golden Triangle	30.67	277.52
% of Households in Poverty	19.10	260.42	1.39	<0.05	Morningside	6.45	3.92	Bluff	71.03	1327.94
% of Female-Headed Households	7.93	137.68	1.62	<0.01	North Oakland	0	0.45	Spring Hill-City View	12.40	532.82
% on Public Assistance	5.00	70.83	1.92	<0.001	Polish Hill	6.82	0.07	West Oakland	14.83	273.38
% with Incomes Less than $30,000	53.47	265.17	1.24	0.10	Friendship	63.83	0.26	Fineview	61.90	1278.40
% with Less than a High School Education	20.80	115.62	1.47	<0.05	Westwood	14.38	0.00	Golden Triangle	19.26	605.61
% Black	18.67	1183.11	3.30	<0.001	Lincoln Place	0	0.00	West Oakland	62.51	1765.24
% with Population Under 18 Years of Age	20.99	97.56	1.21	0.12	Herrs Island-Troy Hill	19.95	0.04	West Oakland	19.55	325.51

Table 4-4 Distribution of Within-Neighborhood Variance of each SEP Measure (25th, 50th, and 75th Percentiles)

Variable	**Quartile 1 (25th Percentile)**	**Quartile 2 (50th Percentile)**	**Quartile 3 (75th Percentile**
% Unemployment	6.29	13.87	31.83
% of Households with No Car	25.79	55.08	112.35
% of Crowded Households	1.08	2.91	5.06
% Renters	70.74	150.21	268.11
% in Professional Occupation	10.05	24.25	49.33
% of Households in Poverty	16.65	45.78	126.93
% of Female-Headed Households	7.16	18.00	74.16
% on Public Assistance	3.31	9.46	31.85
% with Incomes Less than $30,000	26.27	70.59	139.34
% with Less than a High School Education	7.66	18.96	49.47
% Black	8.91	35.54	209.76
% with Population Under 18 Years of Age	14.55	33.86	57.28

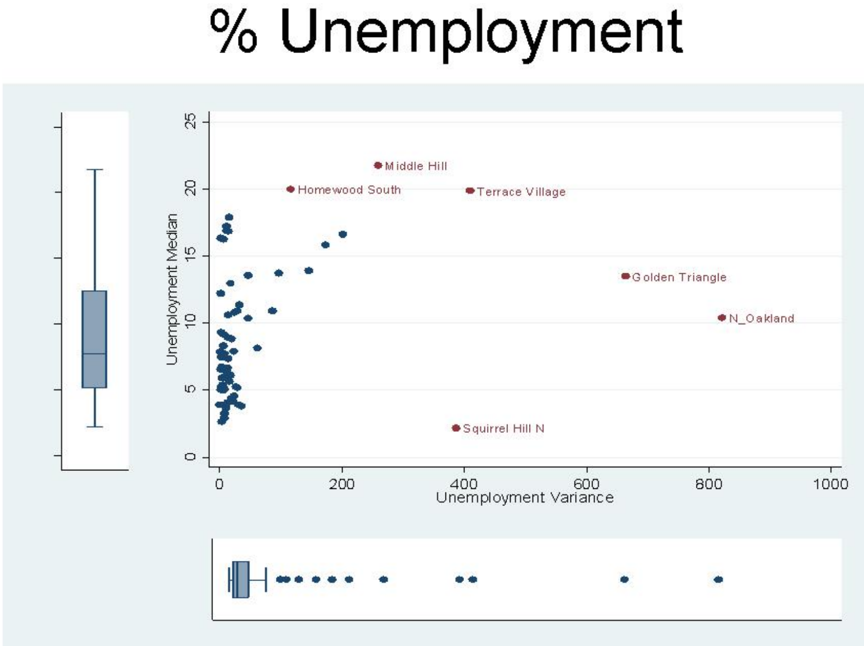

Figure 4-2 Median versus Variance for Unemployment

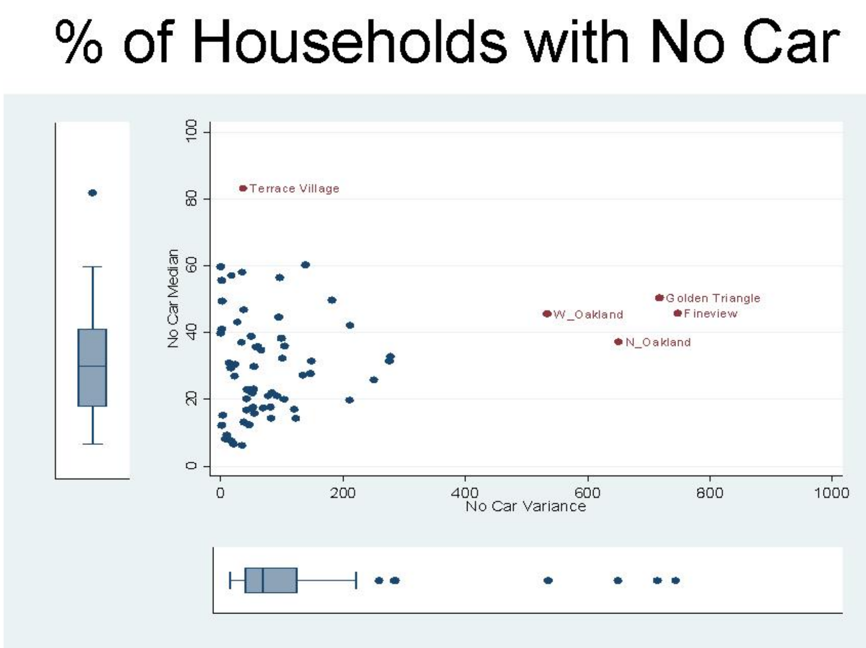

Figure 4-3 Median versus Variance for % with No Car

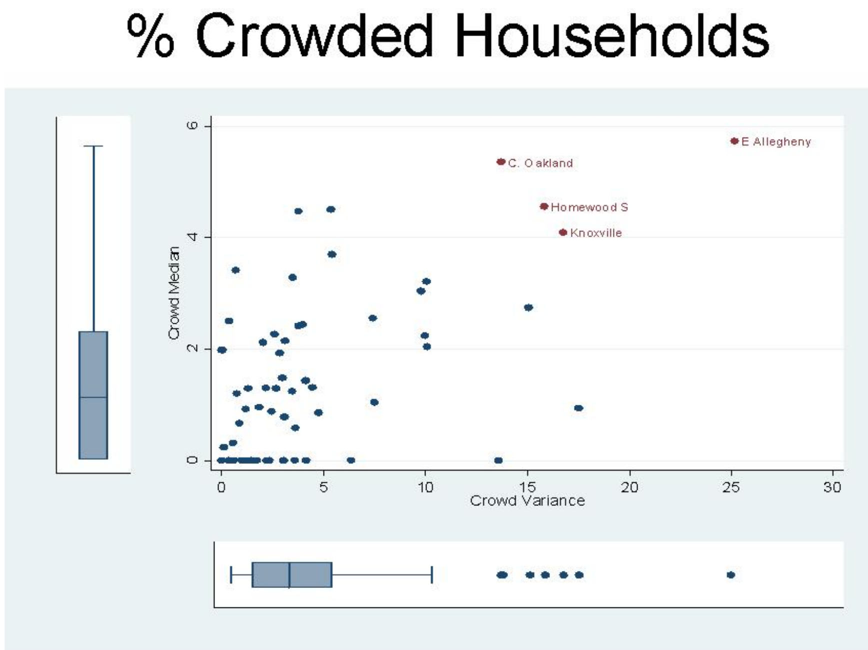

Figure 4-4 Median versus Variance for % Crowded Households

Figure 4-5 Median versus Variance for % Renters

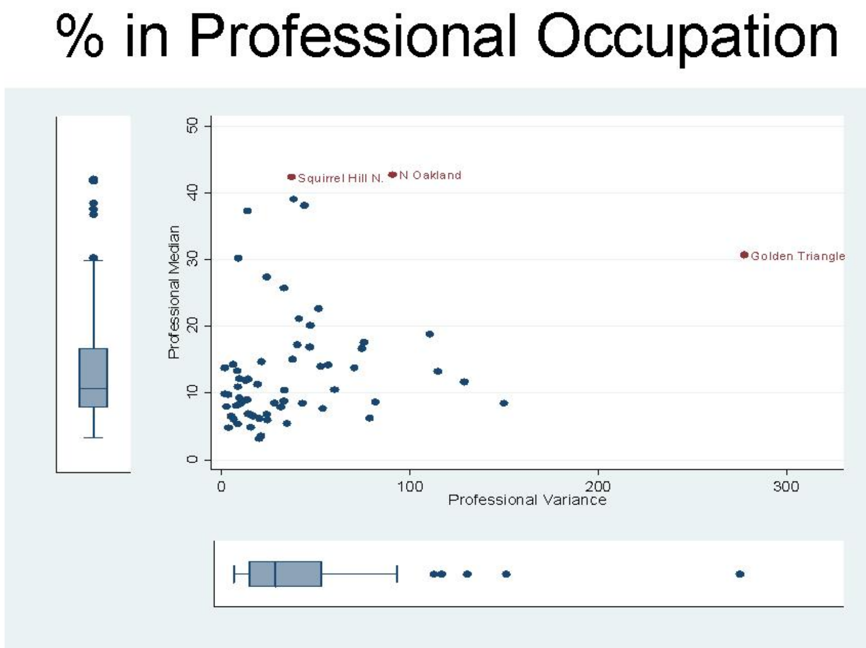

Figure 4-6 Median versus Variance for % in Professional Occupation

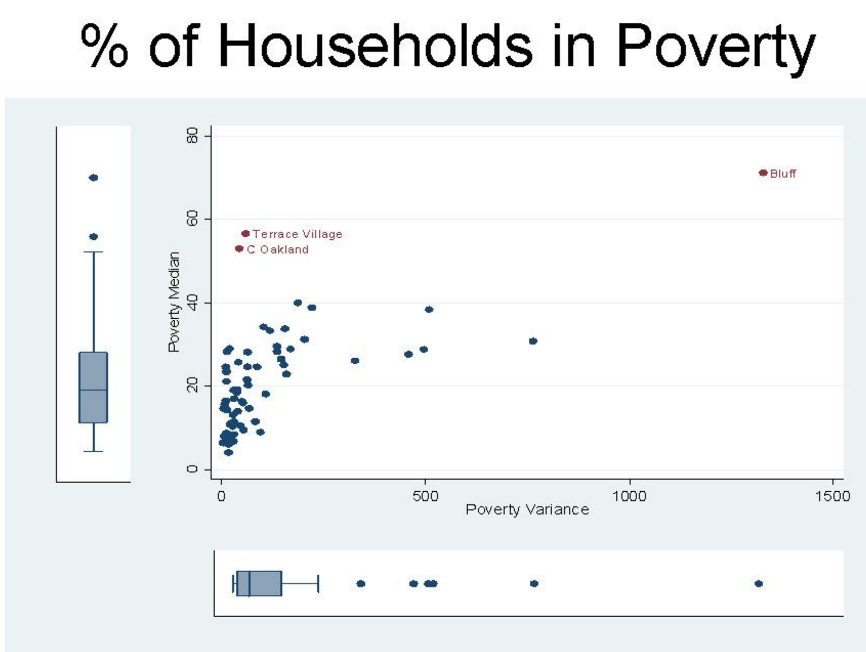

Figure 4-7 Median versus Variance for % Households in Poverty

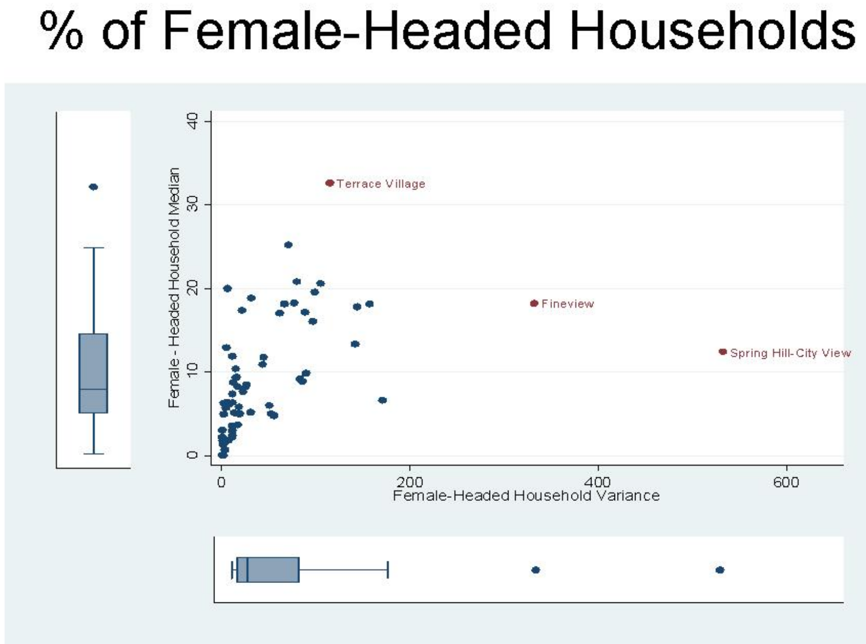

Figure 4-8 Median versus Variance for % Female-Headed Households

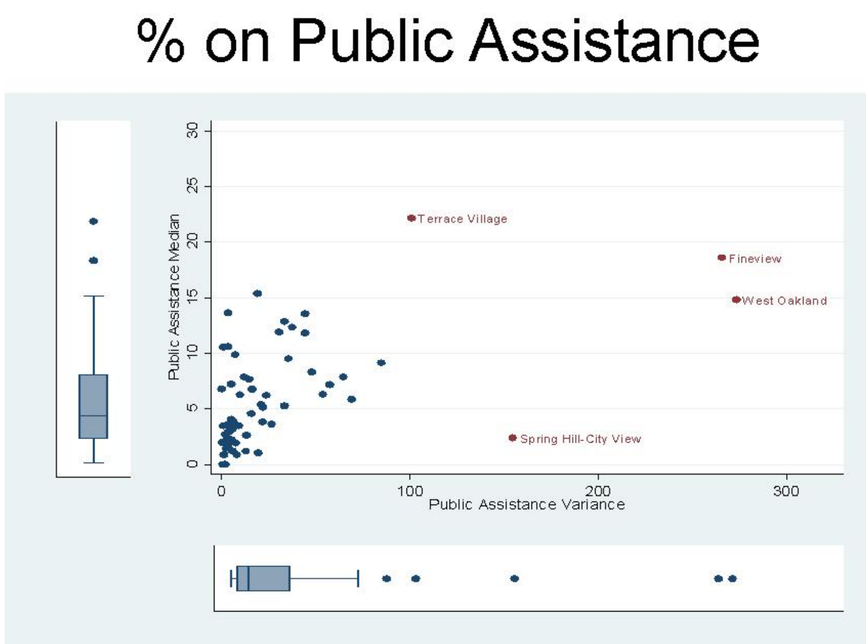

Figure 4-9 Median versus Variance for % on Public Assistance

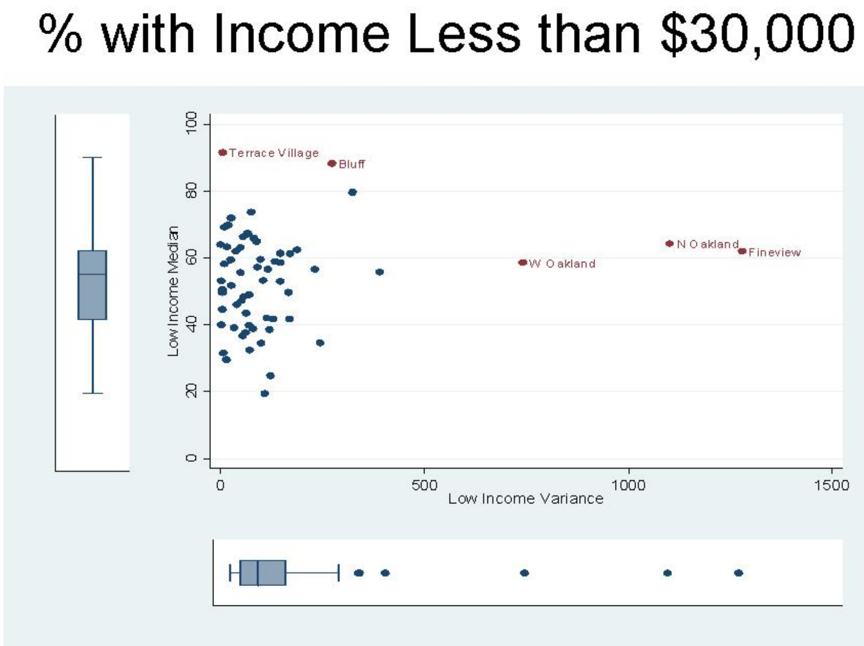

Figure 4-10 Median versus Variance for Income Less than $30,000

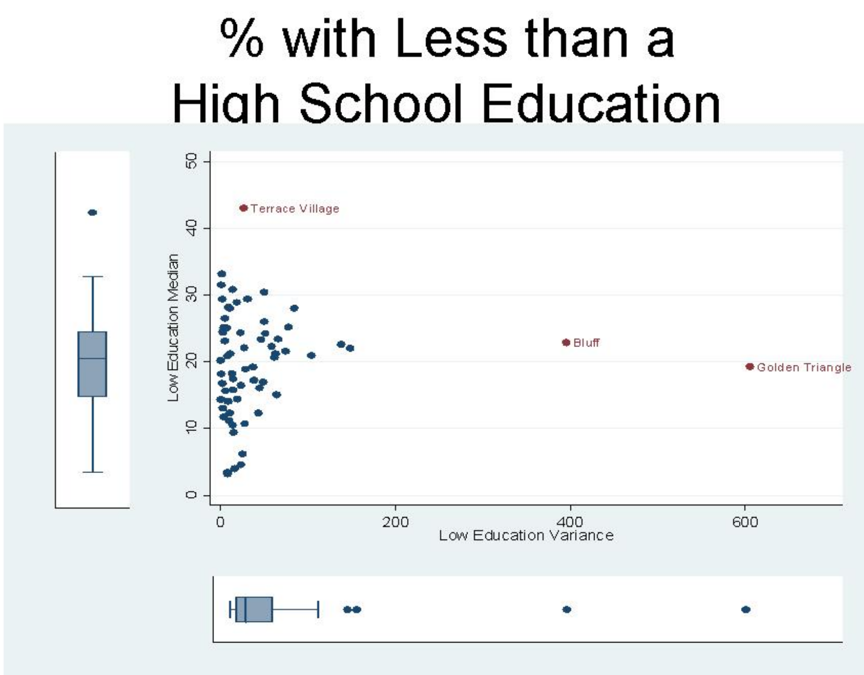

Figure 4-11 Median versus Variance for % with < High School Education

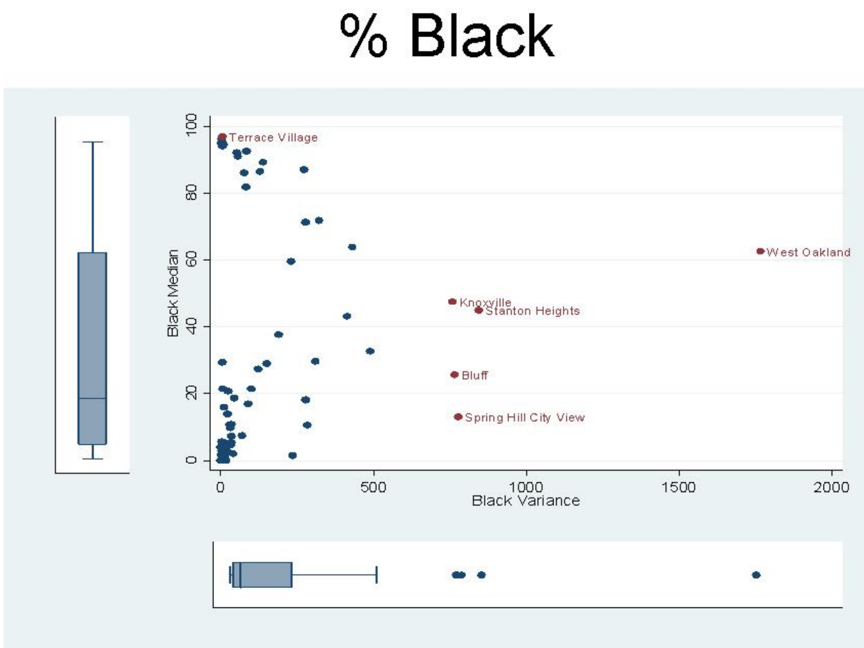

Figure 4-12 Median versus Variance for % Black

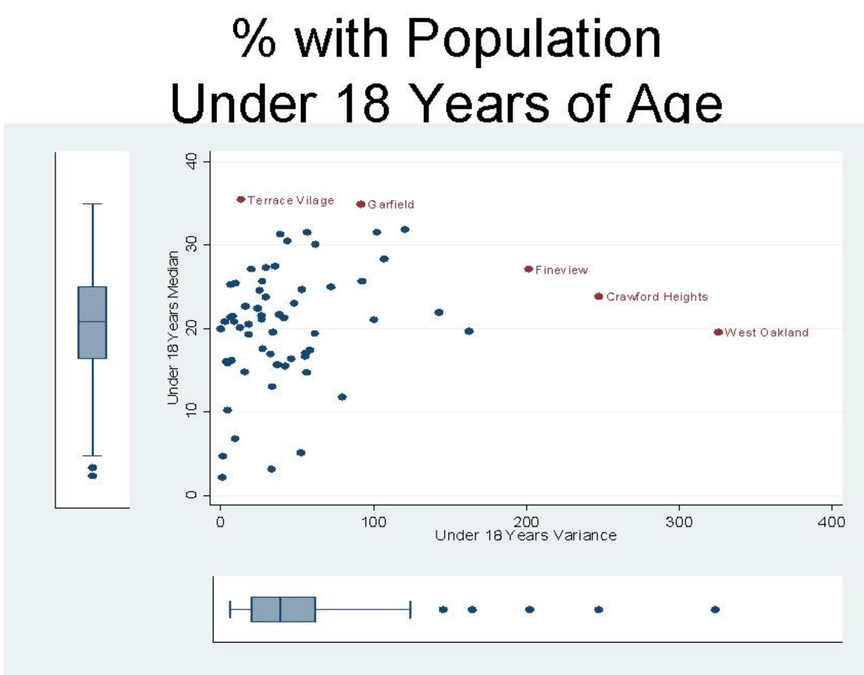

Figure 4-13 Median versus Variance for % Under 18 Years of Age

4.1.3 Spatial Autocorrelation

The correlations between variables in neighboring areas were calculated. Table 4-5 summarizes the Moran's I statistic for each SEP variable at the block group, census tract, and neighborhood levels. Overall, values are positive, indicating that adjacent areas are similar. However, as aggregation increases from block group level to neighborhood level, Moran's I statistic decreases. For example, spatial autocorrelation for percent Black was high at the block group level (0.74), but was lower at the neighborhood level (0.44). All of the values in Table 4-5 are statistically significant, except for crowded households, female-headed households and public assistance at the neighborhood level. This indicates that adjacent neighborhoods are not as similar as adjacent block groups.

Table 4-5 Moran's Statistic by Area Level

	Block Group		**Census Tract**		**Neighborhoods**	
Variables	***Moran's I Statistic***	***p-value***	***Moran's I Statistic***	***p-value***	***Moran's I Statistic***	***p-value***
Unemployment	0.16	<0.01	0.13	<0.01	0.13	<0.05
No Car	0.47	<0.01	0.35	<0.01	0.26	<0.01
Crowded Households	0.09	<0.01	0.09	<0.05	0.05	0.14
Rent	0.44	<0.01	0.31	<0.01	0.26	<0.01
Professional Occupation	0.63	<0.01	0.58	<0.01	0.39	<0.01
Household Poverty	0.34	<0.01	0.23	<0.01	0.16	<0.01
Female-Headed Households	0.32	<0.01	0.26	<0.01	0.11	0.07
Public Assistance	0.27	<0.01	0.15	<0.01	0.04	0.18
<$30,000	0.43	<0.01	0.31	<0.01	0.21	<0.01
<HS Education	0.44	<0.01	0.34	<0.01	0.44	<0.01
Black	0.74	<0.01	0.58	<0.01	0.44	<0.01
Under 18 years of age	0.39	<0.01	0.42	<0.01	0.28	<0.01

4.2 VARIANCE CONTRIBUTIONS OF SEP MEASURES ACROSS LEVELS

Table 4-6 shows the variance decomposition of each of the measures at the neighborhood, census tract, and block group level. For each of these measures, relatively little variance occurred at the census tract level, as demonstrated by non-significant variances for no car, rent, household poverty, and having a salary less than $30,000 or zero variances for unemployment, crowded households, professional occupation, female-headed households, public assistance, less than a high school education, percent Black, and percent under the age of 18 of age. These results indicate that examining SEP at the neighborhood and block group level is sufficient and that a two-level model can be used rather than including census tracts in a three-level model. The remaining analyses in this paper focus only on the block group and neighborhood levels.

The variance decomposition at the block group and neighborhood levels only is shown in Table 4-7. Variances for all measures were significant at the neighborhood and block group levels. The ICCs also were calculated (see Table 4-8) for block groups and neighborhoods. The ICCs show that for most of the SEP measures, relatively more of the SEP variance occurred at the neighborhood level. Only percent unemployment and percent crowded households showed relatively more variance at the block group level. Overall, the ICC at the neighborhood level ranged from 0.18 (crowded households) to 0.90 (Black).

Table 4-6 Variance Decomposition of Socioeconomic Position Measures at Three Levels

	% Unemployment				% of Households with No Car				% Crowded Households			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	16.83	5.47	3.08	<0.001	266.56	47.23	5.64	<0.001	0.96	0.35	2.75	0.01
Census Tract	**0.00**	**0.00**			**3.84**	**12.53**	**0.31**	**0.76**	**0.00**	**0.00**		
Block Groups	61.78	5.37	11.50	<0.001	100.31	12.07	8.31	<0.001	4.47	0.39	11.56	<0.001

	% Renters				% in Professional Occupations				% of Households in Poverty			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	368.61	73.80	4.99	<0.001	102.62	17.80	5.76	<0.001	185.92	33.54	5.54	<0.001
Census Tract	**36.38**	**32.02**	**1.14**	**0.26**	**0.00**	**0.00**			**1.03**	**10.23**	**0.10**	**0.92**
Block Groups	225.98	27.67	8.17	<0.001	36.57	3.25	11.25	<0.001	84.67	10.14	8.35	<0.001

	% of Female-Headed Households				% on Public Assistance				% with Income <$30,000			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	93.80	16.30	5.76	<0.001	46.77	8.15	5.74	<0.001	176.74	36.04	4.90	<0.001
Census Tract	**0.00**	**0.00**			**0.00**	**0.00**			**23.52**	**15.89**	**1.48**	**0.14**
Block Groups	35.48	3.16	11.23	<0.001	17.88	1.59	11.24	<0.001	106.37	13.10	8.12	<0.001

	% with < a High School Education				% Black				% Under 18 Years of Age			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	79.70	14.60	5.46	<0.001	1069.97	168.42	6.35	<0.001	58.80	11.42	5.15	<0.001
Census Tract	**0.00**	**0.00**			**0.00**	**0.00**			**0.00**	**0.00**		
Block Groups	43.31	3.86	11.24	<0.001	114.98	10.24	11.23	<0.001	43.10	3.83	11.27	<0.001

Table 4-7 Variance Decomposition of Socioeconomic Measures at Two Levels

	% Unemployment				% of Households with No Car				% Crowded Households			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	16.83	5.47	3.08	<0.001	267.96	46.86	5.72	<0.001	0.96	0.35	2.75	0.01
Block Groups	61.78	5.37	11.50	<0.001	102.92	9.15	11.24	<0.001	4.47	0.39	11.56	<0.001

	% Renters				% in Professional Occupations				% of Households in Poverty			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	383.06	72.49	5.28	<0.001	102.62	17.80	5.76	<0.001	186.24	33.26	5.60	<0.001
Block Groups	250.29	22.25	11.25	<0.001	36.57	3.25	11.25	<0.001	85.37	7.60	11.24	<0.001

	% of Female-Headed Households				% on Public Assistance				% with Income <$30,000			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	93.80	16.30	5.76	<0.001	46.77	8.15	5.74	<0.001	183.10	35.02	5.23	<0.001
Block Groups	35.48	3.16	11.23	<0.001	17.88	1.59	11.24	<0.001	122.68	10.88	11.27	<0.001

	% with < a High School Education				% Black				% Under 18 Years of Age			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	79.70	14.60	5.46	<0.001	1069.97	167.89	6.37	<0.001	58.80	11.42	5.15	<0.001
Block Groups	43.31	3.86	11.24	<0.001	114.98	10.27	11.20	<0.001	43.10	3.83	11.27	<0.001

Table 4-8 Intraclass Correlation Coefficients of Socioeconomic Measures at Neighborhood and Block Group Levels

	% Unemployment	% of Households with No Car	% Crowded Households
Neighborhood	0.21	0.72	0.18
Block Group	0.79	0.28	0.82
	% Renters	**% in Professional Occupations**	**% of Households in Poverty**
Neighborhood	0.60	0.74	0.69
Block Group	0.40	0.26	0.31
	% of Female-Headed Households	**% on Public Assistance**	**% with Income <$30,000**
Neighborhood	0.73	0.72	0.60
Block Group	0.27	0.28	0.40
	% with < a High School Education	**% Black**	**% Under 18 Years of Age**
Neighborhood	0.65	0.90	0.58
Block Group	0.35	0.10	0.42

4.3 CORRELATIONS OF SEP MEASURES WITH EACH OTHER

To examine associations between the SEP variables, three correlation matrices were generated: total correlation matrix (Table 4-9), and the total correlation matrix partitioned into the within neighborhood correlation matrix (Table 4-10) and the between neighborhood correlation matrix (Table 4-11). Different patterns emerge in the number of variables that are highly correlated with each other (correlations ≥0.30, highlighted in darker font) in each correlation matrix. The total correlation (Table 4-9) matrix shows each of these SEP variables is correlated with between 4 and 10 other SEP variables (lack of car ownership, female-headed households, income less than $30,000, and Black correlated with 10 other variables; household poverty and public assistance correlated with 9 other variables, having less than a high school education correlated with 8 other variables, unemployment correlated with 7 other variables, renters and professional occupations each correlated with six other variables, crowded households correlated with 5 variables, and under 18 years of age correlated with 4 other variables). The stronger correlations were between poverty, income, and having no car, between female-headed households and Black, and between female-headed households and children under 18 years of age (correlations ≥0.70 for each)

However, different patterns emerge in the within neighborhood correlation matrix (Table 4-10). The number of correlations between variables within neighborhoods (i.e., between block groups) ranged from 0 to 7 (public assistance correlated with 7 other variables; lack of car ownership correlated with 6 other variables, household poverty correlated with 5 other variables; renters, female-headed households, income less than $30,000, and Black were correlated with 4 other variables; under 18 years of age correlated with 3 other variables; having less than a high school education correlated with one other variable; and unemployment, crowded households, professional occupations correlated with none of these other variables). There were fewer correlations ≥0.30, and none of the estimated correlations exceeded 0.70.

Correlations were generally stronger in the between neighborhoods matrix (Table 4-11). The number of correlations between variables ranged from 7 to 11 (lack of car ownership, public assistance, income less than $30,000, and Black each correlated with 11 other variables; unemployment and female-headed households each correlated with 10 other variables; household poverty and having less than a high school education each correlated with 9 other variables; crowded households and under 18 years of age correlated with 8 other variables; rent and professional occupations each correlated with 7 other variables). Twelve of these associations had estimated correlations ≥ 0.70.

Table 4-9 Total Correlation Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow	black	und18
unemp	1.00											
no car	0.46	1.00										
crowd	0.17	**0.31**	1.00									
rent	0.23	**0.64**	**0.35**	1.00								
profm	-0.24	**-0.37**	-0.06	0.17	1.00							
pov_h	**0.44**	**0.70**	**0.36**	**0.62**	-0.19	1.00						
fhh	**0.43**	**0.57**	**0.30**	0.24	**-0.49**	**0.54**	1.00					
pbasst	**0.37**	**0.54**	0.28	**0.37**	-0.29	**0.63**	**0.66**	1.00				
inclow	**0.38**	**0.83**	**0.31**	**0.61**	**-0.44**	**0.77**	**0.51**	**0.56**	1.00			
edulow	**0.30**	**0.56**	0.14	0.25	**-0.51**	**0.46**	**0.44**	**0.60**	**0.62**	1.00		
black	**0.48**	**0.63**	0.25	**0.33**	**-0.37**	**0.53**	**0.71**	**0.58**	**0.54**	**0.41**	1.00	
und18	0.20	0.26	0.19	-0.15	**-0.47**	0.21	**0.77**	**0.45**	0.21	0.27	**0.53**	1.00
# corr ≥ 0.30	7	10	5	6	6	9	10	9	10	8	10	4

Table 4-10 Pooled Within Neighborhood Correlation Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow	black	und18
unemp	1.00											
no car	0.08	1.00										
crowd	0.03	0.14	1.00									
rent	-0.03	**0.59**	0.27	1.00								
profm	-0.24	-0.28	-0.08	-0.05	1.00							
pov_h	0.14	**0.43**	0.20	**0.47**	-0.11	1.00						
fhh	0.15	0.28	0.24	0.21	-0.22	**0.42**	1.00					
pbasst	0.19	**0.40**	0.23	**0.31**	-0.14	**0.48**	**0.56**	1.00				
inclow	0.04	**0.67**	0.20	**0.63**	-0.29	**0.63**	0.26	**0.40**	1.00			
edulow	0.11	**0.30**	0.08	0.19	-0.21	0.07	0.16	0.23	0.28	1.00		
black	0.16	**0.30**	0.18	0.24	-0.16	0.26	**0.47**	**0.42**	0.27	0.22	1.00	
und18	0.03	0.05	0.23	-0.09	-0.07	0.21	**0.65**	**0.42**	0.01	0.04	**0.38**	1.00
# corr ≥ 0.30	0	6	0	4	0	5	4	7	4	1	4	3

Table 4-11 Between Neighborhood Correlation Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow	black	und18
unemp	1.00											
nocar	**0.75**	1.00										
crowd	**0.35**	**0.44**	1.00									
rent	**0.45**	**0.67**	**0.42**	1.00								
profm	-0.27	**-0.39**	-0.05	0.25	1.00							
pov_h	**0.71**	**0.81**	**0.49**	**0.68**	-0.22	1.00						
fhh	**0.66**	**0.68**	**0.36**	0.25	**-0.57**	**0.58**	1.00					
pbasst	**0.54**	**0.60**	**0.33**	**0.40**	**-0.34**	**0.69**	**0.70**	1.00				
inclow	**0.66**	**0.90**	**0.41**	**0.60**	**-0.49**	**0.84**	**0.62**	**0.64**	1.00			
edulow	**0.47**	**0.66**	0.19	0.27	**-0.60**	**0.61**	**0.55**	**0.75**	**0.76**	1.00		
black	**0.72**	**0.71**	**0.33**	**0.36**	**-0.40**	**0.61**	**0.79**	**0.65**	**0.63**	**0.46**	1.00	
und18	**0.34**	**0.34**	0.17	-0.17	**-0.62**	0.20	**0.83**	**0.46**	**0.30**	**0.38**	**0.61**	1.00
# corr ≥ 0.30	10	11	8	7	7	9	10	11	11	9	11	8

Figures 4-14 a-c illustrate pairs of variables with a strong and/or weak correlations within and between neighborhoods for four neighborhoods in Pittsburgh: East Liberty, Garfield, Shadyside, and Squirrel Hill North. Figure 4-14a depicts SEP variables with strong within and between neighborhood correlations; Figure 4-14b depicts SEP variables with weak correlations within and between neighborhoods; and Figure 4-14c depicts SEP variables with a weak correlation within and strong correlation between neighborhoods. Table 4-12 includes the corresponding medians and variances for each of the SEP variables plotted.

In Figure 4-14a, percent with households with no car is plotted against percent with income less than $30,000. The correlation between these two variables within neighborhoods is 0.67 and between neighborhoods is 0.90. Each of the neighborhoods shows a positive association between these two variables (e.g., Squirrel Hill North, as indicated by triangles). A stronger increasing trend is apparent across these neighborhoods, i.e., looking at East Liberty, Garfield, Shadyside, and Squirrel Hill North together.

In Figure 4-14b, percent of renters is plotted against percent with less than a high school education. The correlation between these variables is 0.19 within neighborhoods (e.g., East Liberty, indicated by squares) and 0.27 between neighborhoods. Each of these neighborhoods alone shows a flat relationship between the two variables, and the overall association across neighborhoods also is weak.

Figure 4-14c shows percent unemployed plotted against percent with income ≤ $30,000. The correlation between these variables was 0.04 within neighborhoods and 0.66 between neighborhoods. An apparent outlier in Squirrel Hill North contributes to the attenuated correlation within neighborhoods. However, there seems to be an increasing trend across neighborhoods.

Differences between the total correlation matrix and the partitioned correlation matrices at the neighborhood levels further support that examining SEP measures only at the block group level alone would be inaccurate and potentially miss mechanisms of SEP that may be operating differently at block group and neighborhood levels. The total correlation matrix depicts correlations at the block group level, not taking into account correlations at the neighborhood level. Results suggest that variables are correlated with a high number of other variables. However, when partitioning out the total correlation into between neighborhood and within neighborhood correlation matrices, different patterns emerge. Strong correlations at the block group level within neighborhoods were fewer than between neighborhoods.

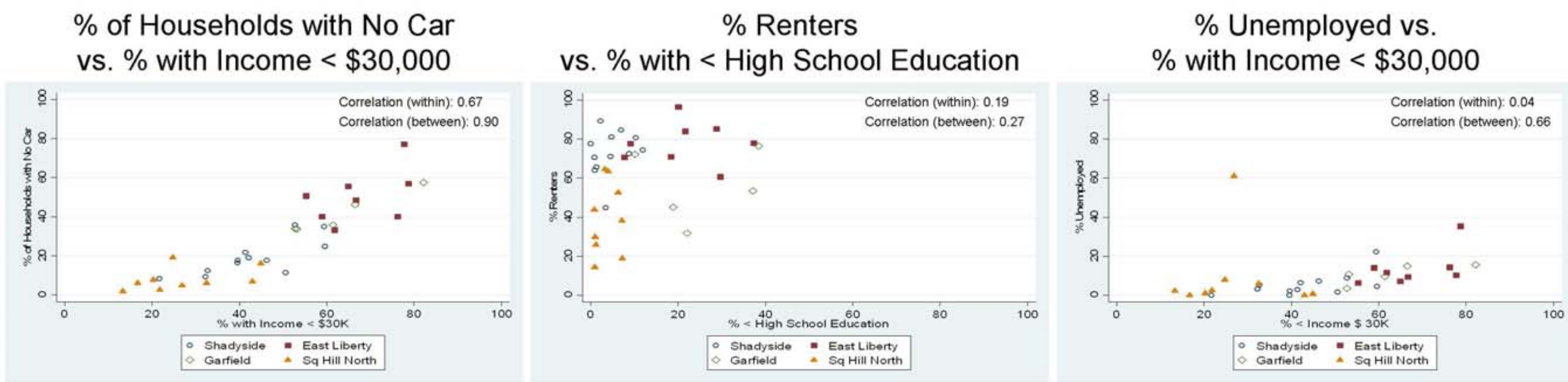

Figure 4-14 a) High Correlation Within and Between Neighborhoods, b) Low Correlation Within and Between Neighborhoods, c) Low Correlation Within and High Correlation Between Neighborhoods.

Table 4-12 Median and Variance for Selected SEP Variables in Four Neighborhoods

	% No Car		**% with Income < $30,000**		**% Renters**		**% < High School Education**		**% Unemployed**	
Neighborhood	***Median***	***Variance***	***Median***	***Variance***	***Median***	***Variance***	***Median***	***Variance***	***Median***	***Variance***
East Liberty	49.71	181.40	65.83	81.08	77.76	119.33	20.93	103.67	10.93	86.45
Garfield	35.93	104.51	61.43	146.36	53.27	344.28	22.07	148.50	10.76	23.70
Shadyside	17.81	81.88	41.74	128.14	73.39	134.51	4.01	16.00	3.92	36.06
Squirrel Hill North	6.23	34.98	24.75	122.37	38.38	339.47	3.26	7.53	2.19	386.56

4.4 COMPOSITE INDEX OF SEP

This section summarizes the results of factor analysis of the total correlation matrix, and the partitioning of the total correlation matrix to the within neighborhood correlation matrix and the between neighborhood correlation matrix. The section concludes with the construction of three factor scores: two within neighborhood factors, and one between neighborhood factor.

4.4.1 Factor Analysis on the Total Correlation Matrix

One factor was extracted from the total correlation matrix based on results from the scree plot (Figure 4-15a) and interpretability of the factor loading matrix. The eigenvalue for the first factor was 3.91, which explained 43 percent of the total variance of the data. Factor loadings of the variables are shown in the first column of Table 4-13. Results from the total correlation matrix are inaccurate because the nested structure is ignored and block groups are assumed to be independent of each other. The results are presented to compare to the MFA results using the within and between correlation matrices.

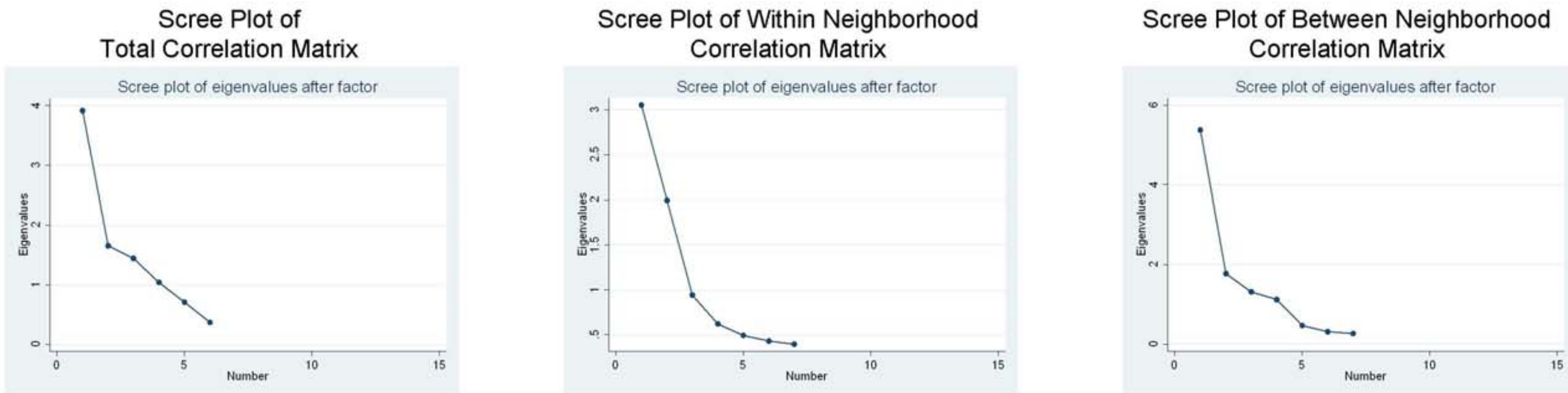

Figure 4-15 Scree Plots for a) Total Correlation Matrix b) Within Neighborhood Correlation Matrix and c) Between Correlation Matrix

Table 4-13 Factor Loadings for Total, Within, and Between Neighborhoods

	Total	Within		Between
	Factor	***Factor 1***	***Factor 2***	***Factor***
% Unemployment	**.51**	.05	.15	**.78**
% of Households with No Car	**.89**	**.75**	-.04	**.94**
% of Crowded Households	**.37**	.18	.23	**.46**
% Renters	**.60**	**.75**	-.09	**.61**
% in Professional Occupation	**-44**	-.25	-.12	**-.45**
% of Households in Poverty	**.82**	**.60**	.24	**.87**
% Female Headed Households	**.70**	.12	**.82**	**.75**
% on Public Assistance	**.71**	**.35**	**.53**	**.73**
% with Income < $30K	**.88**	**.90**	-.04	**.93**
% with < High School Education	**.65**	.29	.08	**.74**
% Black	**.71**	.22	**.47**	**.76**
% Under 18 Years of Age	**.39**	-.20	**.84**	**.42**

4.4.2 Factor Analysis on the Within Neighborhood Correlation Matrix

For the within neighborhood correlation matrix, two factors were extracted based on results from the scree plot (Figure 4-15b) and interpretability of the pattern matrix. The within neighborhood correlation matrix consists of 341 census block groups on 12 SEP variables. The eigenvalues of the first two factors are 3.05 and 1.99. These factors explained 39% and 25% of the total variance in the data, respectively, or a cumulative proportion of 64%. Factor loadings are shown in the second and third columns of Table 4-13.

Variables with factor loadings ≥0.30 were interpreted. Five variables loaded onto factor 1 and four variables loaded onto factor 2. For factor 1, the high-loading variables interpreted were percent with an income ≤ $30,000 (0.90), percent of households with no car (0.75), and percent renters (0.75). Other variables with moderate or low loadings were percent of households in poverty (0.60) and percent on public assistance (0.35). For factor 2, the high-loading variables were percent under 18 years of age (0.84) and percent of female-headed households (0.82). Variables with moderate loadings were percent on public assistance (0.53) and percent Black (0.47). Factor 1 reflects dimensions of wealth/poverty, and is labeled "material and economic block group deprivation" (MED_{ij}). Factor 2 reflects the social structure of an area and is labeled "concentrated block group disadvantage" (CD_{ij}). The correlation between these two factors is 0.27.

4.4.3 Factor Analysis on the Between Neighborhood Correlation Matrix

For the between neighborhood correlation matrix, one factor was extracted based on results from the scree plot (Figure 4-15c) and interpretability of the factor loading matrix. The between neighborhood matrix consists of 89 neighborhoods on 12 SEP variables. The eigenvalue for the one factor is 5.37, which represents 50% of the total variance in the data. Factor loadings are shown in the fourth column of Table 4-13.

All of the variables loaded onto the factor. Variables with high loadings were percent of households with no car (0.94), percent with income less than $30,000 (0.93), percent of households in poverty (0.87), percent unemployment (0.78), percent Black (0.76), percent of female-headed households (0.75), percent with less than high school education (0.74), and percent on public assistance (0.73). Variables with moderate and lower loadings were percent renters (0.61), percent with crowded households (0.46), percent in professional occupations (0.45), and percent under 18 years of age (0.42). Variables that loaded onto this factor represent several SEP dimensions, including income, poverty, wealth, occupation, and education. This factor is labeled "overall neighborhood deprivation" (OND_j) and represents deprivation at the neighborhood level.

4.4.4 Creating Factor Scores

Factor scores were created for each factor. Figures 4-16 and 4-17 show scatterplots of OND_j plotted against MED_{ij} and CD_{ij} scores. On the corresponding axes are the box plots for the neighborhood and block group factor scores. The median for OND_j was 28.2, the mean was 29.3, and the variance was 115.9. Values ranged from 13.2 to 63.1. The median for MED_{ij} was 27.8, the mean was 29.8, and the variance was 184.8. The values ranged from 0 to 75.4. The median for CD_{ij} was 10.35, the mean was 15.7, and the variance was 164.4. Values ranged from 1.1 to 63.7.

To better understand these factors scores, Figures 4-18a-b and Table 4-14 show MED_{ij}, CD_{ij}, and OND_j for East Liberty, Garfield, Shadyside, and Squirrel Hill North. MED_{ij} values for the four neighborhoods are depicted in Figure 4-18a. MED_{ij} was high for East Liberty and Garfield. The mean MED_{ij} for these neighborhoods was 46.8 and 41.1, respectively. MED_{ij} was slightly lower for Shadyside (mean MED_{ij}=31.2) and much lower for Squirrel Hill North (mean MED_{ij} = 17.4). Figure 4-18b shows that CD_{ij} was higher in East Liberty and Garfield (with mean CD_{ij} of 31.1 and 37.8, respectively) than in Shadyside and Squirrel Hill North (with mean CD_{ij} was of 4.5 and 5.6, respectively). For OND_j scores, East Liberty and Garfield OND_j values were near 40.0, and Shadyside and Squirrel Hill were 20.4 and 15.0, respectively. Overall, these results indicated less deprivation and disadvantage in Shadyside and Squirrel Hill North than in East Liberty and Garfield. In addition, block group disadvantage seems to vary more within East Liberty and Garfield than within Squirrel Hill and Shadyside.

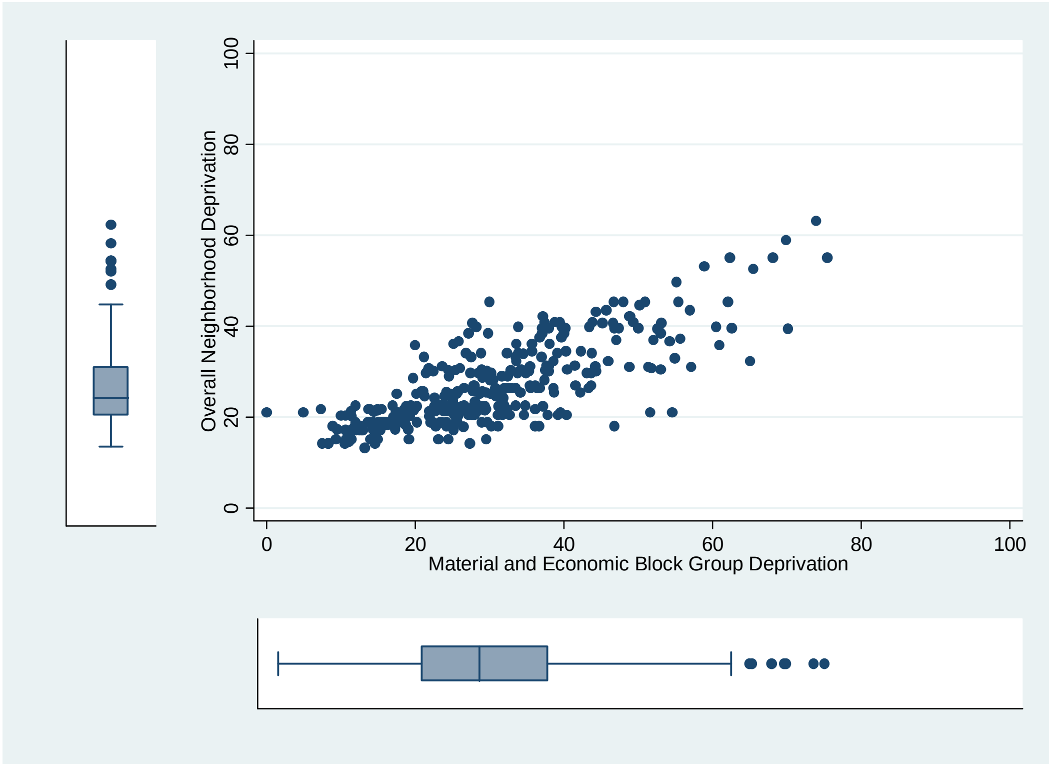

Figure 4-16 Overall Neighborhood Deprivation vs. Material and Economic Deprivation

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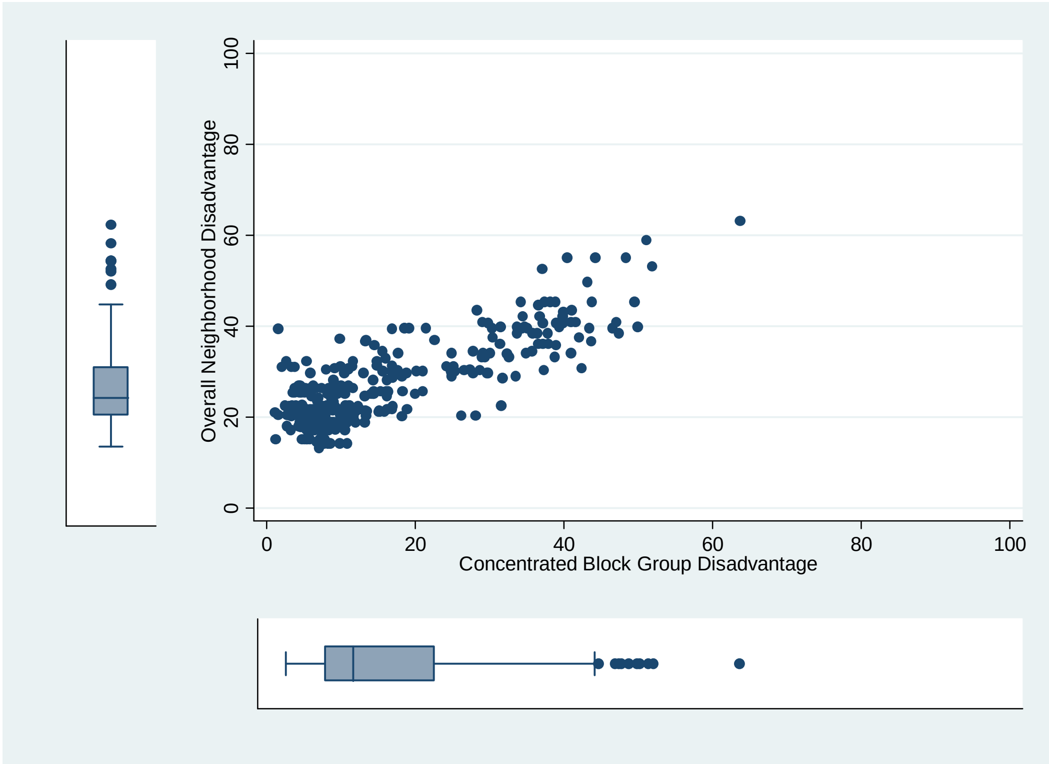
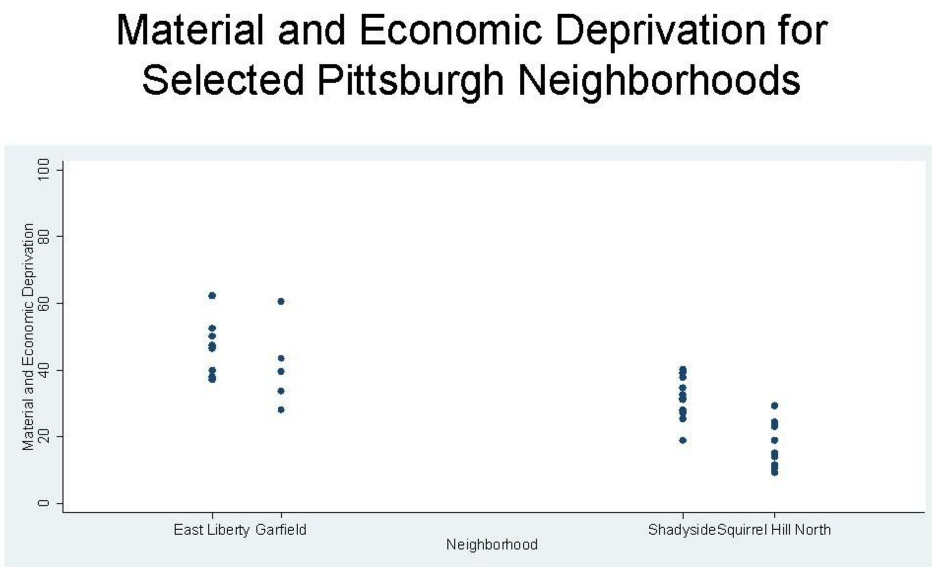


Figure 4-17 Overall Neighborhood Deprivation vs. Concentrated Disadvantage



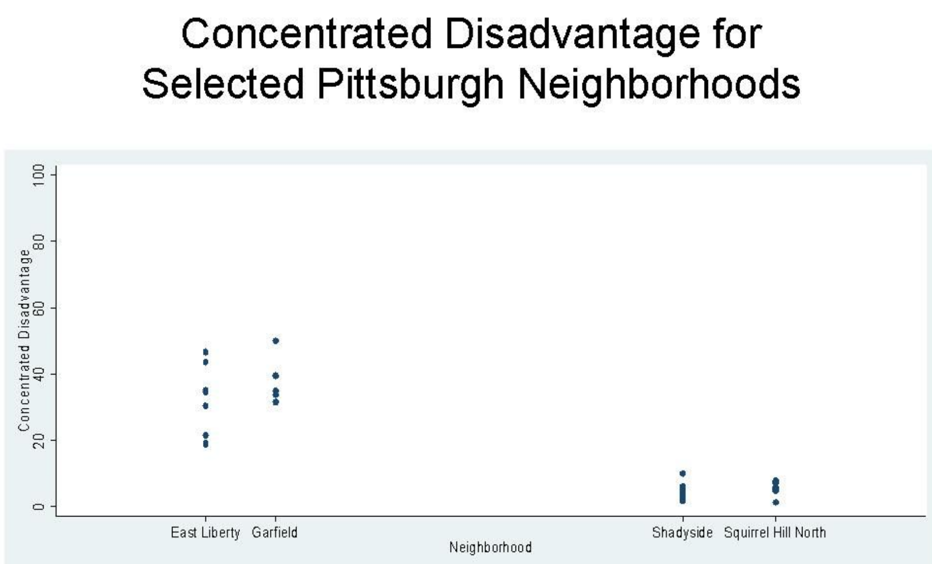


Figure 4-18 Within Factor Scores for Selected Pittsburgh Neighborhoods: a) Material and Economic Deprivation and b) Concentrated Disadvantage

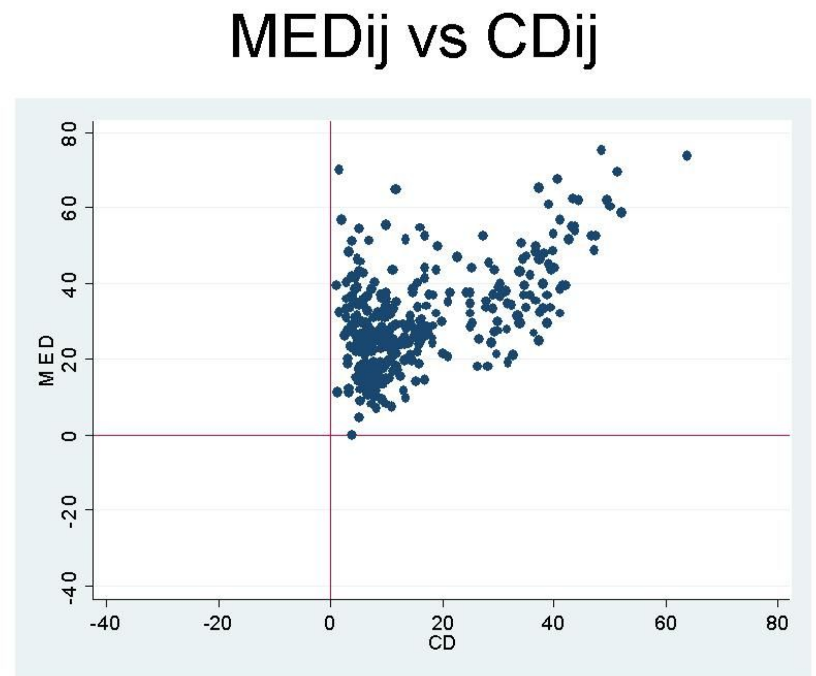
Table 4-14 Material and Economic Deprivation, Concentrated Disadvantage, and Overall Neighborhood Deprivation for Selected Neighborhoods

Neighborhood	Material and Economic Deprivation (MED_{ij})	Concentrated Disadvantage (CD_{ij})	Overall Neighborhood Deprivation (OND_j)
East Liberty			
Block groups			
1113001	40.13	30.36	39.63
1113002	37.04	18.50	39.63
1113003	47.42	35.06	39.63
1113004	38.00	21.48	39.63
1115001	46.81	34.41	39.63
1115002	52.73	46.55	39.63
1115003	49.97	19.17	39.63
1115004	62.56	43.40	39.63
Garfield			
Block groups			
1016001	60.52	49.90	39.85
1017001	28.21	31.50	39.85
1017002	39.70	34.71	39.85
1114001	43.42	33.70	39.85
1114002	33.83	39.36	39.85
Shadyside			
Block groups			
703001	32.68	1.52	20.38
703002	34.62	5.85	20.38
703003	18.93	5.93	20.38
705001	31.07	2.79	20.38
705002	40.35	2.85	20.38
705003	37.80	9.88	20.38
706001	25.25	4.89	20.38
706002	27.88	2.94	20.38
708001	27.63	4.27	20.38
708002	27.16	3.92	20.38
709001	31.70	4.78	20.38
709002	39.22	4.86	20.38
Squirrel Hill North			
Block groups			
1401001	14.92	4.72	15.03
1401002	9.26	5.31	15.03
1401004	11.43	1.19	15.03
1402001	24.51	5.08	15.03
1402002	29.57	5.81	15.03
1403001	19.11	7.77	15.03
1403002	23.11	5.44	15.03
1403003	10.67	7.83	15.03
1403004	13.95	7.19	15.03

4.5 ASSOCIATIONS BETWEEN COMPOSITE INDICATOR OF SEP AND LBW AT DIFFERENT AREA LEVELS

4.5.1 Model Selection

Factors at the block group and neighborhood levels were modeled to examine how well they predict the proportion of LBW infants at the block group level. The mean LBW proportion at the block group level was 0.09, with a variance of 0.004. Proportions ranged from 0 to 0.32. Factors at the block group level were group mean centered, and the factor at the neighborhood level was grand mean centered to help with the interpretation of the final model and reduce collinearity between the factors. Figure 4-19 shows the effect of group centering MED_{ij} and CD_{ij}. In Figure 4-19a, raw values of MED_{ij} are plotted against raw values of CD_{ij}. Centering these block group values around their neighborhood mean shifts these values closer to 0 , as shown in Figure 4-19b.



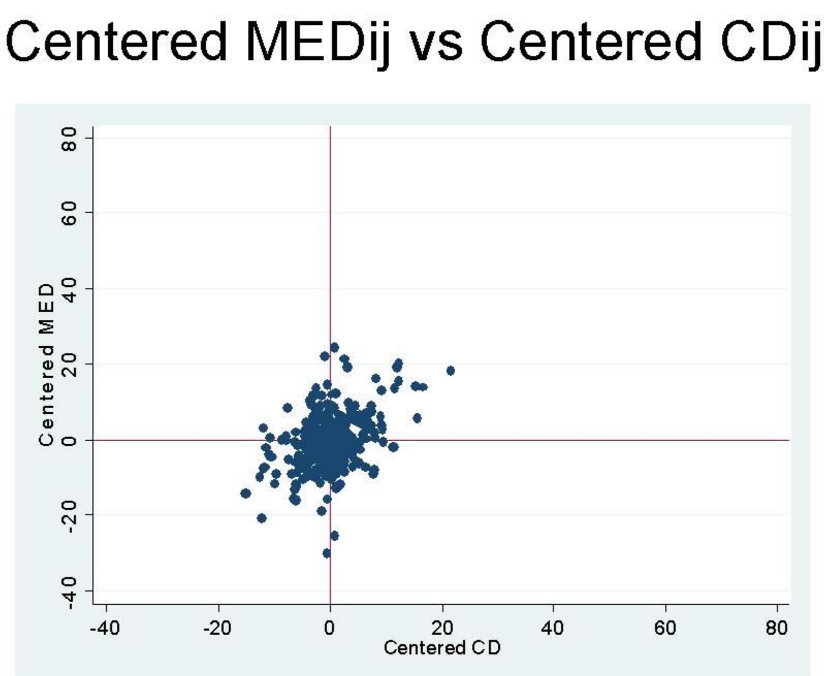


Figure 4-19 a) Raw MED$_{ij}$ vs Raw CD$_{ij}$, b) centered MED$_{ij}$ vs centered CD$_{ij}$

Table 4-15 shows the model selection results in the order in which predictors were added to the model: the null (or intercept model) was considered first, followed by model 2 with the two main effects at the block group level MED_{ij} and CD_{ij}. Model 3 included the main effect at the neighborhood level only, OND_j. Model 4 included the main effects on both levels, and model 5 included the main effects and the interaction terms between the effects at the block group and neighborhood levels ($MED_{ij}*OND_j$, $CD_{ij}*OND_j$). Models 6 and 7 included only one of the interaction terms: model 6 included only $CD_{ij}*OND_j$ and model 7 included only $MED_{ij}*OND_j$. Each model had a corresponding log likelihood, AIC, and R-squared for the block group and neighborhood levels. Results from Table 4-15 suggest that model 6, the main effects model with $CD_{ij}*OND_j$ shows the best fit based on having the smallest AIC (-961.5). In addition, R^2 values suggest that including MED_{ij} and CD_{ij} contributed to a 25% decrease in the reduction in the block-group level unexplained variance, a decrease generally larger than the other models (although slightly lower when compared to models 4 and 7). Including OND_j contributed to a 40% decrease in the reduction of the neighborhood-level unexplained variance, which was greater compared to models 2 and 3, but equal to the value for models 4 through 7. Log likelihoods were greatest in models 5 and 6. Formal test results comparing models are found in Table 4-16.

Table 4-15 Model Selection

Model	Factors	Log Likelihood	AIC	R_1^2	R_2^2
1	intercept only	459.9	-913.7		
2	$MED_{ij} + CD_{ij}$	468.8	-923.5	0.11	0.02
3	OND_j	478.7	-949.4	0.15	0.38
4	$MED_{ij} + CD_{ij} + OND_j$	487.5	-959.1	0.26	0.40
5	$MED_{ij} + CD_{ij} + OND_j + MED_{ij}*OND_j + CD_{ij}*OND_j$	490.7	-961.5	0.25	0.40
6	$MED_{ij} + CD_{ij} + OND_j + CD_{ij}*OND_j$	490.7	-961.5	0.25	0.40
7	$MED_{ij} + CD_{ij} + OND_j + MED_{ij}*OND_j$	489.7	-961.3	0.26	0.40

Table 4-16 provides results of the likelihood ratio tests. The model with main effects of MED_{ij}, CD_{ij}, and OND_j contributed significantly in predicting LBW proportion, compared to the null model (Comparisons 1, 2, and 3, $p<0.01$). In addition, likelihood ratio tests showed that main effects at both levels were significant predictors in the model (Comparisons 4 and 5, $p<0.01$). In comparison 6, the full model with both main effects and two interactions was significantly better in predicting LBW proportion than the main effects only model ($p<0.05$). Each interaction term was tested separately. Comparisons 7 and 8 test the effect of $MED_{ij}*OND_j$. In comparison 7, $MED_{ij}*OND_j$, along with the other main effects, is tested against the full interaction model that includes both $MED_{ij}*OND_j$ and $CD_{ij}*OND_j$. Comparison 8 tests the effect of $MED_{ij}*OND_j$ with the other main effects against the main effects model. The likelihood ratio tests for both comparisons were not statistically significant indicating that $MED_{ij}*OND_j$ does not significantly improve the prediction of the proportion of LBW infants. On the other hand, comparisons 9 and 10 compare the effect of $CD_{ij}*OND_j$ against the full interaction model and the full main effects model. The results show that $CD_{ij}*OND_j$ is a significant predictor (compared to the full main effects model, ($\chi^2(1) = 4.25$, $p<0.05$). $MED_{ij}*OND_j$ is excluded from the model, and $CD_{ij}*OND_j$ is retained in the final model.

Table 4-16 Comparisons of Model Results

Comparisons	Models	LR test	df	p-value	Results
1	2 vs1	17.76	4	<0.01	Keep MED_{ij} and CD_{ij}
2	3 vs 1	37.61	1	<0.001	Keep OND_j
3	4 vs 1	55.32	5	<0.001	Keep MED_{ij} and CD_{ij} and OND_j
4	4 vs 2	37.56	1	<0.001	Keep OND_j
5	4 vs 3	17.71	4	<0.01	Keep MED_{ij} and CD_{ij}
6	5 vs 4	6.39	2	<0.05	Check interaction terms
7	6 vs 5	2.13	1	0.14	Drop $MED_{ij}*OND_j$
8	7 vs 4	0.43	1	0.51	Drop $MED_{ij}*OND_j$
9	7 vs 5	5.96	1	<0.05	Keep $CD_{ij}*OND_j$
10	6 vs 4	4.25	1	<0.05	Keep $CD_{ij}*OND_j$

4.5.2 Diagnostics

Estimation problems were encountered in model 6, which did not converge until the number of expectation-maximization iterations performed and the convergence tolerance were modified to 500 and 0.001, respectively. However, to assess whether aspects of the model were contributing to convergence problems, several model diagnostic steps were used: exploring the data structure, conducting diagnostic tests of model 6 residuals, and examining the effect of setting CD_{ij} as a random effect. Sensitivity analyses were conducted to compare results from these models taking into account these potential problems.

4.5.2.1 Singleton Neighborhoods

There were a total of 25 neighborhoods that were comprised of 1 block group. Table 4-17 includes the neighborhoods with their corresponding values for MED_{ij}, CD_{ij}, OND_j, and $CD_{ij}*OND_j$. Table 4-17 shows that Northview Heights and Bedford Dwellings had the highest

OND_j with values of 63.1 and 58.8, respectively. In addition, these neighborhoods had high values for MED_{ij} (73.9 and 69.9, respectively) and CD_{ij} (63.7 and 51.1) showing that these neighborhoods had high values of deprivation on both the neighborhood and block group levels. In contrast, Regent Square and Swisshelm Park had the lowest OND_j with values of 13.2 and 14.5, respectively. Their values for MED_{ij} and CD_j were relatively lower as well, suggesting that these two neighborhoods exhibit relatively lower deprivation on both the block group and neighborhood levels.

Table 4-17. Deprivation Values for Neighborhoods Comprised of 1 Block Group

Neighborhood- Name	MED_{ij}	CD_{ij}	OND_j	$MED_{ij}*OND_j$	$CD_{ij}*OND_j$
Allegheny Center	55.7	9.9	37.2	2074.0	367.0
Allegheny West	31.9	4.8	22.6	722.8	107.9
Arlington Heights	50.1	36.6	44.7	2240.2	1634.3
Bedford Dwellings	69.9	51.1	58.8	4110.8	3008.9
Bonair	17.7	9.4	18.8	333.3	177.7
California Kirkbride	44.3	39.9	43.1	1906.1	1719.8
Chartiers City	19.7	31.7	28.6	562.7	906.0
East Carnegie	23.9	13.2	24.6	588.6	325.4
Esplen	29.1	17.0	28.8	836.1	489.1
Fairywood	55.2	43.2	49.7	2743.2	2146.3
Glen Hazel	65.5	37.1	52.5	3439.4	1946.2
Hays	25.1	6.8	23.6	593.7	160.1
Mt. Oliver Neighborhood	30.5	16.2	28.2	858.3	455.6
New Homestead	11.1	7.4	16.7	185.9	124.1
North Shore	26.5	4.6	17.9	472.9	81.9
Northview Heights	73.9	63.7	63.1	4663.6	4017.8
Oakwood	28.0	9.0	23.4	654.2	209.1
Regent Square	13.2	7.1	13.2	174.2	93.6
Ridgemont	14.7	5.6	16.5	242.5	93.1
St. Clair	58.9	51.9	53.1	3127.7	2756.0
South Shore	54.9	16.0	32.9	1807.1	526.5
Strip District	34.6	32.3	33.9	1170.5	1093.5
Summer Hill	14.9	8.8	18.0	268.9	158.9
Swisshelm Park	11.1	6.7	14.5	161.4	98.1
West End	37.5	17.5	30.3	1137.3	531.8

Corresponding centered values for the factors are shown in Table 4-18. Table 4-18 lists singleton neighborhoods with their centered block group and neighborhood factors and corresponding interaction values. Because these neighborhoods are comprised of only one block group, centering MED_{ij} and CD_{ij} for these block groups resulted in zero values. In model 6, MED_{ij} and CD_{ij} are not contributing to the predicted LBW proportion, and OND_j is the sole contributor to the estimation of LBW for these neighborhoods. No neighborhoods comprised of more than 1 block group had centered block group factors equal to zero.

Table 4-18 Centered Deprivation Scores for Neighborhoods Comprised of 1 Block Group

Neighborhood Name	$cMED_{ij}$	cCD_{ij}	$cOND_j$	$cMED_{ij}*OND_j$	$cCD_{ij}*OND_j$
Allegheny Center	0.0	0.0	7.9	0.0	0.0
Allegheny West	0.0	0.0	-6.7	0.0	0.0
Arlington Heights	0.0	0.0	15.3	0.0	0.0
Bedford Dwellings	0.0	0.0	29.5	0.0	0.0
Bonair	0.0	0.0	-10.5	0.0	0.0
California Kirkbride	0.0	0.0	13.7	0.0	0.0
Chartiers City	0.0	0.0	-0.8	0.0	0.0
East Carnegie	0.0	0.0	-4.7	0.0	0.0
Esplen	0.0	0.0	-0.6	0.0	0.0
Fairywood	0.0	0.0	20.4	0.0	0.0
Glen Hazel	0.0	0.0	23.2	0.0	0.0
Hays	0.0	0.0	-5.7	0.0	0.0
Mt. Oliver Neighborhood	0.0	0.0	-1.2	0.0	0.0
New Homestead	0.0	0.0	-12.7	0.0	0.0
North Shore	0.0	0.0	-11.5	0.0	0.0
Northview Heights	0.0	0.0	33.7	0.0	0.0
Oakwood	0.0	0.0	-6.0	0.0	0.0
Regent Square	0.0	0.0	-16.1	0.0	0.0
Ridgemont	0.0	0.0	-12.8	0.0	0.0
St. Clair	0.0	0.0	23.8	0.0	0.0

4.5.2.2 Checking Residuals of Model 6

Model 6 residuals were evaluated to assess whether assumptions of normality and homoscedasticity were met and to identify outliers. Figure 4-20 shows plots of residuals, specifically: a) histogram, b) boxplot, c) kernel density plot, and d) quantile of the residuals versus the normal quantiles (Q-Q plot). The graphs, particularly the kernel density plot, show that in comparison to the normal distribution, these residuals are slightly skewed to the right, with a slightly longer tail on the right and shorter one on the left. The Q-Q plot shows a similar skewness on the curved higher values towards the right above the line.

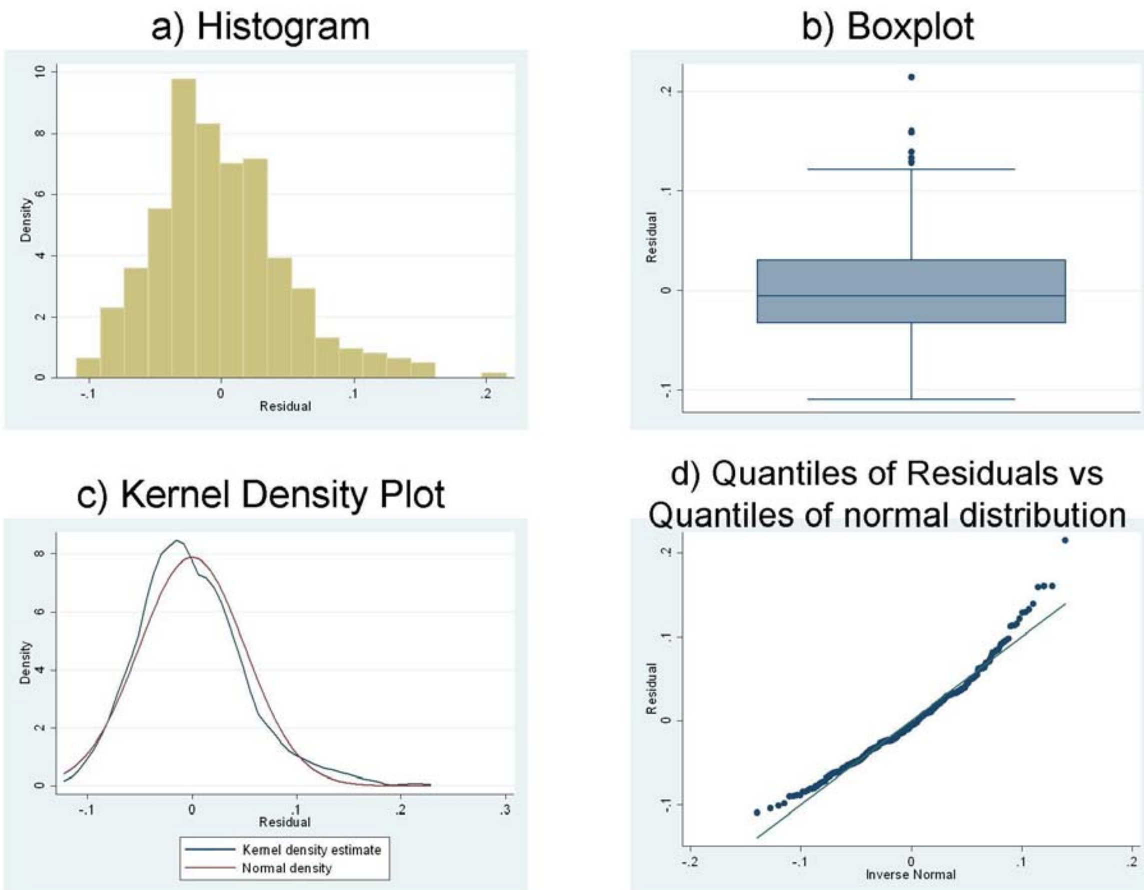


Figure 4-20 Graph of Residuals from Original Model 6

In addition, the standardized residuals of model 6 were explored to assess whether the assumption of homoscedasticity, or constant variance, had been met. Figure 4-21 shows a graph of the standardized residuals versus the predicted value, and Figure 4-22 shows the graph of the standardized residuals versus each of the predictors. Overall, the standardized residuals in each of these graphs show no obvious departure from constant variance (the spread of the residuals on the y-axis is similar across different values of the predictors and outcome).

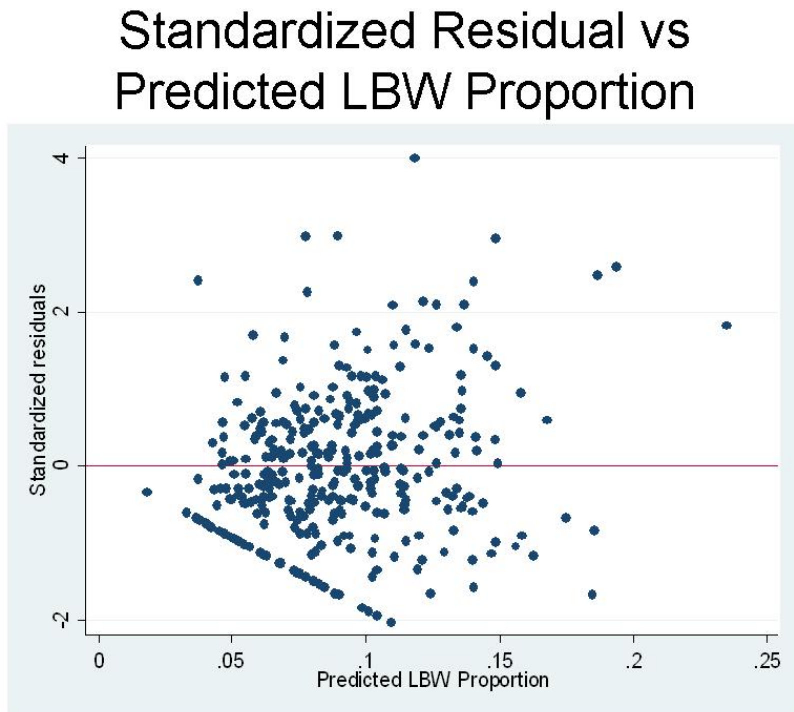


Figure 4-21 Standardized Residual vs Predicted LBW Proportion

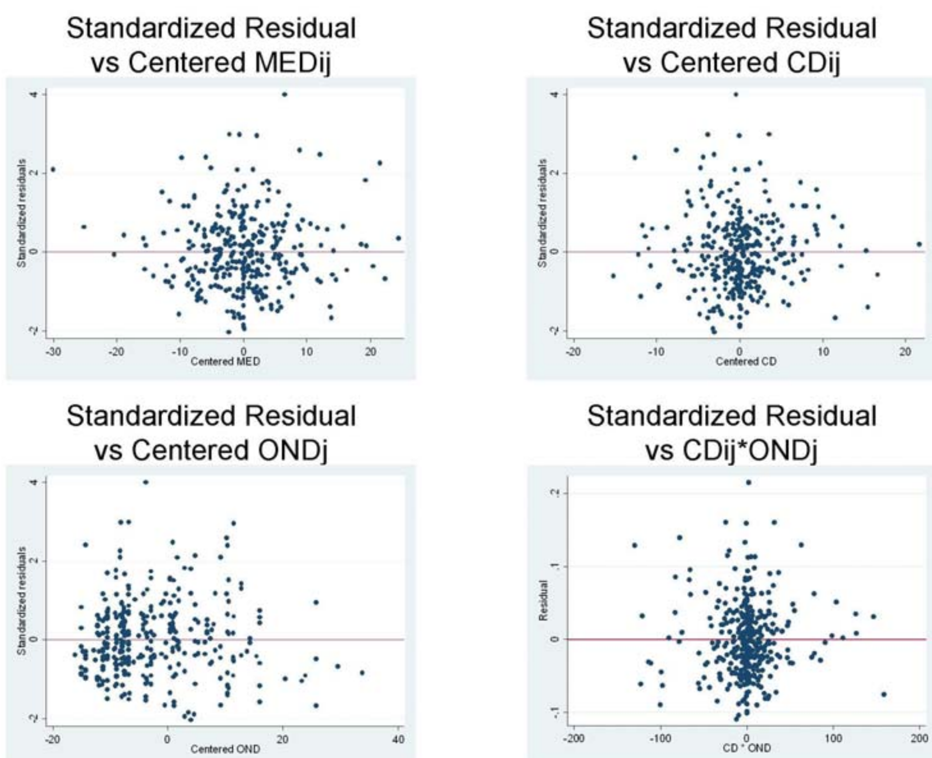


Figure 4-22 Standardized Residuals vs Predictors

Figures 4-21 and 4-22 show an outlier with a standardized residual at 4.0. Table 4-19 summarizes this outlier located in South Side Flats, just immediately west of Birmingham Bridge. This neighborhood had an observed LBW proportion of 0.33, which represented one LBW infant out of a total of three who were born. This block group had relatively lower OND_j (-3.97) compared to other neighborhoods. In comparison to other block groups within South Side Flats, this block group had relatively high MED_{ij} (42.23), and lower CD_{ij} (3.81). This block group also has a high percentage of renters (73%), and a high percentage earning $\leq$ \$30,000 (68%).

Table 4-19 Characteristics of Identified Outlier Block Group in South Side Flats

Neighborhood Name	South Side Flats
Block Group	1609001
# of Block Groups	5.00
Observed LBW Proportion	0.33
Fitted	0.12
$cMED_{ij}$	6.45
cCD_{ij}	-0.50
$cOND_{j}$	-3.97
$cCD_{ij}*OND_{j}$	1.98
Standardized Residual	4.01
MED_{ij}	42.23
CD_{ij}	3.81
OND_{j}	25.38
$CD_{ij}*OND_{j}$	96.70

4.5.2.3 Sensitivity Analysis

Several models were compared to model 6 to examine the effect of the data structure, outliers, and random effects on model estimates. Table 4-20 summarizes the parameters from each of these models: the original model 6, the model including only neighborhoods comprised of more than 1 block group, the model excluding the outlier block group located in South Side Flats, the model indicating CD_{ij} as a fixed effect, and the model with only the main effects. Parameter estimates were similar across the models. In addition, the plots in figure 4-23 shows model 6 predicted values are similar to the predicted values from the other models. Depicted in the bottom right hand corner of figure 4-23 is predicted LBW of model 6 (interaction model) versus the predicted outcome from model 4 (main effects model). Adding the interaction term introduces some variation, although small, about the estimates from the main effects model. Based on results from model building and sensitivity analysis, model 6 is selected as the final model. However, the main effects model (model 4) is also interpreted to further examine the association between CD_{ij} and LBW.

Table 4-20 Sensitivity Analysis: Results from Original Model 6 and Modified Models

	1 Original Model		2 Model with Neighborhoods Comprised of >1 Block Group		3 Model Without Outlier		4 Model Removing CD_{ij} as Random Effect		5 Model with only Main Effects	
# of Block Groups	341		316		340		341		341	
# of Neighborhoods	*89*		64		89		89		89	
Fixed Effects Parameters	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*	*Coefficient*	*SE*
MED_{ij}	0.0018071	0.0006651	0.0018074	0.0006651	0.0015563	0.0006427	0.0018072	0.0006651	0.0016507	0.0006851
CD_{ij}	-0.0003208	0.0007869	-0.000321	0.0007868	-0.0001672	0.0007875	-0.0003209	0.0007869	-0.0004651	0.0008736
OND_j	0.0027202	0.0003809	0.0031953	0.0004392	0.0027007	0.0003843	0.0027201	0.0003809	0.0027126	0.0003802
CD_{ij}*OND_j	-0.0002292	0.0000959	-0.0002292	0.0000959	-0.0002159	0.000096	-0.0002292	0.0000959	--	--
Constant	0.0980762	0.0036437	0.1018746	0.0038694	0.0972666	0.0037024	0.0980762	0.0036438	0.0980671	0.0036409
Random Effects Parameters	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*	*Estimate*	*SE*
Var (MED_{ij})	6.42e-06	3.20e-06	6.43e-06	3.20e-06	5.91e-06	2.85e-06	6.42e-06	3.20e-06	7.23e-06	3.53e-06
Var (CD_{ij})	2.16e-10	1.23e-07	2.05e-10	1..25e-07	1.47e-06	4.77e-06	--	--	4.89e-06	5.52e-06
Var(Constant)	0.0002657	0.0001573	0.0002482	0.000153	0.0003521	0.0003521	0.0002657	0.0001573	0.0002794	0.0001593
Var (Residual)	0.0028753	0.0002625	0.0028736	0.0002696	0.0026276	0.0026276	0.0028752	0.0002624	0.0028087	0.0002714

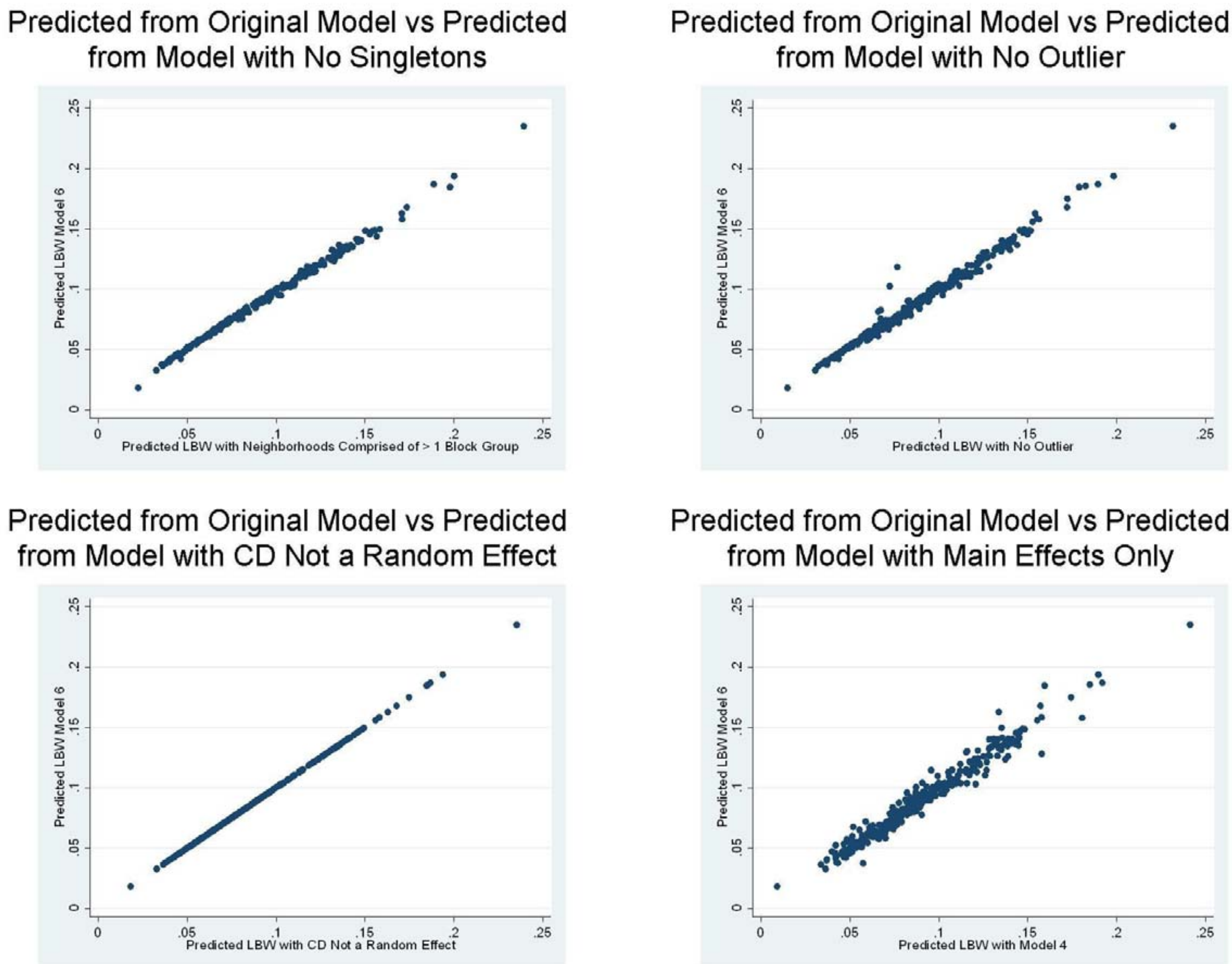


Figure 4-23 Graph of Results from Sensitivity Analysis Comparing Predicted LBW from Model 6 to Modified Models

The following are models 4 and 6:

Model 4, Main Effects Model only:

$$Lowbirth\,weight\,proportion_{ij} = 0.098 + 0.0027 * \left(OND_j - \overline{OND}\right) + 0.0017 * \left(MED_{ij} - \overline{MED}_j\right) + \\ - 0.0005 * \left(CD_{ij} - \overline{CD}_j\right) + \mu_{oj} + \mu_{1j} * MED_{ij} + \mu_{2j} * CD_{ij} + \varepsilon_{ij} \tag{4.1}$$

Model 6 with CD_{ij}*OND_j:

$$Lowbirth\,weight\,proportion_{ij} = 0.098 + 0.0027 * \left(OND_j - \overline{OND}\right) + 0.0018 * \left(MED_{ij} - \overline{MED}_j\right) + \\ - 0.0003 * \left(CD_{ij} - \overline{CD}_j\right) + -0.0002 * \left(OND_j - \overline{OND}\right) * \left(CD_{ij} - \overline{CD}_j\right) + \mu_{oj} + \mu_{1j} * MED_{ij} + \mu_{2j} * CD_{ij} + \varepsilon_{ij} \tag{4.2}$$

where, ε_{ij} is assumed to be independently, normally distributed with a constant variance, and μ_{oj}, μ_{1j}, and μ_{2j} are normally distributed with variances τ_{00}, τ_{11}, and τ_{22}, respectively. Tables 4-21 and 4-22 show complete estimates from the multilevel linear regression analysis for model 4 and model 6, respectively. In both models, the average proportion of LBW for block groups in neighborhoods with an average OND_j was 0.098.

For Model 4, OND_j was a significant predictor of LBW proportion; the proportion of LBW infants increased by about 0.003 per one unit increase in OND_j on a scale of 0 to 100 ($p<0.001$). MED_{ij} was a significant predictor of LBW proportion and on average increased LBW proportion across neighborhoods by 0.0018 per unit increase in MED_{ij} on a scale of 0 to 100 ($p<0.05$). Finally, CD_{ij} alone was not a significant predictor of the proportion of LBW across neighborhoods ($p=0.59$). Interpretation for model 6 was similar to model 4, except that the interaction between CD_{ij} and OND_j was included. For Model 6, OND_j was a significant predictor of LBW proportion; the proportion of LBW infants increased by about 0.003 per one unit increase in OND_j on a scale of 0 to 100 ($p<0.001$). MED_{ij} was a significant predictor of LBW proportion and on average increased LBW proportion across neighborhoods by 0.0018 per unit increase in MED_{ij} on a scale of 0 to 100 ($p<0.01$). Finally, CD_{ij} alone was not a significant predictor of the proportion of LBW across neighborhoods ($p=0.68$ for the main effect), but its effect was moderated by OND_j ($p<0.05$). Figure 4-24 shows the predicted LBW proportion from Model 6 to the observed LBW proportion (the graph of predicted LBW proportion from Model 4 was similar to the Model 6 graph and is not shown).

Table 4-21 Results of Model 4: Multilevel Regression Model with Main Effects Only

	Coefficient	*SE*	*z*	*p-value*
Constant	0.0980671	0.0036409	26.93	<0.001
Fixed Effects Parameters				
MED_{ij}	0.0016507	0.0006851	2.72	<0.05
CD_{ij}	-0.0004651	0.0008736	-0.41	0.59
OND_j	0.0027126	0.0003802	7.14	<0.001
Random Effects Parameters	*Estimate*	*SE*	*95% Confidence Interval*	
Var (MED_{ij})	7.23e-06	3.53e-06	2.77e-06	.0000188
Var (CD_{ij})	4.89e-06	5.52e-06	5.33e-07	.0000448
Var (Constant)	0.0002794	0.0001593	.0000914	.0008541
Var (Residual)	0.0028087	0.0002714	.0023242	.0033943

Table 4-22 Results of Model 6: Multilevel Regression Model with Main Effects and CD_{ij}*OND_j

	Coefficient	SE	z	p-value
Constant	0.0980762	0.0036437	26.92	<0.001
Fixed Effects Parameters				
MED_{ij}	0.0018071	0.0006651	2.72	<0.01
CD_{ij}	-0.0003208	0.0007869	-0.41	0.68
OND_j	0.0027202	0.0003809	7.14	<0.001
Interaction between CD_{ij} and OND_j	-0.0002292	0.0000959	-2.39	<0.05
Random Effects Parameters	**Estimate**	**SE**	**95% Confidence Interval**	
Var (MED_{ij})	6.42e-06	3.20e-06	2.42e06	0.000017
Var (CD_{ij})	2.16e-10	1.23e-07	0	.
Var (Constant)	0.0002657	0.0001573	0.0000832	0.0008478
Var (Residual)	0.0028753	0.0002625	0.0024042	0.0034387

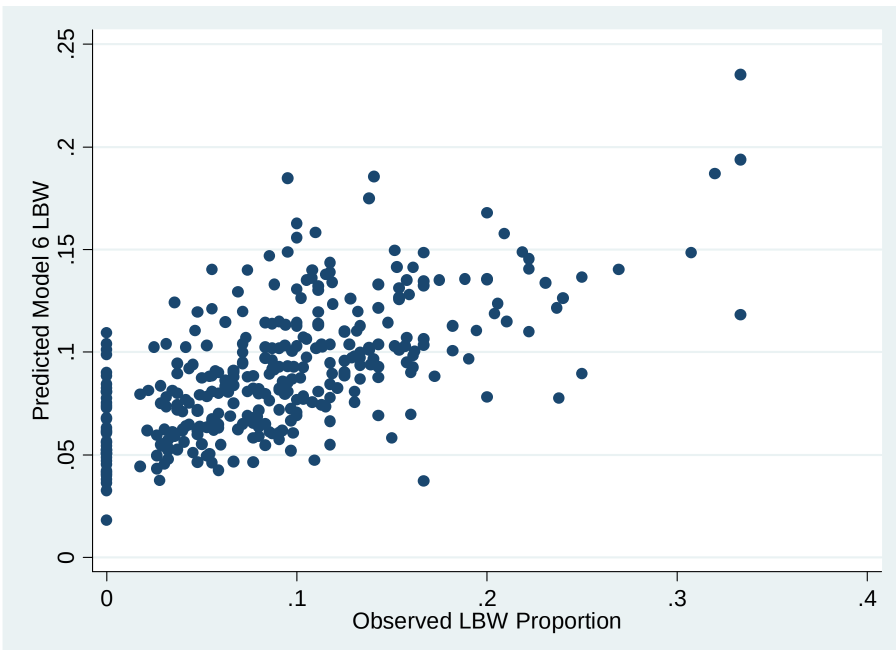


Figure 4-24 Predicted Model 5 LBW vs Observed LBW

4.5.2.4 Interpretation of Model Results

The results of two analyses helped in interpretation of model 6. First, Figures 4-25 a-c show the predicted LBW proportion by each main effect for all of Pittsburgh: increasing trends in MED_{ij}, CD_{ij}, and OND_j correspond to an increase in LBW proportion. These relationships are also reflected in Figures 4-25d-f, which focus on the selected neighborhoods of East Liberty, Garfield, Shadyside, and Squirrel Hill North. Based on Model 6, predicted LBW proportions for Shadyside and Squirrel Hill were much lower than East Liberty and Garfield, suggesting that block groups in East Liberty and Garfield are experiencing relatively higher proportion of LBW infants. In addition, results seem to show that East Liberty and Garfield seem to be experiencing higher levels of deprivation and disadvantage, compared to Shadyside and Squirrel Hill North.

Second, block groups were selected from Squirrel Hill North, East Liberty, and Garfield to further help in interpretation of model 6. Predictor and outcome values are shaded gray in Table 4-23. These selected block groups represent a less deprived block group in a less deprived neighborhood (Squirrel Hill North block group 1401001), a more deprived block group in a more deprived neighborhood (East Liberty block group 1115004), and a less deprived block group in a more deprived neighborhood (Garfield block group 1017001). Estimates from model 6 are used to calculate the predicted LBW proportion (ignoring random effects) and assess which predictor is driving the predicted LBW proportion. These same block groups were also used to help interpret model 4 and compare results between models 4 and 6. The following section describes the simpler model first (model 4) followed by the more complex model (model 6).

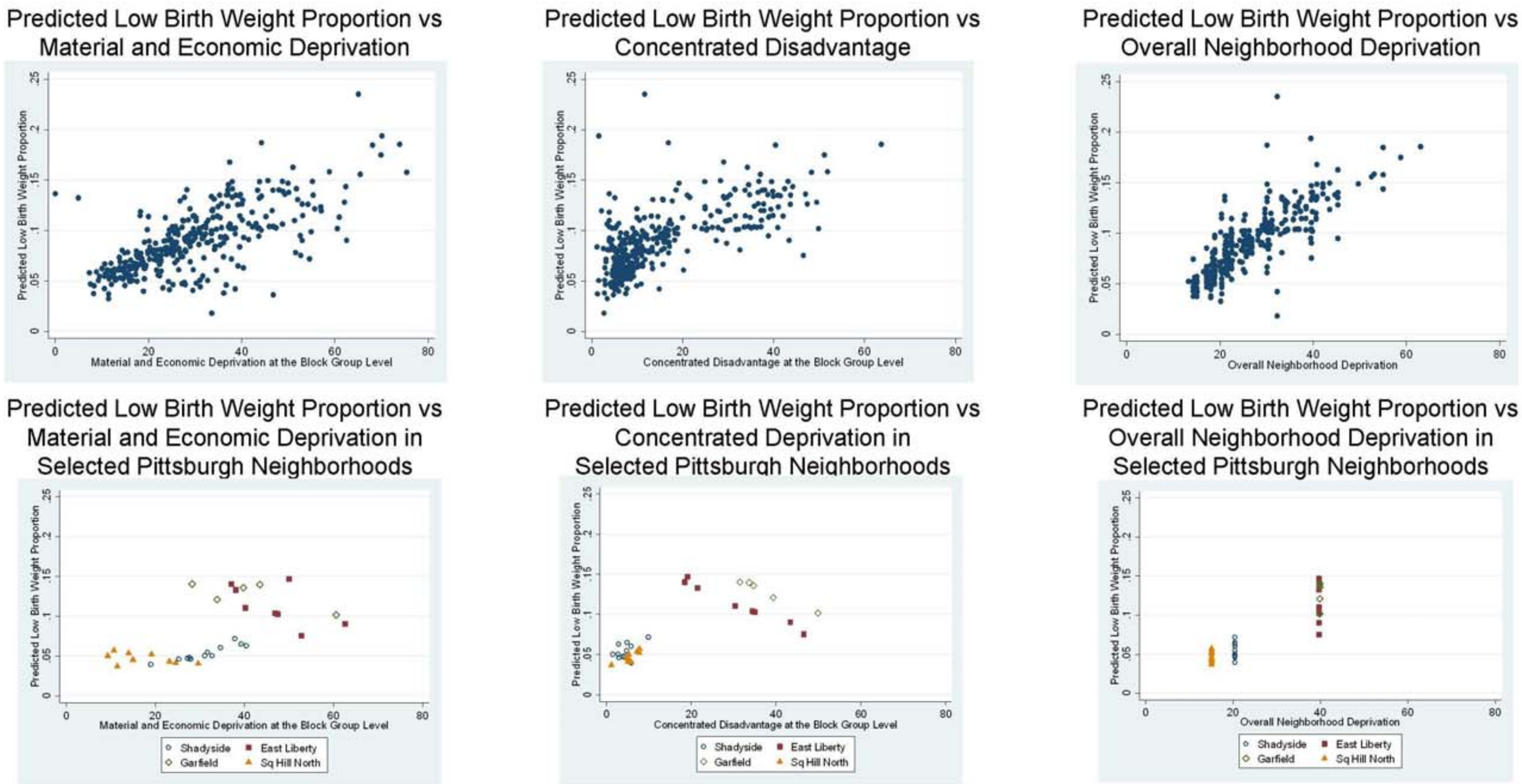


Figure 4-25 Predicted LBW Proportion by Factors. Top row--all of Pittsburgh: a) LBW by MED_{ij}, b) LBW by CD_{ij}, c) LBW by OND_j. Bottom Row--Selected Pittsburgh Neighborhoods: d) LBW by MED_{ij}, e) LBW by CD_{ij}, f) LBW by OND_j

Table 4-23 Predicted LBW Proportion and Centered Values of Block Group and Neighborhood Factors for Selected Pittsburgh Neighborhoods

Neighborhood	Predicted LBW Proportion from Model 4	Predicted LBW Proportion from Model 6	Observed LBW Proportion	Centered Material and Economic Deprivation ($cMED_{ij}$)	Centered Concentrated Disadvantage (cCD_{ij})	Centered Overall Neighborhood Deprivation ($cOND_j$)	Centered Interaction Term (cCD_{ij}*OND_j)
East Liberty							
Block groups							
1113001	0.11	0.11	0.05	-6.7	-0.76	10.29	-7.82
1113002	0.14	0.14	0.27	-9.79	-12.62	10.29	-129.77
1113003	0.10	0.10	0.11	0.59	3.94	10.29	40.55
1113004	0.13	0.13	0.09	-8.84	-9.63	10.29	-99.1
1115001	0.10	0.10	0.03	-0.02	3.3	10.29	33.9
1115002	0.07	0.08	0.00	5.9	15.43	10.29	158.77
1115003	0.15	0.15	0.09	3.14	-11.95	10.29	-122.91
1115004	0.09	0.09	0.13	15.72	12.29	10.29	126.38
Garfield							
Block groups							
1016001	0.11	0.10	0.11	19.39	12.07	10.51	126.87
1017001	0.14	0.14	0.22	-12.92	-6.34	10.51	-66.62
1017002	0.13	0.14	0.19	-1.44	-3.12	10.51	-32.82
1114001	0.13	0.14	0.07	2.28	-4.14	10.51	-43.48
1114002	0.13	0.12	0.06	-7.31	1.53	10.51	16.04
Shadyside							
Block groups							
703001	0.06	0.05	0.00	1.49	-3.02	-8.96	27.08
703002	0.06	0.06	0.00	3.43	1.31	-8.96	-11.71
703003	0.04	0.04	0.00	-12.26	1.39	-8.96	-12.44
705001	0.05	0.05	0.00	-0.12	-1.75	-8.96	15.69
705002	0.06	0.06	0.06	9.2	-1.69	-8.96	15.12
705003	0.06	0.07	0.04	6.61	5.34	-8.96	-47.85
706001	0.04	0.05	0.05	-5.94	0.35	-8.96	-3.17
706002	0.05	0.05	0.08	-3.31	-1.6	-8.96	14.32
708001	0.05	0.05	0.00	-3.56	-0.27	-8.96	2.44
708002	0.05	0.05	0.11	-4.03	-0.62	-8.96	5.58
709001	0.05	0.06	0.03	0.5	0.25	-8.96	-2.2
709002	0.06	0.07	0.07	8.02	0.32	-8.96	-2.85
Squirrel Hill North							
Block groups							
1401001	0.05	0.05	0.03	-2.47	-0.87	-14.31	12.45
1401002	0.05	0.05	0.00	-8.13	-0.29	-14.31	4.11
1401004	0.04	0.06	0.17	-5.97	-4.40	-14.31	62.98
1402001	0.04	0.04	0.00	7.12	-0.52	-14.31	7.40
1402002	0.04	0.04	0.00	12.18	0.21	-14.31	-3.05
1403001	0.05	0.04	0.00	1.72	2.18	-14.31	-31.18
1403002	0.04	0.04	0.03	5.72	-0.15	-14.31	2.18
1403003	0.06	0.05	0.03	-6.72	2.24	-14.31	-32.07
1403004	0.05	0.05	0.03	-3.44	1.60	-14.31	-22.83

4.5.3 Interpreting Model 4 (Main Effects Only) with Three Selected Block Groups

4.5.3.1 Less Deprived Block Group/Less Deprived Neighborhood: Squirrel Hill North Block Group 1401001

Squirrel Hill North block group 1401001 represents a block group with relatively low $cMED_{ij}$ (-2.47), relatively low cCD_{ij} (-0.87), and relatively low $cOND_j$ (-14.31). The predicted LBW proportion for this neighborhood is 0.05, and the observed LBW proportion was 0.03. The predicted LBW proportion is mostly due to $cOND_j$ (decreases of 0.039), and followed by $cMED_{ij}$ (decrease of -0.004). The change due to cCD_{ij} was negligible (0.0004).

$$LBW\ proportion_{ij} = 0.098 + 0.0027 * cOND_j + 0.0017 * cMED_{ii} - 0.0005 * cCD_{ij}$$

$$\begin{aligned} &LBW\ proportion_{1401001,SqHN} = \\ &0.098 + (0.0027 * -14.31) + (0.0017 * -2.47) + (-0.0005 * -0.87) \\ &0.098 + (-0.039) + (-0.004) + (0.0004) \end{aligned} \tag{4.3}$$

4.5.3.2 More Deprived Block Group/More Deprived Neighborhood: East Liberty Block Group 1115004

East Liberty block group 1115004 represents a block group with relatively high $cMED_{ij}$ (15.72), relatively high cCD_{ij} (12.29), and relatively low OND_j (10.29). The predicted LBW proportion for this neighborhood is 0.09, and the observed LBW proportion is 0.13. The predicted LBW proportion is due mostly to OND_j (increase by 0.028) and MED_{ij} (increase by 0.026), but attenuated by $CD_{ij}*OND_j$ (decrease by -0.006).

$$LBW\ proportion_{ij} = 0.098 + 0.0027 * cOND_j + 0.0017 * cMED_{ii} - 0.0005 * cCD_{ij}$$

$$LBW\ proportion_{1115004,EL} =$$
$$0.098 + (0.0027 * 10.29) + (0.0017 * 15.72) + \underline{(-0.0005 *}12.29)$$

$$0.098 + (0.028) + (0.026) + \underline{(-0.006)} \qquad (4.4)$$

4.5.3.3 Less Deprived Block Group/More Deprived Neighborhood: Garfield Block Group 1017001

Garfield block group 1017001 represents a block group with relatively low $cMED_{ij}$ (-12.92), relatively low cCD_{ij} (-6.34), and relatively high OND_j (10.51). The predicted LBW proportion for this neighborhood is 0.14, and the observed LBW proportion is 0.22. The predicted LBW proportion is mostly due to OND_j (increase by 0.029) and MED_{ij} (decrease of 0.021). Change due to CD_{ij} was small (0.003).

$$LBW\ proportion_{ij} = 0.098 + 0.0027 * cOND_j + 0.0017 * cMED_{ii} - 0.0005 * cCD_{ij}$$

$$LBW\ proportion_{1017001,G} =$$
$$0.098 + (0.0027 * 10.51) + (0.0017 * -12.92) + \underline{(-0.0005} * -6.34)$$

$$0.098 + (0.029) + (-0.021) + \underline{(0.003)} \qquad (4.5)$$

4.5.4 Interpreting Model 6 (Main Effects Plus CD_{ij}*OND_j) with Three Selected Block Groups

For model 6, with some algebraic manipulation of the fixed effects (equation 4.6), the simplified model 6 is presented in equation 4.7 where $cMED_{ij}$, cCD_{ij}, and $cOND_j$ are centered predictor values. The regression coefficient to cCD_{ij} in 4.7 represents the interaction coefficient between OND_j and CD_{ij} (indicated in underline). This coefficient shows the moderating effect of OND_j on the association between CD_{ij} and LBW.

$$LBW\ proportion_{ij} = 0.098 + (0.0027 * cOND_j) + (0.0018 * cMED_{ij}) + (-0.0003 * cCD_{ij}) + (-0.00023 * cOND_j * cCD_{ij}) \tag{4.6}$$

$$LBW\ proportion_{ij} = 0.098 + (0.0027 * cOND_j) + (0.0018 * cMED_{ij}) + \underline{(-0.0003 + (-0.00023 * cOND_j))} * cCD_{ij} \tag{4.7}$$

4.5.4.1 Less Deprived Block Group/Less Deprived Neighborhood: Squirrel Hill North Block Group 1401001

The predicted LBW proportion for Squirrel Hill North 1401001 based on model 6 is 0.05. The predicted LBW proportion is mostly due to $cOND_j$ (decreases of 0.039), and to a lesser degree by $cMED_{ij}$ (decrease of .004) and $cCD_{ij}*cOND_j$ (0.003).

$$LBW\ proportion_{ij} = 0.098 + 0.0027 * cOND_j + 0.0018 * cMED_{ij} + \underline{(-0.0003 + (-0.00023 * cOND_j))} * cCD_{ij}$$

$$LBW\ proportion_{1401004,SqHN} =$$
$$0.098 + (0.0027 * -14.31) + (0.0018 * -2.47) + \underline{(-0.0003 + (-0.00023 * -14.31))} * -0.87$$

$$0.098 + (-0.039) + (-0.004) + \underline{(0.003)} * -0.87$$

$$0.098 + (-0.039) + (-0.004) + \underline{(-0.003})\tag{4.8}$$

4.5.4.2 More Deprived Block Group/More Deprived Neighborhood: East Liberty Block Group 1115004

The predicted LBW proportion for East Liberty block group 1115004 based on model 6 is 0.09. The predicted LBW proportion is mostly due to OND_j (increase by 0.028) and MED_{ij} (increase by 0.029), but attenuated by $CD_{ij}*OND_j$ (decrease by -0.03).

$$LBW\ proportion_{1115004,EL} =$$
$$0.098 + (0.0027 * 10.29) + (0.0018 * 15.72) + \underline{(-0.0003 + (-0.00023 * 10.29))} * 12.29$$

$$0.098 + (0.028) + (0.029) + \underline{(-0.0027)} * 12.29$$

$$0.098 + (0.028) + (0.029) + \underline{(-0.03})\tag{4.9}$$

4.5.4.3 Less Deprived Block Group/More Deprived Neighborhood: Garfield Block Group 1017001

The predicted LBW proportion for Garfield block group 1017001 based on model 4 is 0.14. The predicted LBW proportion is mostly due to OND_j (increase by 0.028) and CD_{ij}*OND_j (increase by 0.015), but decreased by MED_{ij} (decrease of 0.023).

$$LBW\ proportion_{ij} = 0.098 + 0.0027 * cOND_j + 0.0018 * cMED_{ij} + \underline{(-0.0003 + (-0.00023 * cOND_j))} * cCD_{ij}$$

$$LBW\ proportion_{1017001,G} =$$
$$0.098 + (0.0027 * 10.51) + (0.0018 * -12.92) + \underline{(-0.0003 + (-0.00023 * -12.92))} * -6.34$$

$$0.098 + (0.029) + (-0.023) + \underline{(0.029)} * -6.34$$

$$0.098 + (0.029) + (-0.023) + \underline{(0.017)} \tag{4.10}$$

Table 4-24 Summary of Model 4 and Model 6 Calculations

		Model 4			Model 6		
Neighborhood	**Block Group**	**OND_j**	**MED_{ij}**	**CD_{ij}**	**OND_j**	**MED_{ij}**	**CD_{ij}*OND_j**
Squirrel Hill North	1401001	-0.039	-0.004	0.0004	-0.039	-0.004	-0.003
East Liberty	1115004	0.028	0.026	-0.006	0.028	0.029	-0.03
Garfield	1017001	0.029	-0.021	0.003	0.029	-0.023	0.017

Table 4-24 summarizes the calculations for model 4 and 6 for each of the selected block groups. Model 4 results show that CD_{ij} contributes little to the prediction of LBW proportion, which is expected given that CD_{ij} is a non-significant predictor in model 4. In contrast, OND_j was a stronger predictor of LBW proportion for each of the selected block groups, followed my MED_{ij}.

Model 6, on the other hand, shows the complexities of the relationship between CD_{ij} and OND_j in predicting LBW. In model 6, as expected, lower deprivation and disadvantage in the Squirrel Hill North block group reflected lower LBW proportion (0.06) than the average LBW.

Most of the decrease was due to OND_j, but a smaller decrement was due to block group levels of MED_{ij} and the interaction between CD_{ij} and OND_j. However, the contribution of the interaction between CD_{ij} and OND_j was more apparent in block groups in East Liberty and Garfield. The East Liberty block group exhibited relatively higher levels of deprivation and disadvantage at both the block group and neighborhood levels. Although a majority of the increase was due to OND_j and MED_{ij}, a large decrease was observed due to the interaction between CD_{ij} and OND_j. Predicted LBW proportion was reduced by -0.03, partially canceling the increase in LBW proportion contributed by both MED_{ij} and OND_j. For the Garfield block group, which represented relatively lower disadvantage and deprivation at the block group level but located in a neighborhood with high level of deprivation, OND_j contributed to an increase in LBW, although this increase was attenuated by MED_{ij}. The interaction between CD_{ij} and OND_j contributed to an increase in LBW proportion (0.015), suggesting that although this block group may have been experiencing less disadvantage, the higher levels of neighborhood deprivation where the block group is located contributed to higher LBW proportion. For this block group, the benefit of living in a less disadvantaged block group was attenuated by the conditions of the neighborhood in which the block group was located.

The predicted LBW proportion is plotted against CD_{ij} for different levels of OND_j: high OND_j, low OND_j, and mean OND_j. Figure 4-26 shows interaction effects between OND_j and CD_{ij} on LBW proportion. For block groups located in neighborhoods with low OND_j (the top decreasing line shown in Figure 4-26), as CD_{ij} at the block group increases, the proportion of LBW decreases. However, for block groups in neighborhoods with high OND_j (the bottom increasing line), as CD_{ij} increases, the proportion of LBW increases. The results suggest a negative relationship between CD_{ij} and LBW proportion if OND_j is low and a positive relationship between the two same variables if OND_j is high. Unlike model 4 results, to understand the contribution of CD_{ij} on LBW, OND_j must be known. Block groups with higher CD_{ij} may have lower predicted LBW proportion if they are located in areas with low levels of OND_j. In other words, low levels of OND_j may confer a protective effect for those block groups with high levels of CD_{ij}. In contrast, however, block groups with lower CD_{ij} may have higher predicted LBW proportion if they are located in neighborhoods with high levels of OND_j. The advantages of living in block groups that are relatively less disadvantaged is reduced if those block groups are located in neighborhoods with higher levels of deprivation.

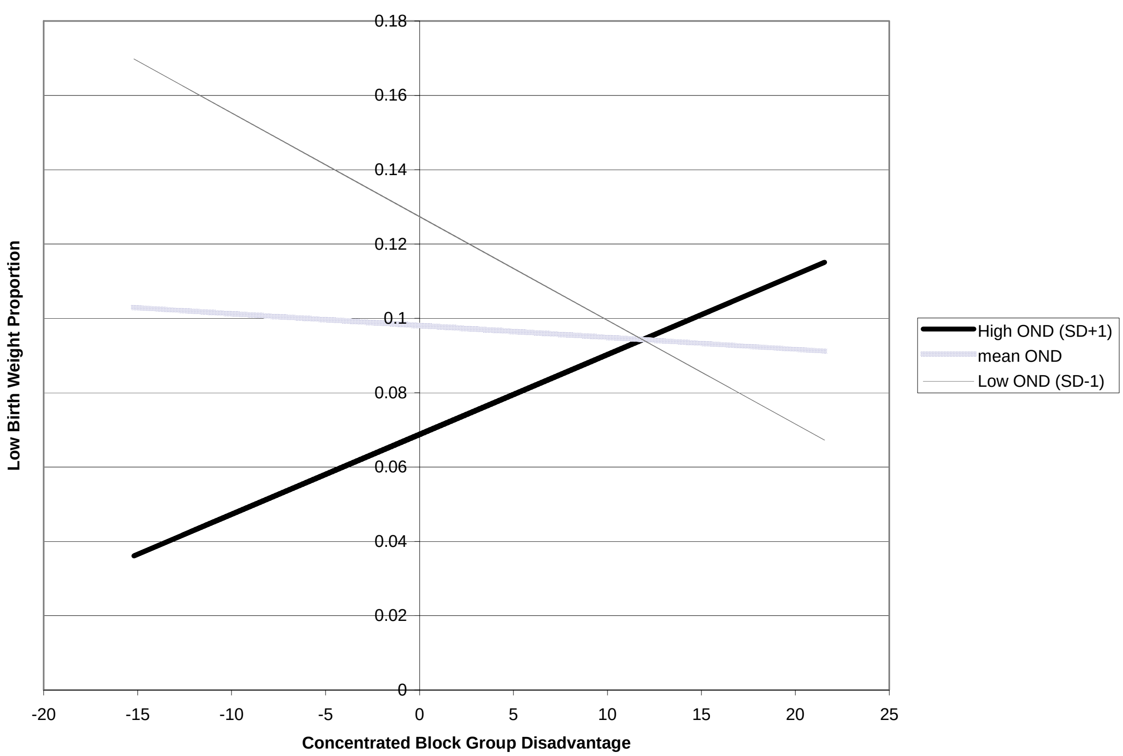


Figure 4-26 Moderating Effect of OND_j on CD_{ij} in Predicting LBW Proportion

5.0 DISCUSSION AND CONCLUSIONS

5.1.1 Summary

Although there has been an increase in the number of studies examining area-level effects and health outcomes, few studies have systematically examined empirically at which area level to conduct the analysis. Although most studies utilize theory to select the level at which to examine the area-level effects on a health outcome, this study used a more empirical approach in exploring the data and constructing composite measures of SEP.

Data exploration through boxplots showed similar distributions of each SEP measure across block groups, census tracts, and neighborhoods. Maps, such as those depicting East Liberty and Squirrel Hill, showed diversity in some SEP measures at the block group level and provided a quick way to compare SEP measures within an area. Most SEP measures at each of the area levels for East Liberty fell in the higher quintiles whereas SEP measures for Squirrel Hill were in the lower quintiles. This suggests that East Liberty exhibits more deprivation than Squirrel Hill. Examining neighborhood variances for each SEP measure showed that most neighborhoods had variances that were significantly different from each other, suggesting that in some neighborhoods, block groups were similar to each other and in other neighborhoods, block groups were very different.

Additional data exploration included examining the contribution of the variance at the block group, census tract, and neighborhood levels. Decomposing the variance for each level demonstrated a significant contribution of the variance at the block group and neighborhood levels, but not at the census tract level. The results suggest that examining SEP only at one level may mask the contribution of area-level effects at the other levels. For example, limiting an analysis to neighborhood level only may obscure the effects of SEP at the block group level. In addition, examining SEP at all three levels does not provide more information than a two-level analysis in Pittsburgh. The contribution of the census tract variance to the total variance was minimal, partly attributable to the fact that there were 25 neighborhoods comprised of one census tract or one block group. ICCs showed the higher proportion of the variance was contributed at the neighborhood level for most SEP measures. Only for percent unemployment and percent crowded households did block groups provide the majority of the total variance. In terms of the spatial relationships among block groups and neighborhoods, adjacent areas at the neighborhood level were not as similar as adjacent areas at the block group level. Based on these results, further analysis of Pittsburgh utilized a two-level approach with block groups at level 1 and neighborhoods at level 2.

Further exploration of the data involved examining correlations between the SEP measures at the block group and neighborhood levels taking into consideration the nested structure of the data. Parsing the total correlation matrix into a within and between correlation matrix revealed different number of strong correlations between measures at the block group and neighborhood levels. Whereas between neighborhoods showed that SEP measures were correlated with seven to eleven other measures, within neighborhoods showed that fewer SEP measures were correlated with each other, with a range of correlated measures spanning from one to seven. Three measures were not correlated with any other measures, suggesting that different SEP factors may be operating at the block group and neighborhood levels.

These findings resulted in a process that assesses the level in which to examine area-level effects on health: using boxplots and maps to compare initially differences across area levels, testing the variance of neighborhoods to examine how heterogeneous these areas are, and examining the bivariate associations of SEP measures at each level to ascertain if different associations emerge out of each area level. In addition to the use of theory in explaining the rationale of why an area level was selected for analysis, the aforementioned steps provide an empirical way to assess the structure of the data to help select at which area level to conduct the analysis. For our analysis, the findings suggest that examining SEP at the block group and neighborhood levels was warranted.

MFA was a novel way of combining SEP measures to represent constructs of deprivation in an area. MFA revealed different factors at the block group and neighborhood levels. There were two SEP factors at the block group level: MED_{ij} and CD_{ij}. MED_{ij} represented material deprivation of an area, such as not owning a car and renting one's residence, and the economic deprivation of an area, specifically being in poverty, receiving public assistance, and having a low income. CD_{ij} represented the concentration of socially disadvantaged groups, specifically Blacks, single-headed households with children, and those receiving public assistance. These were the same SEP measures that loaded onto Sampson's Concentrated Disadvantage Index, although Sampson's Index also included percentage in poverty or percentage unemployed. Of note, percent receiving public assistance loaded onto both within neighborhood factors and is considered a complex item. Because this measure was used in both the Concentrated Disadvantage Index developed by Sampson and colleagues (1997) and in the Neighborhood

Deprivation Index developed by Messer and colleagues (2004) suggests that this measure may play a role in characterizing both the economic deprivation and the social structure of an area. Those receiving public assistance may represent those who are deprived economically and also those who are socially disadvantaged. For the neighborhood factor (OND_j), all 12 SEP measures were captured.

Also, this paper outlines steps in which to select the final model. Two models were considered: the model that included only the main effects (Model 4), and the model that included the main effects and the interaction between CD_{ij} and OND_j (Model 6). Model 4 showed that MED_{ij} and OND_j were significant predictors of LBW proportion, but CD_{ij} was not. Model 6 also showed that MED_{ij} and OND_j were significant predictors of the proportion of LBW, specifically hat MED_{ij} and OND_j increased the proportion of LBW at block group level by 0.002 and 0.003 per unit increase in MED_{ij} and OND_j on a scale of 0 to 100, respectively. On the other hand, the effect of CD_{ij} by itself was not significant (p=0.68) but was significantly moderated by OND_j. This suggests a complex role of concentrated disadvantage unlike material deprivation. To understand the association between concentrated disadvantage and LBW proportion, one must also know the neighborhood (i.e., neighborhood deprivation).

Model 6 encountered convergence problems in estimating the parameters. Diagnostics were conducted to examine the structure of the data, and also assess whether assumptions of residual normality and homoscedasticity were and examine possible outliers. Sensitivity analyses were conducted to compare model 6 to other models, including model 4, and results demonstrated no large differences in the parameter estimates between the models.

Selected neighborhoods representing various levels of block group and neighborhood deprivation and disadvantage were used to help better understand both models, especially model

6 and the interaction between CD_{ij} and OND_j. Using Squirrel Hill North block group as an example, a less disadvantaged block group located in a less deprived neighborhood exhibited lower LBW proportion, which was expected. In contrast, East Liberty block group was both disadvantaged and located in a highly deprived neighborhood, but it experienced a relatively lower LBW proportion. The Garfield example showed that although the block group was relatively less disadvantaged compared to other block groups, being located in a neighborhood with high deprivation was associated with higher LBW proportion. Both of these findings warrant further exploration in understanding the contextual factors that may be contributing to different levels of LBW proportion. For example, because of high levels of disadvantage and deprivation at the block group and neighborhood levels for East Liberty, this neighborhood may have received targeted prenatal care services to reduce LBW proportion. On the other hand, as with the Garfield block group, living in a neighborhood with high overall deprivation may negate the possible benefits of living in areas within that neighborhood that have a relatively lower concentration of disadvantage. Examining other contextual factors, such as location and access to prenatal care services, may be worth exploring.

5.1.2 Public Health Implications

The methodological approach and the findings from this study have implications on research examining area-level effects on health. A limitation in the literature on neighborhoods and health is the lack of consensus on which area-level to use (Diez Roux, 2001; Messer, 2007). Many studies have used areas defined by the U.S. Census, primarily census tracts. However, this study was able to examine three different area levels for Pittsburgh, Pennsylvania: areas defined by the U.S. Census (block groups and census tracts) and those defined by the City of Pittsburgh (neighborhoods). For Pittsburgh, examining SEP at both the block group and neighborhood level revealed potential different mechanisms in which area-level SEP operates. One-level analysis would have potentially masked how SEP operates at both the block group and neighborhood level, and adding census tracts to the two-level model would have not provided additional information. A strength and contribution of this paper to the field is that it demonstrates a systematic and empirical approach in examining which area-levels and the number of levels to consider in one's analysis. In addition, this approach can be applied to not only neighborhoods and block groups, but also to a larger scale, such as at the city, county, and state levels .

A second strength of this study is that it describes a process that uses both theory and statistics to combine related measures that represent common SEP factors. Although factor analysis has been used in previous neighborhoods and health research (Sampson and colleagues, 1997), this study takes a novel approach in creating factors that reflect the nested structure of the data. A contribution of the use of MFA is that it may help reveal area-level mechanisms that may impact health outcomes. This approach addresses the heterogeneity of SEP of block groups within Pittsburgh neighborhoods and considers the complexity in which area-level SEP operates at both the block group and neighborhood levels. For example, unlike other published studies, this study found that concentrated disadvantage at the block group level may be moderated by overall neighborhood deprivation. Although results are inconclusive, understanding further how high and low levels of CD_{ij} predict LBW is worth examining. Some studies have examined a related construct to concentrated disadvantage: residential segregation and racial density. Grady (2006) found a positive association between residential segregation and mean LBW at the census tract level, regardless of the poverty level of neighborhoods. Pickett and colleagues (2005) compared the effect of living in wealthy census tracts on LBW in African-American women and found that African-American women residing in wealthy census tracts with a majority African-American were less likely to give birth to LBW infants. In contrast, women living in similar census tracts but in tracts with a mixture of African Americans and other race/ethnicities demonstrated no protective effect of wealth in decreasing one's risk for giving birth to LBW infants. This suggests the advantages for African-American women in living in wealthy areas with a high proportion of African-American residents.

Limitations of the study include the following: higher area level measures of SEP were aggregated by combining block group level data together, ignoring the different sampling weights at the block group, census tract, and neighborhood levels. Ignoring the sampling weights could potentially lead to inaccurate estimates of SEP measures at each of these levels. Second, SEP measures were based on U.S. Census from 2000. Findings from this study may not be applicable to the current conditions of neighborhoods where the makeup of residences have changed since 2000. Fourth, the data are aggregated and inferences cannot be made to the individual. Finally, SEP measures were developed specifically for Pittsburgh and are not generalizable to the experiences in other U.S. cities.

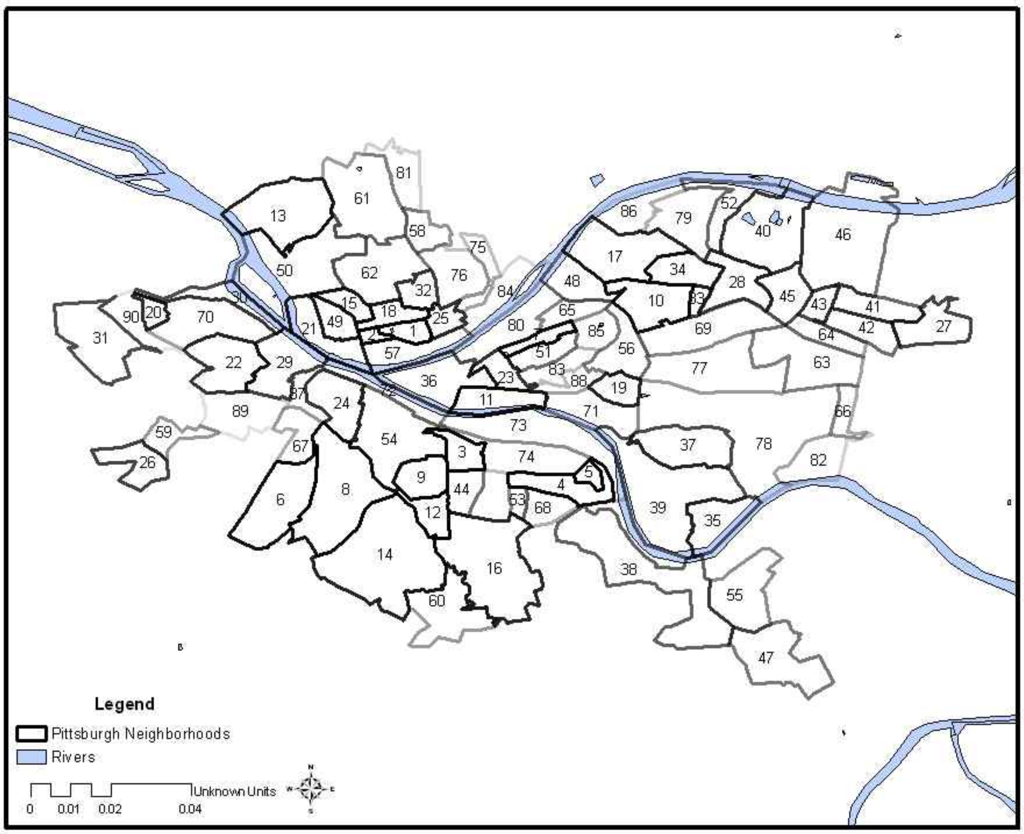
Future directions of this study include the following: 1) examine the effect of MED_{ij}, CD_{ij}, and OND_j on individual-level LBW in Pittsburgh. Other individual-level factors shown to be predictive of adverse birth outcomes would also be considered, such as maternal smoking and prenatal care utilization. This would help elucidate how area-level factors interact with individual-level risk factors in predicting individual-level LBW proportion; 2) confirmatory factor analysis, a special type of factor analysis, that would empirically test the construct validity of the measures developed; 3) comparison of the predictability of the newly constructed factors to the Townsend Material Deprivation Index, Concentrated Disadvantage, and Neighborhood

Deprivation Index; 4) comparison of the predictability of the newly constructed measures to each of the SEP measures by themselves; 5) examination of other area-level characteristics, such as crime, vacant housing, proximity to health care services, that may be associated with SEP factors and potentially contribute to adverse birth outcomes. Long term goals would be to utilize this measure to help allocate funding and develop policies to improve block groups and/or neighborhoods within Pittsburgh, specifically to improve health outcomes and reduce health disparities.

This study applied a systematic approach in examining SEP data for Pittsburgh, Pennsylvania and constructing composite indicators of SEP to account for the multilevel nature of the predictors. The study found different factors at the block group and neighborhood levels in predicting LBW. Future studies should explore the association of these indicators on individual LBW and test the measures further through confirmatory factor analysis. Overall, the methods described in the study provide a template in which to examine the association between SEP and LBW proportion and adds to existing research by offering a novel approach to examine how SEP at different area levels may be operating differently in predicting health outcomes.

APPENDIX A

PITTSBURGH NEIGHBORHOOD MAP



INDEX	NEIGHBORHOOD	INDEX	NEIGHBORHOOD	INDEX	NEIGHBORHOOD
1	Allegheny Center	31	Fairywood	61	Perry North
2	Allegheny West	32	Fineview	62	Perry South
3	Allentown	33	Friendship	63	Point Breeze
4	Arlington	34	Garfield	64	Point Breeze North
5	Arlington Heights	35	Glen Hazel	65	Polish Hill
6	Banksville	36	Golden Triangle	66	Regent Square
7	Bedford Dwellings	37	Greenfield	67	Ridgemont
8	Beechview	38	Hays	68	St. Clair
9	Beltzhoover	39	Hazelwood	69	Shadyside
10	Bloomfield	40	Highland Park	70	Sheraden
11	Bluff	41	Homewood North	71	South Oakland
12	Bonair	42	Homewood South	72	South Shore
13	Brighton Heights	43	Homewood West	73	South Side Flats
14	Brookline	44	Knoxville	74	South Side Slopes
15	California Kirkbride	45	Larimer	75	Spring Garden
16	Carrick	46	Lincoln-Lemington-Belmar	76	Spring Hill-City View
17	Central Lawrenceville	47	Lincoln Place	77	Squirrel Hill North
18	Central Northside	48	Lower Lawrenceville	78	Squirrel Hill South
19	Central Oakland	49	Manchester	79	Stanton Heights
20	Chartiers City	50	Marshall-Shadeland	80	Strip District
21	Chateau	51	Middle Hill	81	Summer Hill
22	Crafton Heights	52	Morningside	82	Swisshelm Park
23	Crawford Roberts	53	Mt. Oliver Neighborhood	83	Terrace Village
24	Duquesne Heights	54	Mount Washington	84	Herrs Island - Troy Hill
25	East Allegheny	55	New Homestead	85	Upper Hill
26	East Carnegie	56	North Oakland	86	Upper Lawrenceville
27	East Hills	57	North Shore	87	West End
28	East Liberty	58	Northview Heights	88	West Oakland
29	Elliot	59	Oakwood	89	Westwood
30	Esplen	60	Overbrook	90	Windgap

APPENDIX B

PITTSBURGH NEIGHBORHOODS AND CENSUS TRACT NUMBERS FOR 2000

Neighborhood	2000 Census Tracts
Allegheny Center	2204
Allegheny West	2201
Allentown	1803
Arlington	1603
Arlington Heights	1604
Banksville	2023
Bedford Dwellings	509
Beechview	1916, 1920
Beltzhoover	1809
Bloomfield	903, 809, 806, 802, 804
Bluff	103
Bonair	1806
Brighton Heights	2708, 2701, 2703
Brookline	1917, 3206, 1919, 1918
California Kirkbride	2507
Carrick	2901, 2902, 2904
Central Lawrenceville	901, 902
Central Northside	2503, 2206
Central Oakland	405,406
Chartiers City	2021
Chateau	2108
Crafton Heights	2814, 2815
Crawford Roberts	305
Duquesne Heights	1911
East Allegheny	2304
East Carnegie	2805
East Hills	1306
East Liberty	1113, 1115
Elliot	2020
Esplen	2017
Fairywood	2808
Fineview	2509
Friendship	807

Garfield	1016, 1017, 1114
Glen Hazel	1504
Golden Triangle	201
Greenfield	1516, 1517
Hays	3101
Hazelwood	1501, 1515
Herrs Island	2406
Highland Park	1106, 1102
Homewood North	1301, 1302
Homewood South	1303, 1304
Homewood West	1207
Knoxville	3001
Larimer	1204, 1208
Lincoln Place	3102
Lincoln-Lemington- Belmar	1201, 1202, 1203
Lower Lawrenceville	603
Manchester	2107
Marshall-Shadeland	2715, 2704
Middle Hill	501
Morningside	1014
Mount Washington	1903, 1914, 1807, 1915
Mt. Oliver Neighborhood	1607
New Homestead	3103
North Oakland	507, 403, 404
North Shore	2205
Northview Heights	2609
Oakwood	2812
Overbrook	3204, 3207
Perry North	2602, 2607
Perry South	2615, 2614
Point Breeze	1404, 1406
Point Breeze North	1405
Polish Hill	605
Regent Square	1410
Ridgemont	2016
Shadyside	708, 705, 709, 706, 703
Sheraden	2018, 2022
South Oakland	409
South Shore	1921
South Side Flats	1702, 1609
South Side Slopes	1608, 1706
Spring Garden	2412
Spring Hill-City View	2620
Squirrel Hill North	1402, 1401, 1403
Squirrel Hill South	1413, 1408, 1414
St. Clair	1606
Stanton Heights	1018, 1005
Strip District	203
Summer Hill	2612
Swisshelm Park	1411
Terrace Village	510, 511
Troy Hill	2406
Upper Hill	506

Upper Lawrenceville	1011
West End	2019
West Oakland	402
Westwood	2811
Windgap	2807

APPENDIX C

SEP DATA FROM U.S. CENSUS 2000

Table number	Table contents	Data dictionary reference name	Seg-ment	Max size
P6.	**RACE [8]**			
	Universe: Total population			
	Total:	P006001	01	9
	White alone	P006002	01	9
	Black or African American alone	P006003	01	9
	American Indian and Alaska Native alone	P006004	01	9
	Asian alone	P006005	01	9
	Native Hawaiian and Other Pacific Islander alone	P006006	01	9
	Some other race alone	P006007	01	9
	Two or more races	P006008	01	9
P8.	**SEX BY AGE [79]**			
	Universe: Total population			
	Total:	P008001	01	9
	Male:	P008002	01	9
	Under 1 year	P008003	01	9
	1 year	P008004	01	9
	2 years	P008005	01	9
	3 years	P008006	01	9
	4 years	P008007	01	9
	5 years	P008008	01	9
	6 years	P008009	01	9
	7 years	P008010	01	9
	8 years	P008011	01	9
	9 years	P008012	01	9
	10 years	P008013	01	9
	11 years	P008014	01	9
	12 years	P008015	01	9

P8. SEX BY AGE [79]—Con.

Total—Con.			
Male—Con.			
13 years	P008016	01	9
14 years	P008017	01	9
15 years	P008018	01	9
16 years	P008019	01	9
17 years	P008020	01	9
18 years	P008021	01	9
19 years	P008022	01	9
20 years	P008023	01	9
21 years	P008024	01	9
22 to 24 years	P008025	01	9
25 to 29 years	P008026	01	9
30 to 34 years	P008027	01	9
35 to 39 years	P008028	01	9
40 to 44 years	P008029	01	9
45 to 49 years	P008030	01	9
50 to 54 years	P008031	01	9
55 to 59 years	P008032	01	9
60 and 61 years	P008033	01	9
62 to 64 years	P008034	01	9
65 and 66 years	P008035	01	9
67 to 69 years	P008036	01	9
70 to 74 years	P008037	01	9
75 to 79 years	P008038	01	9
80 to 84 years	P008039	01	9
85 years and over	P008040	01	9
Female:	P008041	01	9
Under 1 year	P008042	01	9
1 year	P008043	01	9
2 years	P008044	01	9
3 years	P008045	01	9
4 years	P008046	01	9
5 years	P008047	01	9
6 years	P008048	01	9
7 years	P008049	01	9
8 years	P008050	01	9
9 years	P008051	01	9
10 years	P008052	01	9
11 years	P008053	01	9
12 years	P008054	01	9
13 years	P008055	01	9
14 years	P008056	01	9
15 years	P008057	01	9
16 years	P008058	01	9
17 years	P008059	01	9

P8. SEX BY AGE [79]—Con.

Total—Con.			
Female—Con.			
18 years	P008060	01	9
19 years	P008061	01	9
20 years	P008062	01	9
21 years	P008063	01	9
22 to 24 years	P008064	01	9
25 to 29 years	P008065	01	9
30 to 34 years	P008066	01	9
35 to 39 years	P008067	01	9
40 to 44 years	P008068	01	9
45 to 49 years	P008069	01	9
50 to 54 years	P008070	01	9
55 to 59 years	P008071	01	9
60 and 61 years	P008072	01	9
62 to 64 years	P008073	01	9
65 and 66 years	P008074	01	9
67 to 69 years	P008075	01	9
70 to 74 years	P008076	01	9
75 to 79 years	P008077	01	9
80 to 84 years	P008078	01	9
85 years and over	P008079	01	9

P12. HOUSEHOLDS BY AGE OF HOUSEHOLDER BY HOUSEHOLD TYPE (INCLUDING LIVING ALONE) BY PRESENCE OF OWN CHILDREN UNDER 18 YEARS [31]

Universe: Households

Total:	P012001	01	9
Householder 15 to 64 years:	P012002	01	9
Family households:	P012003	01	9
Married-couple family:	P012004	01	9
With own children under 18 years	P012005	01	9
No own children under 18 years	P012006	01	9
Other family:	P012007	01	9
Male householder, no wife present:	P012008	01	9
With own children under 18 years	P012009	01	9
No own children under 18 years	P012010	01	9
Female householder, no husband present:	P012011	01	9
With own children under 18 years	P012012	01	9
No own children under 18 years	P012013	01	9
Nonfamily households:	P012014	01	9
Householder living alone	P012015	01	9
Householder not living alone	P012016	01	9

P12. HOUSEHOLDS BY AGE OF HOUSEHOLDER BY HOUSEHOLD TYPE (INCLUDING LIVING ALONE) BY PRESENCE OF OWN CHILDREN UNDER 18 YEARS [31]—Con.

Total—Con.			
Householder 65 years and over:	P012017	01	9
Family households:	P012018	01	9
Married-couple family:	P012019	01	9
With own children under 18 years	P012020	01	9
No own children under 18 years	P012021	01	9
Other family:	P012022	01	9
Male householder, no wife present:	P012023	01	9
With own children under 18 years	P012024	01	9
No own children under 18 years	P012025	01	9
Female householder, no husband present:	P012026	01	9
With own children under 18 years	P012027	01	9
No own children under 18 years	P012028	01	9
Nonfamily households:	P012029	01	9
Householder living alone	P012030	01	9
Householder not living alone	P012031	01	9

P37. SEX BY EDUCATIONAL ATTAINMENT FOR THE POPULATION 25 YEARS AND OVER [35]

Universe: Population 25 years and over

Total:	P037001	03	9
Male:	P037002	03	9
No schooling completed	P037003	03	9
Nursery to 4th grade	P037004	03	9
5th and 6th grade	P037005	03	9
7th and 8th grade	P037006	03	9
9th grade	P037007	03	9
10th grade	P037008	03	9
11th grade	P037009	03	9
12th grade, no diploma	P037010	03	9
High school graduate (includes equivalency)	P037011	03	9
Some college, less than 1 year	P037012	03	9
Some college, 1 or more years, no degree	P037013	03	9
Associate degree	P037014	03	9
Bachelor's degree	P037015	03	9
Master's degree	P037016	03	9
Professional school degree	P037017	03	9
Doctorate degree	P037018	03	9
Female:	P037019	03	9
No schooling completed	P037020	03	9
Nursery to 4th grade	P037021	03	9
5th and 6th grade	P037022	03	9
7th and 8th grade	P037023	03	9
9th grade	P037024	03	9
10th grade	P037025	03	9
11th grade	P037026	03	9
12th grade, no diploma	P037027	03	9
High school graduate (includes equivalency)	P037028	03	9
Some college, less than 1 year	P037029	03	9
Some college, 1 or more years, no degree	P037030	03	9
Associate degree	P037031	03	9
Bachelor's degree	P037032	03	9
Master's degree	P037033	03	9
Professional school degree	P037034	03	9
Doctorate degree	P037035	03	9

P43. SEX BY EMPLOYMENT STATUS FOR THE POPULATION 16 YEARS AND OVER [15]

Universe: Population 16 years and over

Total:	P043001	04	9
Male:	P043002	04	9
In labor force:	P043003	04	9
In Armed Forces	P043004	04	9
Civilian:	P043005	04	9
Employed	P043006	04	9
Unemployed	P043007	04	9
Not in labor force	P043008	04	9
Female:	P043009	04	9
In labor force:	P043010	04	9
In Armed Forces	P043011	04	9
Civilian:	P043012	04	9
Employed	P043013	04	9
Unemployed	P043014	04	9
Not in labor force	P043015	04	9

P50. SEX BY OCCUPATION FOR THE EMPLOYED CIVILIAN POPULATION 16 YEARS AND OVER [95]

Universe: Employed civilian population 16 years and over			
Total:	P050001	05	9
Male:	P050002	05	9
Management, professional, and related occupations:	P050003	05	9
Management, business, and financial operations occupations:	P050004	05	9
Management occupations, except farmers and farm managers	P050005	05	9
Farmers and farm managers	P050006	05	9
Business and financial operations occupations:	P050007	05	9
Business operations specialists	P050008	05	9
Financial specialists	P050009	05	9
Professional and related occupations:	P050010	05	9
Computer and mathematical occupations	P050011	05	9
Architecture and engineering occupations:	P050012	05	9
Architects, surveyors, cartographers, and engineers	P050013	05	9
Drafters, engineering, and mapping technicians	P050014	05	9
Life, physical, and social science occupations	P050015	05	9
Community and social services occupations	P050016	05	9
Legal occupations	P050017	05	9
Education, training, and library occupations	P050018	05	9
Arts, design, entertainment, sports, and media occupations	P050019	05	9
Healthcare practitioners and technical occupations:	P050020	05	9
Health diagnosing and treating practitioners and technical occupations	P050021	05	9
Health technologists and technicians	P050022	05	9

P50. SEX BY OCCUPATION FOR THE EMPLOYED CIVILIAN POPULATION 16 YEARS AND OVER [95]—Con.

Total—Con.			
Male—Con.			
Service occupations:	P050023	05	9
Healthcare support occupations	P050024	05	9
Protective service occupations:	P050025	05	9
Fire fighting, prevention, and law enforcement workers, including supervisors	P050026	05	9
Other protective service workers, including supervisors	P050027	05	9
Food preparation and serving related occupations	P050028	05	9
Building and grounds cleaning and maintenance occupations	P050029	05	9
Personal care and service occupations	P050030	05	9
Sales and office occupations:	P050031	05	9
Sales and related occupations	P050032	05	9
Office and administrative support occupations	P050033	05	9
Farming, fishing, and forestry occupations	P050034	05	9
Construction, extraction, and maintenance occupations:	P050035	05	9
Construction and extraction occupations:	P050036	05	9
Supervisors, construction and extraction workers	P050037	05	9
Construction trades workers	P050038	05	9
Extraction workers	P050039	05	9
Installation, maintenance, and repair occupations	P050040	05	9
Production, transportation, and material moving occupations:	P050041	05	9
Production occupations	P050042	05	9
Transportation and material moving occupations:	P050043	05	9
Supervisors, transportation and material moving workers	P050044	05	9
Aircraft and traffic control occupations	P050045	05	9
Motor vehicle operators	P050046	05	9
Rail, water and other transportation occupations	P050047	05	9
Material moving workers	P050048	05	9

P50. SEX BY OCCUPATION FOR THE EMPLOYED CIVILIAN POPULATION 16 YEARS AND OVER [95]—Con.

Total—Con.			
Female:	P050049	05	9
Management, professional, and related occupations:	P050050	05	9
Management, business, and financial operations occupations:	P050051	05	9
Management occupations, except farmers and farm managers	P050052	05	9
Farmers and farm managers	P050053	05	9
Business and financial operations occupations:	P050054	05	9
Business operations specialists	P050055	05	9
Financial specialists	P050056	05	9
Professional and related occupations:	P050057	05	9
Computer and mathematical occupations	P050058	05	9
Architecture and engineering occupations:	P050059	05	9
Architects, surveyors, cartographers, and engineers	P050060	05	9
Drafters, engineering, and mapping technicians	P050061	05	9
Life, physical, and social science occupations	P050062	05	9
Community and social services occupations	P050063	05	9
Legal occupations	P050064	05	9
Education, training, and library occupations	P050065	05	9
Arts, design, entertainment, sports, and media occupations	P050066	05	9
Healthcare practitioners and technical occupations:	P050067	05	9
Health diagnosing and treating practitioners and technical occupations	P050068	05	9
Health technologists and technicians	P050069	05	9
Service occupations:	P050070	05	9
Healthcare support occupations	P050071	05	9
Protective service occupations:	P050072	05	9
Fire fighting, prevention, and law enforcement workers, including supervisors	P050073	05	9
Other protective service workers, including supervisors	P050074	05	9
Food preparation and serving related occupations	P050075	05	9
Building and grounds cleaning and maintenance occupations	P050076	05	9
Personal care and service occupations	P050077	05	9

P50. SEX BY OCCUPATION FOR THE EMPLOYED CIVILIAN POPULATION 16 YEARS AND OVER [95]—Con.

Total—Con.			
Female—Con.			
Sales and office occupations:	P050078	05	9
Sales and related occupations	P050079	05	9
Office and administrative support occupations	P050080	05	9
Farming, fishing, and forestry occupations	P050081	05	9
Construction, extraction, and maintenance occupations:	P050082	05	9
Construction and extraction occupations:	P050083	05	9
Supervisors, construction and extraction workers	P050084	05	9
Construction trades workers	P050085	05	9
Extraction workers	P050086	05	9
Installation, maintenance, and repair occupations	P050087	05	9
Production, transportation, and material moving occupations:	P050088	05	9
Production occupations	P050089	05	9
Transportation and material moving occupations:	P050090	05	9
Supervisors, transportation and material moving workers	P050091	05	9
Aircraft and traffic control occupations	P050092	05	9
Motor vehicle operators	P050093	05	9
Rail, water and other transportation occupations	P050094	05	9
Material moving workers	P050095	05	9

P52. HOUSEHOLD INCOME IN 1999 [17]

Universe: Households			
Total:	P052001	06	9
Less than $10,000	P052002	06	9
$10,000 to $14,999	P052003	06	9
$15,000 to $19,999	P052004	06	9
$20,000 to $24,999	P052005	06	9
$25,000 to $29,999	P052006	06	9
$30,000 to $34,999	P052007	06	9
$35,000 to $39,999	P052008	06	9
$40,000 to $44,999	P052009	06	9
$45,000 to $49,999	P052010	06	9
$50,000 to $59,999	P052011	06	9
$60,000 to $74,999	P052012	06	9
$75,000 to $99,999	P052013	06	9
$100,000 to $124,999	P052014	06	9
$125,000 to $149,999	P052015	06	9
$150,000 to $199,999	P052016	06	9
$200,000 or more	P052017	06	9

P53. MEDIAN HOUSEHOLD INCOME IN 1999 (DOLLARS) [1]

Universe: Households			
Median household income in 1999	P053001	06	9

P64. PUBLIC ASSISTANCE INCOME IN 1999 FOR HOUSEHOLDS [3]

Universe: Households			
Total:	P064001	06	9
With public assistance income	P064002	06	9
No public assistance income	P064003	06	9

P76. FAMILY INCOME IN 1999 [17]

Universe: Families			
Total:	P076001	07	9
Less than $10,000	P076002	07	9
$10,000 to $14,999	P076003	07	9
$15,000 to $19,999	P076004	07	9
$20,000 to $24,999	P076005	07	9
$25,000 to $29,999	P076006	07	9
$30,000 to $34,999	P076007	07	9
$35,000 to $39,999	P076008	07	9
$40,000 to $44,999	P076009	07	9
$45,000 to $49,999	P076010	07	9
$50,000 to $59,999	P076011	07	9
$60,000 to $74,999	P076012	07	9
$75,000 to $99,999	P076013	07	9
$100,000 to $124,999	P076014	07	9
$125,000 to $149,999	P076015	07	9
$150,000 to $199,999	P076016	07	9
$200,000 or more	P076017	07	9

P77. MEDIAN FAMILY INCOME IN 1999 (DOLLARS) [1]

Universe: Families			
Median family income in 1999	P077001	07	9

P89. POVERTY STATUS IN 1999 BY AGE BY HOUSEHOLD TYPE [39]

Universe: Population for whom poverty status is determined			
Total:	P089001	07	9
Income in 1999 below poverty level:	P089002	07	9
Under 65 years:	P089003	07	9
In married-couple families	P089004	07	9
In other families:	P089005	07	9
Male householder, no wife present	P089006	07	9
Female householder, no husband present	P089007	07	9
Unrelated individuals	P089008	07	9

P89. POVERTY STATUS IN 1999 BY AGE BY HOUSEHOLD TYPE [39]—Con.

Total—Con.			
Income in 1999 below poverty level—Con.			
65 to 74 years:	P089009	07	9
In married-couple families	P089010	07	9
In other families:	P089011	07	9
Male householder, no wife present	P089012	07	9
Female householder, no husband present	P089013	07	9
Unrelated individuals	P089014	07	9
75 years and over:	P089015	07	9
In married-couple families	P089016	07	9
In other families:	P089017	07	9
Male householder, no wife present	P089018	07	9
Female householder, no husband present	P089019	07	9
Unrelated individuals	P089020	07	9
Income in 1999 at or above poverty level:	P089021	07	9
Under 65 years:	P089022	07	9
In married-couple families	P089023	07	9
In other families:	P089024	07	9
Male householder, no wife present	P089025	07	9
Female householder, no husband present	P089026	07	9
Unrelated individuals	P089027	07	9
65 to 74 years:	P089028	07	9
In married-couple families	P089029	07	9
In other families:	P089030	07	9
Male householder, no wife present	P089031	07	9
Female householder, no husband present	P089032	07	9
Unrelated individuals	P089033	07	9
75 years and over:	P089034	07	9
In married-couple families	P089035	07	9
In other families:	P089036	07	9
Male householder, no wife present	P089037	07	9
Female householder, no husband present	P089038	07	9
Unrelated individuals	P089039	07	9

P90. POVERTY STATUS IN 1999 OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RELATED CHILDREN UNDER 18 YEARS BY AGE OF RELATED CHILDREN [41]

Universe: Families			
Total:	P090001	07	9
Income in 1999 below poverty level:	P090002	07	9
Married-couple family:	P090003	07	9
With related children under 18 years:	P090004	07	9
Under 5 years only	P090005	07	9
Under 5 years and 5 to 17 years	P090006	07	9
5 to 17 years only	P090007	07	9
No related children under 18 years	P090008	07	9

P90. POVERTY STATUS IN 1999 OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RELATED CHILDREN UNDER 18 YEARS BY AGE OF RELATED CHILDREN [41]—Con.

Total—Con.			
Income in 1999 below poverty level—Con.			
Other family:	P090009	07	9
Male householder, no wife present:	P090010	07	9
With related children under 18 years:	P090011	07	9
Under 5 years only	P090012	07	9
Under 5 years and 5 to 17 years	P090013	07	9
5 to 17 years only	P090014	07	9
No related children under 18 years	P090015	07	9
Female householder, no husband present:	P090016	07	9
With related children under 18 years:	P090017	07	9
Under 5 years only	P090018	07	9
Under 5 years and 5 to 17 years	P090019	07	9
5 to 17 years only	P090020	07	9
No related children under 18 years	P090021	07	9
Income in 1999 at or above poverty level:	P090022	07	9
Married-couple family:	P090023	07	9
With related children under 18 years:	P090024	07	9
Under 5 years only	P090025	07	9
Under 5 years and 5 to 17 years	P090026	07	9
5 to 17 years only	P090027	07	9
No related children under 18 years	P090028	07	9
Other family:	P090029	07	9
Male householder, no wife present:	P090030	07	9
With related children under 18 years:	P090031	07	9
Under 5 years only	P090032	07	9
Under 5 years and 5 to 17 years	P090033	07	9
5 to 17 years only	P090034	07	9
No related children under 18 years	P090035	07	9
Female householder, no husband present:	P090036	07	9
With related children under 18 years:	P090037	07	9
Under 5 years only	P090038	07	9
Under 5 years and 5 to 17 years	P090039	07	9
5 to 17 years only	P090040	07	9
No related children under 18 years	P090041	07	9

P92. POVERTY STATUS IN 1999 OF HOUSEHOLDS BY HOUSEHOLD TYPE BY AGE OF HOUSEHOLDER [59]

Universe: Households			
Total:	P092001	08	9
Income in 1999 below poverty level:	P092002	08	9
Family households:	P092003	08	9
Married-couple family:	P092004	08	9
Householder under 25 years	P092005	08	9
Householder 25 to 44 years	P092006	08	9
Householder 45 to 64 years	P092007	08	9
Householder 65 years and over	P092008	08	9
Other family:	P092009	08	9
Male householder, no wife present:	P092010	08	9
Householder under 25 years	P092011	08	9
Householder 25 to 44 years	P092012	08	9
Householder 45 to 64 years	P092013	08	9
Householder 65 years and over	P092014	08	9
Female householder, no husband present:	P092015	08	9
Householder under 25 years	P092016	08	9
Householder 25 to 44 years	P092017	08	9
Householder 45 to 64 years	P092018	08	9
Householder 65 years and over	P092019	08	9
Nonfamily households:	P092020	08	9
Male householder:	P092021	08	9
Householder under 25 years	P092022	08	9
Householder 25 to 44 years	P092023	08	9
Householder 45 to 64 years	P092024	08	9
Householder 65 years and over	P092025	08	9
Female householder:	P092026	08	9
Householder under 25 years	P092027	08	9
Householder 25 to 44 years	P092028	08	9
Householder 45 to 64 years	P092029	08	9
Householder 65 years and over	P092030	08	9

P92. POVERTY STATUS IN 1999 OF HOUSEHOLDS BY HOUSEHOLD TYPE BY AGE OF HOUSEHOLDER [59]—Con.

Total—Con.			
Income in 1999 at or above poverty level:	P092031	08	9
Family households:	P092032	08	9
Married-couple family:	P092033	08	9
Householder under 25 years	P092034	08	9
Householder 25 to 44 years	P092035	08	9
Householder 45 to 64 years	P092036	08	9
Householder 65 years and over	P092037	08	9
Other family:	P092038	08	9
Male householder, no wife present:	P092039	08	9
Householder under 25 years	P092040	08	9
Householder 25 to 44 years	P092041	08	9
Householder 45 to 64 years	P092042	08	9
Householder 65 years and over	P092043	08	9
Female householder, no husband present:	P092044	08	9
Householder under 25 years	P092045	08	9
Householder 25 to 44 years	P092046	08	9
Householder 45 to 64 years	P092047	08	9
Householder 65 years and over	P092048	08	9
Nonfamily households:	P092049	08	9
Male householder:	P092050	08	9
Householder under 25 years	P092051	08	9
Householder 25 to 44 years	P092052	08	9
Householder 45 to 64 years	P092053	08	9
Householder 65 years and over	P092054	08	9
Female householder:	P092055	08	9
Householder under 25 years	P092056	08	9
Householder 25 to 44 years	P092057	08	9
Householder 45 to 64 years	P092058	08	9
Householder 65 years and over	P092059	08	9

H7. TENURE [3]

Universe: Occupied housing units			
Total:	H007001	56	9
Owner occupied	H007002	56	9
Renter occupied	H007003	56	9

H20. TENURE BY OCCUPANTS PER ROOM [13]

Universe: Occupied housing units			
Total:	H020001	57	9
Owner occupied:	H020002	57	9
0.50 or less occupants per room	H020003	57	9
0.51 to 1.00 occupants per room	H020004	57	9
1.01 to 1.50 occupants per room	H020005	57	9
1.51 to 2.00 occupants per room	H020006	57	9
2.01 or more occupants per room	H020007	57	9
Renter occupied:	H020008	57	9
0.50 or less occupants per room	H020009	57	9
0.51 to 1.00 occupants per room	H020010	57	9
1.01 to 1.50 occupants per room	H020011	57	9
1.51 to 2.00 occupants per room	H020012	57	9
2.01 or more occupants per room	H020013	57	9

H44. TENURE BY VEHICLES AVAILABLE [15]

Universe: Occupied housing units			
Total:	H044001	58	9
Owner occupied:	H044002	58	9
No vehicle available	H044003	58	9
1 vehicle available	H044004	58	9
2 vehicles available	H044005	58	9
3 vehicles available	H044006	58	9
4 vehicles available	H044007	58	9
5 or more vehicles available	H044008	58	9
Renter occupied:	H044009	58	9
No vehicle available	H044010	58	9
1 vehicle available	H044011	58	9
2 vehicles available	H044012	58	9
3 vehicles available	H044013	58	9
4 vehicles available	H044014	58	9
5 or more vehicles available	H044015	58	9

APPENDIX D

CREATING SEP MEASURES FROM U.S. CENSUS

RECODING U.S. CENSUS VARIABLES

Census Variable	Definition	New variable name
Geo Data		
sumlev	Area level of data	sumlev 130 = Neighborhoods 140 = Census tract 150 = Census block group
state	state	state 42 = Pennsylvania
county	county	county 003 = Allegheny County
tract	census tract	tract
blkgroup	census block group	blkgroup
P6. Race		
P006001	Universe: Total Population	rac_tot
P006003	Black or African American Alone	rac_bla
P8. Sex by Age		
P008001	Universe: Total Population	pop_tot
Males		
P008003	Under 1 year	popm_und1
P008004	1 year	popm_1
P008005	2 years	popm_2
P008006	3 years	popm_3
P008007	4 years	popm_4
P008008	5 years	popm_5
P008009	6 years	popm_6
P008010	7 years	popm_7
P008011	8 years	popm_8
P008012	9 years	popm_9
P008013	10 years	popm_10
P008014	11 years	popm_11
P008015	12 years	popm_12
P008016	13 years	popm_13
P008017	14 years	popm_14
P008018	15 years	popm_15
P008019	16 years	popm_16
P008020	17 years	popm_17

Census Variable	Definition	New variable name
Females		
P008042	Under 1 year	popf_und1
P008043	1 year	popf_1
P008044	2 years	popf_2
P008045	3 years	popf_3
P008046	4 years	popf_4
P008047	5 years	popf_5
P008048	6 years	popf_6
P008049	7 years	popf_7
P008050	8 years	popf_8
P008051	9 years	popf_9
P008052	10 years	popf_10
P008053	11 years	popf_11
P008054	12 years	popf_12
P008055	13 years	popf_13
P008056	14 years	popf_14
P008057	15 years	popf_15
P008058	16 years	popf_16
P008059	17 years	popf_17
P12. Households by Age of Householder by Household Type		
P012001	Universe: Total Households	fhh_tot
P012011	Female householder, 15 to 64 years, no husband present	fhh_15_64
P012012	Female householder, 15 to 64 years, no husband present, with own children under 18 years	fhh_15_64c
P012026	Female householder, >65, no husband present	fhh_65
P012027	Female householder, >64, no husband present, with own children under 18 years	fhh_65chil
P37. Sex by Educational Attainment for the Population 25 years and over		
P037001	Universe: Total Population 25 years and over	edu_tot
P037002	Total male	edu_male
P037003	Male, no schooling completed	edu_mno
P037004	Male, nursery to 4th grade completed	edu_mnt4
P037005	Male, 5th and 6th grade completed	edu_m5t6
P037006	Male, 7th and 8th grade completed	edu_m7t8
P037007	Male, 9th grade completed	edu_m9
P037008	Male, 10th grade completed	edu_m10
P037019	Male, 11th grade completed	edu_m11
P037010	Male, 12th grade completed, no diploma	edu_m12
P037019	Total female	edu_fem
P037020	Female, no schooling completed	edu_fno
P037021	Female, nursery to 4th grade completed	edu_fnt4
P037022	Female, 5th and 6th grade completed	edu_f5t6
P037023	Female, 7th and 8th grade completed	edu_f7t8
P037024	Female, 9th grade completed	edu_f9
P037025	Female, 10th grade completed	edu_f10
P037026	Female, 11th grade completed	edu_f11
P037027	Female, 12th grade completed, no diploma	edu_f12
P43. Sex by Employment Status for the Population 16 years and over		
P043005	Male, total civilian population 16 years and over	emp_mciv
P043007	Male, total unemployed civilian population 16 years and over	emp_mune
P043012	Female, total civilian population 16 years	emp_fciv

Census Variable	Definition	New variable name
	and over	
P043014	Female, total unemployed civilian population 16 years and over	emp_fune
P50. Sex by Occupation for the Employed Civilian Population 16 years and over		
P050001	Universe: Employed civilian population 16 years and over	occ_tot
P050003	Total male in management, professional, and related occupations	occ_mprof
P050050	Total female in management, professional, and related occupations	occ_fprof
P52. Household Income in 1999		
P052001	Universe: Households Total	inc_htot
P052002	Households, Less than $10,000	inc_h10
P052003	Households, $10,000 to $14,999	inc_h14
P052004	Households, $15,000 to $19,999	inc_h19
P052005	Households, $20,000 to $24,999	inc_h25
P052006	Households, $25,000 to $29,999	inc_h29
P53. Median Household Income in 1999		
P053001	Universe: Households Median household income in 1999	inc_hmed
P64. Public Assistance Income in 1999 for Households		
P064001	Universe: Households total	pub_htot
P064002	Households with public assistance	pub_hwit
P76. Family Income in 1999		
P076001	Universe: Families Total	inc_ftot
P076002	Families, Less than $10,000	inc_f10
P076003	Families, $10,000 to $14,999	inc_f14
P076004	Families, $15,000 to $19,999	inc_f19
P076005	Families, $20,000 to $24,999	inc_f24
P076006	Families, $25,000 to $29,999	inc_f29
P77. Median Family INcome in 1999 (Dollars)		
P077001	Universe: Families Median family income in 1999	inc_fmed
P89. Poverty status in 1999 by age by household type		
P089001	Universe: Population for whom poverty status is determined, Total	pov_htot
P089001	Households, Income in 1999 below poverty level	pov_hbel
P90. Poverty status of families by family type by presence of related children 18 years of age of related children		
P090001	Universe: Families, Total	pov_ftot
P090001	Families, Income in 1999 below poverty level	pov_fbel
H7. Tenure		
H007001	Universe: Occupied housing units, Total	hou_tot
H007003	Renter occupied	hou_rent
H20. Tenure by Occupants per room		
H020001	Universe: Occupied housing units, Total	cro_tot
H020005	Owner occupied: 1.01 to 1.50 occupants per room	cro_o15

Census Variable	Definition	New variable name
H020006	Owner occupied: 1.51 to 2.00 occupants per room	cro_o20
H020007	Owner occupied: 2.01 or more occupants per room	cro_omo
H020011	Renter occupied: 1.01 to 1.50 occupants per room	cro_r15
H020012	Renter occupied: 1.51 to 2.00 occupants per room	cro_r20
H020013	Renter occupied: 2.01 or more occupants per room	cro_rmo
H44. Tenure by Vehicles Available		
H044001	Universe: Occupied housing units, Total	car_tot
H044002	Owner occupied, Total	car_otot
H044003	Owner, No vehicle available	car_onon
H044009	Renter occupied, Total	car_rtot
H044010	Renter, no vehicle available	car_rnon

DERIVED CENSUS VARIABLES IN STATA DATASET

Townsend Index

New Variable Name	Description	Calculation
unemp	% unemployed individuals	(emp_mune + emp_fune / emp_mciv + emp_fciv)*100
nocar	% housing with no car	(car_onon + car_rnon/car_otot + car_rtot)*100
crowd	% crowded housing	(cro_o15+ cro_o20+ cro_omo+ cro_r15+ cro_r20+ cro_rmo/cro_tot)*100
rent	% renters	(hou_rent/ hou_tot)*100

Messer Neighborhood Deprivation Index

New Variable Name	Description	Calculation
profm	% of males in management and professional occupations	(occ_mprof/ occ_tot)*100
profmrev	% of males NOT in management and professional occupations	(1-occ_mprof)/occ_tot)*100
proftrev	% of males and females NOT in management and professional occupations	((1-(occ_mprof +occ_fprof))/occ_tot)*100
crowd	% crowded housing	(cro_o15+ cro_o20+ cro_omo+ cro_r15+ cro_r20+ cro_rmo/cro_tot)*100
pov_h	% of households in poverty	(pov_hbel/ pov_htot)*100
fhh	% of female headed households with dependents	(fhh_15_64c + fhh_65chil/ fhh_tot)*100
pbasst	% of households on public assistance	(pub_hwit/ pub_htot)*100
inclow	% of households earning less than $30,000/year	((inc_h10+ inc_h14+ inc_h19+ inc_h25+ inc_h29)/inc_htot)*100
edulow	% with less than a high school education	((edu_mno + edu_mnt4+ edu_m5t6+ edu_m7t8+ edu_m9+ edu_m10+ edu_m11+ edu_m12+ edu_fno+ edu_fnt4+ edu_f5t6+ edu_f7t8+ edu_f9+ edu_f10+ edu_f11+ edu_f12)/edu_tot)*100
unemp	% unemployed	(emp_mune + emp_fune / emp_mciv + emp_fciv)*100

Concentrated Disadvantage Index

New Variable Name	Description	Calculation
pov_h	% households below poverty line	(pov_hbel/ pov_htot)*100
pb_asst	% of households receiving public assistance	(pub_hwit/ pub_htot)*100
Unemp	% unemployed	(emp_mune + emp_fune / emp_mciv + emp_fciv)*100
Fhh	% of female headed households with dependents	(fhh_15_64c + fhh_65chil/ fhh_tot)*100
Black	% of residents who are Black	(rac_bla/ rac_tot)*100
und18	% of residents who are under 18 years of age	((popm_und1 + popm_1 + popm_2 + popm_3 + popm_4 + popm_5 + popm_6 + popm_7 + popm_8 + popm_9 + popm_10 + popm_11 + popm_12 + popm_13 + popm_14 + popm_15 + popm_16 + popm_17 + popf_und1 + popf_1 + popf_2 + popf_3 + popf_4 + popf_5 + popf_6 + popf_7 + popf_8 + popf_9 + popf_10 + popf_11 + popf_12 + popf_13 + popf_14 + popf_15 + popf_16 + popf_17) / pop_t) *100

APPENDIX E

STATISTICAL CODE

4.1.1 Boxplots

```
clear

*Creating Bar Graphs of SEP Data

*The following dataset is the long form of the main data


use "C:\MSTHESIS\Data Files 12_10_08\Mapping\allareafilelong.dta"


*Create Bar Graphs of Data

graph box unemp, over (area) ysc (r(0 100)) ylabel (0(20)100)

graph save "C:\MSTHESIS\Final\Graphs\Boxplots\unemp.gph", replace


graph box nocar, over (area) ysc (r(0 100)) ylabel (0(20)100)

graph save "C:\MSTHESIS\Final\Graphs\Boxplots\nocar.gph", replace


graph box crowd, over (area) ysc (r(0 100)) ylabel (0(20)100)

graph save "C:\MSTHESIS\Final\Graphs\Boxplots\crowd.gph", replace


graph box rent, over (area) ysc (r(0 100)) ylabel (0(20)100)

graph save "C:\MSTHESIS\Final\Graphs\Boxplots\rent.gph", replace


graph box profm, over (area) ysc (r(0 100)) ylabel (0(20)100)

graph save "C:\MSTHESIS\Final\Graphs\Boxplots\profm.gph", replace
```

```
graph box pov_h, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\pov_h.gph", replace

graph box fhh, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\fhh.gph", replace

graph box pbasst, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\pbasst.gph", replace

graph box inclow, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\inclow.gph", replace

graph box edulow, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\edulow.gph", replace

graph box black, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\black.gph", replace

graph box und18, over (area) ysc (r(0 100)) ylabel (0(20)100)
graph save "C:\MSTHESIS\Final\Graphs\Boxplots\und18.gph", replace

*Create summary of each variables, mean, median, variance
sort area
by area:  summarize unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, detail
```

4.1.2 Brown and Forsythe Test of Homogeneity

```
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"
*Test for homogeneity of variances. Use median test b/c of skewed data
robvar unemp, by(neigh)
robvar nocar, by(neigh)
robvar crowd, by(neigh)
robvar rent, by(neigh)
robvar profm, by(neigh)
robvar pov_h, by(neigh)
robvar fhh, by(neigh)
robvar pbasst, by(neigh)
robvar inclow, by(neigh)
robvar edulow, by(neigh)
robvar black, by(neigh)
robvar und18, by(neigh)

*Calculate the variance of each variable for each neighborhood (using block group data)
*Calculate SD then square to obtain the variance
collapse (sd) unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18 (count)
nbg=cfbwn, by (neigh)
g varunemp = unemp*unemp
g varnocar = nocar*nocar
g varcrowd = crowd*crowd
g varrent = rent*rent
g varprofm = profm*profm
g varpov_h = pov_h*pov_h
g varfhh = fhh*fhh
g varpbasst = pbasst*pbasst
g varinclow = inclow*inclow
g varedulow = edulow*edulow
g varblack = black*black
g varund18 = und18*und18
save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\variance of SEP.dta", replace
```

```
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"
collapse (median) unempmd=unemp nocarmd=nocar crowdmd=crowd rentmd=rent profmmd=profm
pov_hmd=pov_h fhhmd=fhh pbasstmd=pbasst inclowmd=inclow edulowmd=edulow blackmd=black
und18md=und18 (count) nbg=cfbwn, by (neigh)
save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\median of SEP.dta", replace

merge neigh using "C:\MSTHESIS\Final\Dataset\Test of homogeneity\variance of SEP.dta", unique
drop _merge
sort neigh
merge neigh using "C:\MSTHESIS\NeighLookup.dta"
save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta", replace

*Obtin min, max, median, mean, and Q1, Q2, and Q3 for each variable
summarize varunemp varnocar varcrowd varrent varprofm varpov_h varfhh varpbasst varinclow
varedulow varblack varund18, detail

*Identify min and max neighborhood for each variable
*obtain minimum and maximum of SEP variables
sort varunemp
summarize varunemp
list neigh varunemp in 1
list nbg neigh varunemp if varunemp>820 & varunemp~=.

sort varnocar
list neigh varnocar in 1
summarize varnocar
list neigh varnocar in 1
list nbg neigh varnocar if varnocar>740 & varnocar~=.

summarize varcrowd
list nbg neigh crowd varcrowd if varcrowd ==0
*Check 43, 84, 32
list nbg neigh varcrowd if varcrowd >=25 & varcrowd ~=.

sort varrent
```

```
summarize varrent

list nbg neigh varrent in 1

list nbg neigh varrent if varrent>=2293 & varrent~=.


sort varprofm

summarize varprofm

list nbg neigh varprofm in 1

list nbg neigh varprofm if varprofm>=277 & varprofm~=.


sort varpov_h

summarize varpov_h

list nbg neigh varpov_h in 1

list nbg neigh varpov_h if varpov_h>=1327 & varpov_h~=.


sort varfhh

summarize varfhh

list nbg neigh varfhh in 1

list nbg neigh varfhh if varfhh>=532 & varfhh~=.


sort varpbasst

summarize varpbasst

list nbg neigh varpbasst in 1

list nbg neigh varpbasst if varpbasst>=273 & varpbasst~=.


sort varinclow

summarize varinclow

list nbg neigh varinclow in 1

list nbg neigh varinclow if varinclow>=1278 & varinclow~=.


sort varedulow

summarize varedulow

list nbg neigh varedulow in 1

list nbg neigh varedulow if varedulow>=605 & varedulow~=.


sort varblack

summarize varblack
```

```
list nbg neigh varblack in 1
list nbg neigh varblack if varblack <0.50

list nbg neigh varblack if varblack>=1765 & varblack~=.

sort varund18
summarize varund18
list nbg neigh varund18 in 1
list nbg neigh varund18 if varund18>=325 & varund18~=.

*UNEMPLOYMENT
graph hbox varunemp, ysc (r(0 1000)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\unempdot.gph", replace

graph box unempmd if nbg~=1, fxsize(15) ysc(r(0 25)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\unempmd.gph", replace

twoway (scatter unempmd varunemp if nbg~=1) ///
(scatteri  10.38062  821.0441  "N_Oakland"    13.49206      663.6738  "Golden  Triangle"  2.190923
386.5553 "Squirrel Hill N" ///
19.86301    409.1569 "Terrace Village" 19.9408    116.5554 "Homewood South" 21.75439    258.9963
"Middle Hill"), ///
xsc (r(0 1000)) xlabel (0 (200) 1000) ysc (r(0 25)) ylabel (0 (5) 25) ///
legend (off) xtitle(Unemployment Variance) ytitle (Unemployment Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unemp.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\unempmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\unemp.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\unempdot.gph", cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unempvarmd.gph", replace

*NO CAR
*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter nocarmd varnocar if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name nocarmd varnocar if varnocar >400 & varnocar ~=.
```

```
*List neighborhoods with a high median
list neigh neigh_name nocarmd varnocar if nocarmd > 70 & varnocar ~=.

graph hbox varnocar, ysc (r(0 1000)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\nocardot.gph", replace

graph box nocarmd if nbg~=1 , fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\\nocarmd.gph", replace

*Graph with Possible Outliers
twoway (scatter nocarmd varnocar if nbg~=1)  ///
(scatteri  45.7356     747.0778  "Fineview"   50.45296     716.6321  "Golden  Triangle"  37.11467
650.6452 ///
"N_Oakland"  45.57227    533.501  "W_Oakland" 83.12236   36.69792 "Terrace Village" ), ///
ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 1000)) xlabel (0 (200) 1000) ///
legend (off) xtitle(No Car Variance) ytitle (No Car Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocar.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\nocarmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocar.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\nocardot.gph", cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocarvarmd.gph", replace

*CROWD
*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter crowdmd varcrowd if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name crowdmd varcrowd if varcrowd > 15 & varcrowd ~=.

*List neighborhoods with a high median
list neigh neigh_name crowdmd varcrowd if crowdmd > 4 & varcrowd ~=.

graph hbox varcrowd, ysc (r(0 30)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
```

```
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\crowddot.gph", replace


graph box crowdmd if nbg~=1, fxsize(15) ysc (r(0 6)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\crowdmd.gph", replace


*Graph with Possible Outliers
twoway (scatter crowdmd varcrowd if nbg~=1)  ///
(scatteri   5.723366     25.15245  "E  Allegheny"   4.558332     15.82427  "Homewood  S"  4.090909
16.75761 ///
"Knoxville"   ///
 5.355494   13.70937 "C. Oakland"), ///
ysc (r(0 6)) ylabel (0(2)6) xsc (r(0 30)) xlabel (0 (5) 30) ///
legend (off) xtitle(Crowd Variance) ytitle (Crowd Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\crowd.gph", replace


gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\crowdmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of Homogeneity\crowd.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\crowddot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\crowdvarmd.gph", replace



*RENT
*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter rentmd varrent if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name rentmd varrent if varrent > 1200 & varrent ~=.


*List neighborhoods with a high median
list neigh neigh_name rentmd varrent if rentmd > 80 & varrent ~=.


graph hbox varrent, ysc (r(0 2500)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\rentdot.gph", replace


graph box rentmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\rentmd.gph", replace
```

```
*Graph with Possible Outliers
twoway (scatter rentmd varrent if nbg~=1)  ///
(scatteri  45.31425   1420.688 "Fineview"  57.15166   2293.607 "N Oakland" 86.93333   341.4755
///
"Bluff" 87.44229   5.181983  "C Oakland" 91.13924   91.78765  "Terrace Village"), ///
xsc (r(0 2500)) xlabel (0(500)2500) ysc (r(0 100)) ylabel (0 (20) 100) ///
legend (off) xtitle(Rent Variance) ytitle (Rent Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\rent.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\rentmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of Homogeneity\rent.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\rentdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\rentvarmd.gph", replace

*PROFM
*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter profmmd varprofm if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name profmmd varprofm if varprofm > 200 & varprofm ~=.

*List neighborhoods with a high median
list neigh neigh_name profmmd varprofm if profmmd > 40 & varprofm ~=.

graph hbox varprofm, ysc (r(0 325)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\profmdot.gph", replace

graph box profmmd if nbg~=1, fxsize(15) ysc (r(0 50)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\profmmd.gph", replace

*Graph with Possible Outliers
twoway (scatter profmmd varprofm if nbg~=1)  ///
(scatteri   30.66627      277.516  "Golden  Triangle"   42.68657    90.74117  "N  Oakland"  42.29765
37.28466 "Squirrel Hill N."), ///
xsc (r(0 325)) xlabel (0(100)325) ysc (r(0 50)) ylabel (0 (10) 50) ///
legend (off) xtitle(Professional Variance) ytitle (Professional Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\profm.gph", replace
```

```
gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\profmmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of Homogeneity\profm.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\profmdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\profmvarmd.gph", replace

*POV_H
*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter pov_hmd varpov_h if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name pov_hmd varpov_h if varpov_h > 1000 & varpov_h ~=.

*List neighborhoods with a high median
list neigh neigh_name pov_hmd varpov_h if pov_hmd > 50 & varpov_h ~=.

graph hbox varpov_h, ysc (r(0 1500)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pov_hdot.gph", replace

graph box pov_hmd if nbg~=1, fxsize(15) ysc (r(0 80)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pov_hmd.gph", replace

*Graph with Possible Outliers
twoway (scatter pov_hmd varpov_h if nbg~=1)  ///
(scatteri   71.0295    1327.944  "Bluff"   52.92803    44.40141  "C  Oakland"  56.55271    59.90442
"Terrace Village"), ///
ysc (r(0 80)) ylabel (0(20)80) xsc (r(0 1500)) xlabel (0 (500) 1500) ///
legend (off) xtitle(Poverty Variance) ytitle (Poverty Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\povh.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pov_hmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\povh.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\pov_hdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\povhvarmd.gph", replace

*FHH
```

```
*Graph of median vs. variance for neighborhoods with > 1 block groups

graph twoway scatter fhhmd varfhh if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name fhhmd varfhh if varfhh > 300 & varfhh ~=.

*List neighborhoods with a high median
list neigh neigh_name fhhmd varfhh if fhhmd > 30 & varfhh ~=.

graph hbox varfhh, ysc (r(0 650)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\fhhdot.gph", replace

graph box fhhmd if nbg~=1, fxsize(15) ysc (r(0 40)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\fhhmd.gph", replace

*Graph with Possible Outliers
twoway (scatter fhhmd varfhh if nbg~=1)  ///
(scatteri  18.17483   332.4659 "Fineview"  12.39892   532.8243 "Spring Hill-City View" 32.5779
114.5896 "Terrace Village"), ///
ysc (r(0 40)) ylabel (0(10)40) xsc (r(0 650)) xlabel (0 (200) 650) ///
legend (off) xtitle(Female-Headed Household Variance) ytitle (Female-Headed Household Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\fhh.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\fhhmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\fhh.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\fhhdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\fhhvarmd.gph", replace

*PBASST
graph hbox varpbasst,ysc (r(0 325)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pbasstdot.gph", replace

graph box pbasstmd if nbg~=1,fxsize(15) ysc (r(0 30)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\pbasstmd.gph", replace

*Graph of median vs. variance for neighborhoods with > 1 block groups
```

```
graph twoway scatter pbasstmd varpbasst if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name pbasstmd varpbasst if varpbasst > 100 & varpbasst ~=.

*List neighborhoods with a high median
list neigh neigh_name pbasstmd varpbasst if pbasstmd > 17 & varpbasst ~=.

*Graph with Possible Outliers
twoway (scatter pbasstmd varpbasst if nbg~=1)  ///
(scatteri  18.56967   265.7627 "Fineview"  2.393162   154.7268 "Spring Hill-City View" 22.14533
100.714 "Terrace Village" 14.83288   273.3831 "West Oakland"), ///
ysc (r(0 30)) ylabel (0(05)30) xsc (r(0 325)) xlabel (0 (100) 325) ///
legend (off) xtitle(Public Assistance Variance) ytitle (Public Assistance Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\pbasst.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pbasstmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\pbasst.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\pbasstdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\pbasstvarmd.gph", replace

*INCLOW
graph hbox varinclow, ysc (r(0 1500)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\inclowdot.gph", replace

graph box inclowmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\inclowmd.gph", replace

*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter inclowmd varinclow if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name inclowmd varinclow if varinclow > 500 & varinclow ~=.

*List neighborhoods with a high median
list neigh neigh_name inclowmd varinclow if inclowmd > 79 & varinclow ~=.
```

```
*Graph with Possible Outliers
twoway (scatter inclowmd varinclow if nbg~=1)  ///
(scatteri  61.90209   1278.397 "Fineview" 64.20119   1101.615 "N Oakland" 58.50546   740.2354 "W
Oakland" ///
88.31658   273.0045 "Bluff" 91.46706   5.469415 "Terrace Village"), ///
ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 1500)) xlabel (0 (500) 1500) ///
legend (off) xtitle(Low Income Variance) ytitle (Low Income Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\inclow.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\inclowmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\inclow.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\inclowdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\inclowvarmd.gph", replace



*EDULOW
graph hbox varedulow, ysc (r(0 700)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\edulowdot.gph", replace

graph box edulowmd if nbg~=1, fxsize(15) ysc (r(0 50)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\edulowmd.gph", replace

*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter edulowmd varedulow if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name edulowmd varedulow if varedulow > 300 & varedulow ~=.

*List neighborhoods with a high median
list neigh neigh_name edulowmd varedulow if edulowmd > 40 & varedulow ~=.

*Graph with Possible Outliers
twoway (scatter edulowmd varedulow if nbg~=1)  ///
(scatteri  22.85996   395.8593 "Bluff" 19.25591    605.606 "Golden Triangle" 42.99065   26.40998
"Terrace Village"), ///
```

```
ysc (r(0 50)) ylabel (0(10)50) xsc (r(0 700)) xlabel (0 (200) 700) ///
legend (off) xtitle(Low Education Variance) ytitle (Low Education Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\edulow.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\edulowmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\edulow.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\edulowdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\edulowvarmd.gph", replace

*BLACK
graph hbox varblack, ysc (r(0 2000)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\blackdot.gph", replace

graph box blackmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\blackmd.gph", replace

*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter blackmd varblack if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name blackmd varblack if varblack > 500 & varblack ~=.

*List neighborhoods with a high median
list neigh neigh_name blackmd varblack if blackmd > 80 & varblack ~=.
list neigh neigh_name blackmd varblack if blackmd > 95 & varblack ~=.
list neigh neigh_name blackmd varblack if blackmd < 5 & varblack ~=.
list neigh neigh_name blackmd varblack if blackmd > 90 & varblack ~=.
*list neigh neigh_name blackmd varblack if neigh_name=="East Liberty" | neigh_name=="Squirrel
Hill North"

*Graph with Possible Outliers
twoway (scatter blackmd varblack if nbg~=1)  ///
(scatteri  25.58116   764.8744 "Bluff" 47.38372   758.6419 "Knoxville" 13.14433   777.0013
"Spring Hill City View" ///
44.85184   844.6577 "Stanton Heights" 62.50841    1765.24 "West Oakland" 96.85265   5.089941
"Terrace Village"), ///
```

```
ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 2000)) xlabel (0 (500) 2000) ///
legend (off) xtitle(Black Variance) ytitle (Black Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\black.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\blackmd.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\black.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\blackdot.gph",  cols(2) holes(3)
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\blackvarmd.gph", replace

*UND18
graph hbox varund18, ysc (r(0 400)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\und18dot.gph", replace

graph box und18md if nbg~=1, fxsize(15) ysc (r(0 40)) caption(" " " ") ytitle(" ") ylabel (none)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\und18md.gph", replace

*Graph of median vs. variance for neighborhoods with > 1 block groups
graph twoway scatter und18md varund18 if nbg~=1
*List neighborhoods with a high variance
list neigh neigh_name und18md varund18 if varund18 > 200 & varund18 ~=.

*List neighborhoods with a high median
list neigh neigh_name und18md varund18 if und18md > 33 & varund18 ~=.

*Graph with Possible Outliers
twoway (scatter und18md varund18 if nbg~=1)  ///
(scatteri   23.81184      247.345  "Crawford  Heights"   27.07936    201.1734  "Fineview"  19.54798
325.5054 "West Oakland" ///
35.40773   13.33136 "Terrace Vilage" 34.87545    91.8574 "Garfield"),  ///
ysc (r(0 40)) ylabel (0(10)40) xsc (r(0 400)) xlabel (0 (100) 400) ///
legend (off) xtitle(Under 18 Years Variance) ytitle (Under 18 Years Median)
graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\und18.gph", replace

gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\und18md.gph" ///
"C:\MSTHESIS\Final\Graphs\Test of homogeneity\und18.gph" ///
 "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\und18dot.gph",  cols(2) holes(3)
```

```
graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\und18varmd.gph", replace


*Example neighborhoods representing various percentiles
clear
use "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta"
list neigh neigh_name blackmd varblack if varblack <9.00
*Central Lawrenceville (17) had a varblack ==8.87, around 25th percentile


list neigh neigh_name blackmd varblack if varblack >209
*Morningside (52) had a varblack==235.48, around 75th percentile


*now obtain figures for these neighborhoods
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"
list neigh neigh_name ctblock black if neigh_name=="Central Lawrenceville" | neigh_name=="Morningside"
```

4.3 Correlations

```
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"
*Strong Correlation Within, Strong Correlation Between
graph twoway (scatter nocar inclow if neigh==69, msymbol(Oh)) ///
  (scatter nocar inclow if neigh==28, msymbol(S)) ///
  (scatter nocar inclow if neigh==34, msymbol(Dh)) ///
  (scatter nocar inclow if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xtitle(% with Income < $30K) ytitle (% of Households with No Car) ///
  ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)
graph save "C:\MSTHESIS\Final\Graphs\Correlations\car_inc.gph", replace

*Weak Correlation Within, Weak Correlation Between
graph twoway (scatter rent edulow if neigh==69, msymbol(Oh)) ///
  (scatter rent edulow if neigh==28, msymbol(S)) ///
  (scatter rent edulow if neigh==34, msymbol(Dh)) ///
  (scatter rent edulow if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xtitle (% < High School Education) ytitle(% Renters )  ///
  ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)

graph twoway (scatter unemp inclow if neigh==69, msymbol(Oh)) ///
  (scatter unemp inclow if neigh==28, msymbol(S)) ///
  (scatter unemp inclow if neigh==34, msymbol(Dh)) ///
  (scatter unemp inclow if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xtitle (% < Income $30K) ytitle(% Unemployed )  ///
  ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)
graph save "C:\MSTHESIS\Final\Graphs\Correlations\unemp_inc.gph", replace



use "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta"
```

```
list  neigh_name  neigh  nocarmd  varnocar  inclowmd  varinclow  rentmd  varrent  edulowmd  varedulow
unempmd varunemp  ///
if neigh==69 | neigh ==28 | neigh==34 | neigh==77
```

4.4 Composite Index of SEP

```
*Syntax for Conducting Factor Analysis on Total Correlation
*Within Correlation
*And Between Correlation Matrix


*Total Correlation Matrix

*use total correlation matrix of SEP
clear
insheet using "C:\MSTHESIS\Final\Dataset\totalcorrelation.DAT"

*TOTAL CORRELATION MATRIX (ignore clustering)
*delete mean and std from correlation matrix
drop in 13
drop in 13

*upload correlation matrix
*check to make sure that everything looks okay
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix (withincor)
matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list withincor

*conduct factor analysis
factormat withincor, n(341) ml
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph", replace

*conduct factor analysis on 1-3 factors
*One factor
factormat withincor, n(341) factors(1) ml

*Two factor, with rotation
factormat withincor, n(341) factors(2) ml
```

```
rotate, oblimin oblique

*Three factor, with rotation
factormat withincor, n(341) factors(3) ml
rotate, oblimin oblique

*Results demonstrate that 1 factor solution is the best

*WITHIN NEIGHBORHOOD MATRIX
clear
insheet using "C:\MSTHESIS\Final\Dataset\withinneighbg.DAT"

*Within, neighborhood is clustering variable
*delete mean and std from correlation matrix
drop in 13
drop in 13

*upload correlation matrix
*check to make sure that everything looks okay
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix (withincor)
matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list withincor

*Conduct factor analysis
factormat withincor, n(341) ml
estat common
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph", replace

*Conduct factor analysis on 1-3 factors
*1 factor
factormat withincor, n(341) factors(1) ml
estat common

*2 factors
```

```
factormat withincor, n(341) factors(2) ml
rotate, oblimin oblique
estat common

*3 factors
factormat withincor, n(341) factors(3) ml
rotate, oblimin oblique
estat common

*Results demonstrate that 2 factor solution is the best

*BETWEEN NEIGHBORHOOD
clear
insheet using "C:\MSTHESIS\Final\Dataset\betweencorrneigh.csv"
drop v1
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(betweencor)
matrix rownames betweencor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list betweencor

*Conduct factor analysis
factormat betweencor, n(89) ml
estat common
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph", replace

*1 Factor
factormat betweencor, n(89) factors(1) ml
rotate, oblimin oblique
estat common

*2 Factors
factormat betweencor, n(89) factors(2) ml
rotate, oblimin oblique
estat common
```

```
*3 Factor
factormat betweencor, n(89) factors(3) ml
rotate, oblimin oblique

estat common

*Results demonstrate that 1 factor solution is the best
```

4.4.4 Creating Factor Scores

```
*Syntax for Conducting Factor Analysis on Total Correlation
*Within Correlation
*And Between Correlation Matrix


*Total Correlation Matrix

*use total correlation matrix of SEP
clear
insheet using "C:\MSTHESIS\Final\Dataset\totalcorrelation.DAT"

*TOTAL CORRELATION MATRIX (ignore clustering)
*delete mean and std from correlation matrix
drop in 13
drop in 13

*upload correlation matrix
*check to make sure that everything looks okay
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix (withincor)
matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list withincor

*conduct factor analysis
factormat withincor, n(341) ml
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph", replace

*conduct factor analysis on 1-3 factors
*One factor
factormat withincor, n(341) factors(1) ml

*Two factor, with rotation
factormat withincor, n(341) factors(2) ml
rotate, oblimin oblique
```

```
*Three factor, with rotation
factormat withincor, n(341) factors(3) ml
rotate, oblimin oblique

*Results demonstrate that 1 factor solution is the best

*WITHIN NEIGHBORHOOD MATRIX
clear
insheet using "C:\MSTHESIS\Final\Dataset\withinneighbg.DAT"

*Within, neighborhood is clustering variable
*delete mean and std from correlation matrix
drop in 13
drop in 13

*upload correlation matrix
*check to make sure that everything looks okay
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix (withincor)
matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list withincor

*Conduct factor analysis
factormat withincor, n(341) ml
estat common
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph", replace

*Conduct factor analysis on 1-3 factors
*1 factor
factormat withincor, n(341) factors(1) ml
estat common

*2 factors
factormat withincor, n(341) factors(2) ml
```

```
rotate, oblimin oblique
estat common

*3 factors
factormat withincor, n(341) factors(3) ml
rotate, oblimin oblique
estat common

*Results demonstrate that 2 factor solution is the best

*BETWEEN NEIGHBORHOOD
clear
insheet using "C:\MSTHESIS\Final\Dataset\betweencorrneigh.csv"
drop v1
mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(betweencor)
matrix rownames betweencor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18
matrix list betweencor

*Conduct factor analysis
factormat betweencor, n(89) ml
estat common
screeplot
graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph", replace

*1 Factor
factormat betweencor, n(89) factors(1) ml
rotate, oblimin oblique
estat common

*2 Factors
factormat betweencor, n(89) factors(2) ml
rotate, oblimin oblique
estat common
```

```
*3 Factor
factormat betweencor, n(89) factors(3) ml
rotate, oblimin oblique

estat common

*Results demonstrate that 1 factor solution is the best
```

4.5.1 Model Selection

```
*Now conduct multilevel model
clear

use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

summarize lbwper, detail
*Model Fitting Neigborhood Data
**Model 1
xtmixed lbwper || neigh:, variance covar(ind) mle
estat ic
estimates store m1
display "deviance = " -2*e(ll)

**Model 2 Main Effects Model, Within
xtmixed lbwper cf1nw cf2nw || neigh: cf1nw cf2nw, variance covar(ind) mle
estat ic
estimates store m2
display "deviance = " -2*e(ll)

**Model 3 Main Effects Model, Between
xtmixed lbwper cfbw || neigh:, variance covar(ind) mle
estat ic
estimates store m3
display "deviance = " -2*e(ll)

**Model 4 Main Effects Model, Full
xtmixed lbwper cf1nw cf2nw cfbw || neigh: cf1nw cf2nw, variance covar(ind) mle
estat ic
estimates store m4
display "deviance = " -2*e(ll)

**Model 5 Interaction Model F1w*Fbw F2w*Fbw
g f1int = cf1nw*cfbwn
g f2int = cf2nw*cfbwn
xtmixed lbwper cf1nw cf2nw cfbw f1int f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
```

```
estat ic
estimates store m5
display "deviance = " -2*e(ll)
predict yhat

**Model 6 f2int only
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
estat ic
estimates store m6
display "deviance =" -2*e(ll)

**Model 7 f1int only
xtmixed lbwper cf1nw cf2nw cfbw f1int || neigh: cf1nw cf2nw, variance covar(ind) mle
estat ic
estimates store m7
display "deviance =" -2*e(ll)

*Now examine fit
lrtest m2 m1
lrtest m3 m1
lrtest m4 m1
lrtest m4 m2
lrtest m4 m3
lrtest m5 m4
lrtest m6 m5
lrtest m7 m4
lrtest m7 m5
lrtest m6 m4

*Model 6 is the final model
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

*Original model had trouble converging
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
```

4.5.2 Diagnostics

```
*Diagnostic
*Why is Model 6 not converging?
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
drop fitted yhat6 f1int f2int eres rstandard

**Model 6 f2int only
g f1int = cf1nw*cfbwn
g f2int = cf2nw*cfbwn
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
estat ic
estimates store m6
display "deviance =" -2*e(ll)
*Predicted y only fixed effects
predict yhat6
*Predicted y given fixed and random effects
predict fitted, fitted
*Predict residuals
predict eres, resid
label variable eres "Residual"
*Predict standardized residuals
predict rstandard, rstandard

save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace

*How many neighborhoods are comprised of only 1 block group?
collapse (count) n_bg=lbwper, by(neigh)
list neigh if n_bg==1
summarize neigh if n_bg==1
codebook neigh if n_bg==1
**There are 25 neighborhoods comprised of 1 block group
```

```
sort neigh
save "C:\MSTHESIS\Final\Dataset\n_bg.dta", replace

*Now merge number of bg with existing dataset
use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
sort neigh
merge neigh using "C:\MSTHESIS\Final\Dataset\n_bg.dta"
drop _merge
save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace

*List neighborhoods comprised of 1 block group along with centered values
list neigh neigh_name cf1nw cf2nw cfbwn f1int f2int if n_bg==1

*Generate uncentered interaction terms
generate f1intr=f1nw*fbwn
generate f2intr=f2nw*fbwn

*List neighborhoods comrpised of 1 block group along with raw values
list neigh neigh_name f1nw f2nw fbwn f1intr f2intr if n_bg==1
*interactions became 0!!!!

*are 0 values just for these neighborhoods with 1 bg??
list neigh cf1nw cf2nw cfbwn f1int f2int if (cf1nw==0 | cf2nw==0)
*they are the same
*Structural issue??

*EXAMINING RESIDUALS
*Model 6 xtmixed lbwper cf1nw cf2nw cfbw f2int|| neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

*Diagnostic Plots
*Graphs examining departure from normality
histogram eres
graph box eres
kdensity eres, normal
qnorm eres
```

```
*Fitted Standardized Residuals vs predictors
graph twoway (scatter rstandard fitted), yline(0) xtitle (Predicted LBW Proportion)
graph twoway (scatter rstandard cf1nw), yline(0) xtitle (Centered MED)
graph twoway (scatter rstandard cf2nw), yline(0) xtitle (Centered CD)
graph twoway (scatter rstandard cfbw), yline(0)  xtitle (Centered OND)
graph twoway (scatter rstandard f2int), yline(0)   xtitle (CD*OND)

*Describe outlier
list neigh neigh_name ctblock n_bg lbwper fitted yhat6 cf1nw cf2nw cfbw f2int rstandard if rstandard>4.0
list neigh neigh_name ctblock n_bg lbwper fitted f1nw f2nw fbw f2intr rstandard if rstandard>4.0
list neigh_name lbwper fitted und18 unemp inclow f1nw f2nw fbw f2intr if neigh_name=="South Side Flats"

*SENSITIVITY ANALYSIS
*Original Model 6
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle emiterate(500) emtolerance(1e-3)
predict fitted_6, fitted

*Model 6 Excluding neighborhoods = 1 Block group
xtmixed lbwper cf1nw cf2nw cfbw f2int if n_bg~=1 || neigh: cf1nw cf2nw, variance covar(ind) mle
predict fitted_nbg, fitted

*Model 6 Excluding Outlier
xtmixed lbwper cf1nw cf2nw cfbw f2int if ctblock~="1609001" || neigh: cf1nw cf2nw, variance covar(ind) mle
predict fitted_out, fitted

*Model 6 where cf2nw is not a random effect
xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw, variance covar(ind) mle
predict fitted_re, fitted

*Model 4 Main Effects Only
xtmixed lbwper cf1nw cf2nw cfbw|| neigh: cf1nw cf2nw, variance covar(ind) mle
```

```
predict fitted_4, fitted


sort neigh ctblock

. list neigh_name ctblock fitted_4 fitted_6 lbwper cf1nw cf2nw cfbwn f2int if neigh==28 |
neigh==34 | neigh==69 | neigh==77


*GRAPHING

graph twoway (scatter fitted_6 fitted_nbg), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with Neighborhoods Comprised of >1 Block Group)

graph twoway (scatter fitted_6 fitted_out), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with No Outlier)

graph twoway (scatter fitted_6 fitted_re), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with CD Not a Random Effect)

graph twoway (scatter fitted_6 fitted_4), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with Model 4)


*Observed vs predicted for Model 6

graph twoway (scatter fitted_6 lbwper), ytitle (Predicted LBW Model 6) xtitle (Observed LBW)


*Effect of Centering

graph twoway (scatter cf1nw cf2nw), ytitle (Centered MED) xtitle (Centered CD) ///
  xsc (r(-40 80)) xlabel(-40(20)80)  ysc (r(-40 80)) ylabel(-40(20)80) ///
  yline (0) xline(0)

graph twoway (scatter f1nw f2nw), ytitle (MED) xtitle (CD) ///
  xsc (r(-40 80)) xlabel(-40(20)80)  ysc (r(-40 80)) ylabel(-40(20)80) ///
  yline (0) xline(0)


*UNDERSTANDING MODEL 6

*Graph predicted fitted_6 from model 6 vs main effects

graph twoway (scatter fitted_6 f1nw), ///
ytitle(Predicted Low Birth Weight Proportion Model 6 ) xtitle (Material and Economic Deprivation
at the Block Group Level) ///
xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)


graph twoway (scatter fitted_6 f2nw), ///
ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Concentrated Disadvantage at the
Block Group Level) ///
```

```
xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)

graph twoway (scatter fitted_6 fbwn), ///
ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Overall Neighborhood Deprivation)
///
xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)

*Graphs for 4 neighborhoods
graph twoway (scatter fitted_6 f1nw if neigh==69, msymbol(Oh)) ///
  (scatter fitted_6  f1nw if neigh==28, msymbol(S)) ///
  (scatter fitted_6  f1nw if neigh==34, msymbol(Dh)) ///
  (scatter fitted_6 f1nw if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
  ytitle(Predicted  Low  Birth  Weight  Proportion   Model  6  )  xtitle  (Material  and  Economic
Deprivation at the Block Group Level)

graph twoway (scatter fitted_6  f2nw if neigh==69, msymbol(Oh)) ///
  (scatter fitted_6  f2nw if neigh==28, msymbol(S)) ///
  (scatter fitted_6  f2nw if neigh==34, msymbol(Dh)) ///
  (scatter fitted_6  f2nw if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
  ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Concentrated Disadvantage at
the Block Group Level)

graph twoway (scatter fitted_6  fbwn if neigh==69, msymbol(Oh)) ///
  (scatter fitted_6  fbwn if neigh==28, msymbol(S)) ///
  (scatter fitted_6 fbwn if neigh==34, msymbol(Dh)) ///
  (scatter fitted_6  fbwn if neigh==77, msymbol(T)), ///
  legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
  xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
  ytitle(Predicted  Low  Birth  Weight  Proportion   Model  6)  xtitle  (Overall  Neighborhood
Deprivation)
```

4.5.2 Interpretation of Model Results

```
clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
collapse (mean) cfbwn=cfbwn, by(neigh)
summarize cfbwn
*SD = 10.76975

clear
use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
sum cfbwn

*Summarize interaction terms for mean model
summarize f1int
summarize f2int

*Create interaction for 1+SD model
generate cfbwp  =  cfbwn + 10.76975
generate f2intp = cf2nw*cfbwp
generate f1intp = cf1nw*cfbwp

*Create interaction for 1-SD model
generate cfbwm  =  cfbwn - 10.76975
generate f2intm = cf2nw*cfbwm
generate f1intm = cf1nw*cfbwm

*Mean model
xtmixed lbwper cf1nw cf2nw cfbwn f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
predict fitted_mean, fitted

*1+SD model
xtmixed lbwper cf1nw cf2nw cfbwp f2intp || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
predict fitted_pSD, fitted

*1-SD model
```

```
xtmixed lbwper cf1nw cf2nw cfbwm f2intm || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
predict fitted_mSD, fitted

*see example syntax on http://www.ats.ucla.edu/stat/stata/faq/conconb.htm

sort neigh ctblock
list neigh_name ctblock fitted_mean lbwper cf1nw cf2nw cfbwn f1int f2int if neigh==28 |
neigh==69|neigh==34|neigh==77
```

APPENDIX F

ANNOTATED OUTPUT

4.1.1 Boxplots

```
------------------------------------------------------------------------------------------------
-----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Box Plots.log
  log type:  text
 opened on:  20 Jul 2009, 11:20:57

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. clear

. *Creating Bar Graphs of SEP Data
. *The following dataset is the long form of the main data
.
. use "C:\MSTHESIS\Data Files 12_10_08\Mapping\allareafilelong.dta"

.
. *Create Bar Graphs of Data
. graph box unemp, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\unemp.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\unemp.gph saved)

.
. graph box nocar, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\nocar.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\nocar.gph saved)

.
. graph box crowd, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\crowd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\crowd.gph saved)

.
. graph box rent, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\rent.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\rent.gph saved)

.
. graph box profm, over (area) ysc (r(0 100)) ylabel (0(20)100)
```

```
. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\profm.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\profm.gph saved)

.
. graph box pov_h, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\pov_h.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\pov_h.gph saved)

.
. graph box fhh, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\fhh.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\fhh.gph saved)

.
. graph box pbasst, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\pbasst.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\pbasst.gph saved)

.
. graph box inclow, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\inclow.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\inclow.gph saved)

.
. graph box edulow, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\edulow.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\edulow.gph saved)

.
. graph box black, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\black.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\black.gph saved)

.
. graph box und18, over (area) ysc (r(0 100)) ylabel (0(20)100)

. graph save "C:\MSTHESIS\Final\Graphs\Boxplots\und18.gph", replace
(file C:\MSTHESIS\Final\Graphs\Boxplots\und18.gph saved)

.
. *Create summary of each variables, mean, median, variance
. sort area

. by area:  summarize unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18,
detail

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
-> area = Census Block Group

                            unemp
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     .4807692              0
10%     1.791045              0       Obs                 341
25%     3.693931              0       Sum of Wgt.         341

50%     6.765676                      Mean           9.006871
                        Largest       Std. Dev.      8.823738
75%     11.56463       41.41104
90%     17.41742       60.96546       Variance       77.85835
95%     22.27102       62.26804       Skewness       3.070658
99%     41.41104       70.04405       Kurtosis       17.25129
```

```
                            nocar
-------------------------------------------------------------
      Percentiles      Smallest
 1%     1.939655              0
 5%     5.863192              0
10%     8.542713              0       Obs                 341
25%     15.17241       1.939655       Sum of Wgt.         341

50%     25.52553                      Mean            28.4605
                        Largest       Std. Dev.      17.60645
75%     38.99371       79.70863
90%     52.56242       81.63265       Variance       309.9872
95%     60.50157       83.12236       Skewness       .8281092
99%     79.70863       90.58642       Kurtosis       3.431184

                            crowd
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 341
25%            0              0       Sum of Wgt.         341

50%     1.116071                      Mean           1.774172
                        Largest       Std. Dev.      2.306099
75%     2.866242       9.661836
90%     4.748603       9.913794       Variance       5.318092
95%         6.25       10.47619       Skewness        1.79493
99%     9.661836       15.87983       Kurtosis       7.808186

                            rent
-------------------------------------------------------------
      Percentiles      Smallest
 1%     5.200946              0
 5%      10.9375              0
10%     13.91304       4.103672       Obs                 341
25%     26.00619       5.200946       Sum of Wgt.         341

50%     40.24024                      Mean           44.18024
                        Largest       Std. Dev.      23.79379
75%     61.82796            100
90%     77.40492            100       Variance       566.1445
95%     89.23841            100       Skewness       .4381194
99%          100            100       Kurtosis       2.343278

                            profm
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     2.155172              0
10%     4.245283              0       Obs                 341
25%     7.941176              0       Sum of Wgt.         341

50%     11.82796                      Mean           16.00148
                        Largest       Std. Dev.      12.25763
75%     20.66365       51.59236
90%     37.68546       51.63511       Variance       150.2495
95%     42.59259       54.87078       Skewness       1.190133
99%     51.59236       58.62069       Kurtosis       3.723149

                            pov_h
-------------------------------------------------------------
      Percentiles      Smallest
 1%     1.044776              0
 5%     3.356643              0
10%     5.771496       .9090909       Obs                 341
25%     9.453471       1.044776       Sum of Wgt.         341

50%     16.01942                      Mean           19.82638
                        Largest       Std. Dev.      14.67612
75%     26.48428       67.45351
```

```
90%     38.95131       70.08648       Variance       215.3886
95%     52.48509       70.96774       Skewness        1.57373
99%     67.45351       96.79715       Kurtosis       6.140148

                           fhh
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%     1.086957              0       Obs                 341
25%     2.773723              0       Sum of Wgt.         341

50%     6.241332                      Mean           9.438665
                        Largest       Std. Dev.      9.581384
75%         12.5       44.17373
90%     21.78218       50.31446       Variance       91.80292
95%     28.16092       55.57769       Skewness       2.028984
99%     44.17373        64.8855       Kurtosis       8.738496

                          pbasst
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 341
25%     1.592357              0       Sum of Wgt.         341

50%     3.809524                      Mean           5.739311
                        Largest       Std. Dev.      6.578321
75%     7.594937       27.69461
90%     13.31361       30.09709       Variance       43.27431
95%     19.20375       35.75064       Skewness        2.66434
99%     27.69461       57.14286       Kurtosis       15.38247

                          inclow
-------------------------------------------------------------
      Percentiles      Smallest
 1%     15.02058              0
 5%     24.63768       13.30377
10%     29.34783       14.44043       Obs                 341
25%     39.28571       15.02058       Sum of Wgt.         341

50%      50.5176                      Mean           51.02156
                        Largest       Std. Dev.       16.9932
75%     61.83844       91.46706
90%     74.27746        91.6955       Variance       288.7688
95%     80.81761       93.06931       Skewness        .175657
99%     91.46706            100       Kurtosis       2.870157

                          edulow
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     2.996255              0
10%     6.185567              0       Obs                 341
25%     11.52074              0       Sum of Wgt.         341

50%     18.31579                      Mean           18.89958
                        Largest       Std. Dev.      10.50695
75%      25.3493       48.75445
90%     31.98128       50.20833       Variance        110.396
95%     36.45833       64.11594       Skewness       .7972786
99%     48.75445       72.13115       Kurtosis       5.080073

                           black
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 341
25%     2.670227              0       Sum of Wgt.         341
```

```
50%     10.40462                      Mean            27.2931
                        Largest       Std. Dev.      32.97228
75%     47.38372       97.66187
90%      89.7541       97.95454       Variance       1087.171
95%     94.99342        99.2272       Skewness       1.081429
99%     97.66187            100       Kurtosis       2.620368

                            und18
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .8741259              0
 5%     4.693786              0
10%     7.249803        .562701       Obs                 341
25%      14.6875       .8741259       Sum of Wgt.         341

50%     20.50114                      Mean           20.60265
                        Largest       Std. Dev.      9.476071
75%     26.24855       48.08362
90%     31.81818       48.83841       Variance       89.79592
95%     36.63462       49.31034       Skewness       .2924898
99%     48.08362       57.81676       Kurtosis       3.497003

----------------------------------------------------------------------------------------------------
-----------------------------------------------------------
-> area = Census Tract

                            unemp
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     1.222494              0
10%     2.913753              0       Obs                 139
25%     4.312035              0       Sum of Wgt.         139

50%     7.234043                      Mean           10.14328
                        Largest       Std. Dev.      9.421143
75%      12.8012       39.08918
90%      20.3125       40.45308       Variance       88.75794
95%     29.66361       40.92036       Skewness       2.686378
99%     40.92036       67.79272       Kurtosis        13.5073

                            nocar
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     7.897664              0
10%      9.44816       3.278688       Obs                 139
25%     15.93264       4.821601       Sum of Wgt.         139

50%     26.84729                      Mean           30.48375
                        Largest       Std. Dev.      18.18781
75%     40.80146           77.5
90%         56.8       79.70863       Variance       330.7963
95%     60.21657       80.28391       Skewness       .8116333
99%     80.28391       90.58642       Kurtosis       3.385732

                            crowd
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 139
25%     .3805899              0       Sum of Wgt.         139

50%     1.395349                      Mean           1.990534
                        Largest       Std. Dev.        2.1605
75%     2.720207       6.842105
90%     4.735683       7.157464       Variance       4.667762
95%     5.921052        7.57764       Skewness        2.43992
99%      7.57764       15.87983       Kurtosis       14.06601
```

rent

	Percentiles	Smallest		
1%	6.284153	0		
5%	11.93634	6.284153		
10%	19.65812	7.20339	Obs	139
25%	30.92224	9.531773	Sum of Wgt.	139
50%	44.98886		Mean	47.55943
		Largest	Std. Dev.	23.37539
75%	65.89595	96.31579		
90%	80.80808	97.1223	Variance	546.4091
95%	89.47369	100	Skewness	.3396462
99%	100	100	Kurtosis	2.338038

profm

	Percentiles	Smallest		
1%	0	0		
5%	4.186047	0		
10%	5.509642	0	Obs	139
25%	8.018504	0	Sum of Wgt.	139
50%	11.82894		Mean	15.837
		Largest	Std. Dev.	11.96837
75%	20.18072	44.78764		
90%	37.68546	47.29627	Variance	143.242
95%	40.66742	51.59236	Skewness	1.347314
99%	51.59236	58.62069	Kurtosis	4.199837

pov_h

	Percentiles	Smallest		
1%	2.844639	0		
5%	6.060606	2.844639		
10%	7.126113	2.98194	Obs	139
25%	11.2138	3.139014	Sum of Wgt.	139
50%	18.19842		Mean	22.18155
		Largest	Std. Dev.	15.46927
75%	29.53587	62.33037		
90%	42.71589	67.1141	Variance	239.2982
95%	58.63343	67.45351	Skewness	1.228136
99%	67.45351	70.08648	Kurtosis	4.03106

fhh

	Percentiles	Smallest		
1%	0	0		
5%	.4807692	0		
10%	1.455301	0	Obs	139
25%	3.430962	0	Sum of Wgt.	139
50%	6.888889		Mean	10.66059
		Largest	Std. Dev.	10.83712
75%	13.7931	39.42766		
90%	22.78245	44.17373	Variance	117.4432
95%	32	55.57769	Skewness	2.123182
99%	55.57769	64.8855	Kurtosis	8.883384

pbasst

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	.8460237	0	Obs	139
25%	2.129032	0	Sum of Wgt.	139
50%	4.28737		Mean	6.758533
		Largest	Std. Dev.	7.54906

```
75%     8.759124       27.01271
90%     14.48598       27.69461       Variance        56.9883
95%     20.40816       35.75064       Skewness       3.073035
99%     35.75064       57.14286       Kurtosis        17.5442

                            inclow
-------------------------------------------------------------
      Percentiles      Smallest
 1%     18.28572        17.4538
 5%     28.69796       18.28572
10%     33.10345       20.70796       Obs                 139
25%     40.63574       23.94366       Sum of Wgt.         139

50%     52.81553                      Mean           53.34958
                        Largest       Std. Dev.      16.10985
75%     63.94558        89.4081
90%     73.33334       90.07633       Variance       259.5274
95%     82.69962       91.46706       Skewness        .229182
99%     91.46706       93.06931       Kurtosis       2.768277

                            edulow
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .8849558              0
 5%     4.095987       .8849558
10%     7.138114       1.352875       Obs                 139
25%     12.79586       2.265193       Sum of Wgt.         139

50%      18.6087                      Mean           20.00334
                        Largest       Std. Dev.       10.7438
75%     26.01239       45.15236
90%     32.91536       48.75445       Variance       115.4292
95%      36.6985       50.20833       Skewness       1.057869
99%     50.20833       72.13115       Kurtosis       6.218506

                             black
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     1.212344              0
10%      1.96793       .1875293       Obs                 139
25%     4.347826       .2762431       Sum of Wgt.         139

50%     13.55182                      Mean            30.7246
                        Largest       Std. Dev.      33.67083
75%     63.85887       96.37427
90%     90.27107       96.39498       Variance       1133.725
95%      94.8526       96.85265       Skewness       .9254493
99%     96.85265       98.17427       Kurtosis       2.219046

                             und18
-------------------------------------------------------------
      Percentiles      Smallest
 1%      .562701              0
 5%     4.693786        .562701
10%     7.910943       1.476355       Obs                 139
25%     15.27851       1.942668       Sum of Wgt.         139

50%     20.71346                      Mean           20.92258
                        Largest       Std. Dev.       9.84338
75%     26.57895       48.08362
90%     31.67036       48.83841       Variance       96.89212
95%     35.66186       49.31034       Skewness       .5362508
99%     49.31034       57.81676       Kurtosis       4.388139

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
-> area = Neighborhood

                             unemp
-------------------------------------------------------------
```

	Percentiles	Smallest		
1%	0	0		
5%	.5899705	0		
10%	3.223807	0	Obs	89
25%	5.398773	0	Sum of Wgt.	89
50%	7.785888		Mean	10.83676
		Largest	Std. Dev.	8.335252
75%	15.3277	29.66361		
90%	24.00835	31.12745	Variance	69.47642
95%	28.78338	31.5873	Skewness	1.303647
99%	41.72149	41.72149	Kurtosis	4.499726

nocar

	Percentiles	Smallest		
1%	0	0		
5%	8.420552	3.278688		
10%	8.986459	5.921052	Obs	89
25%	18.54696	7.9566	Sum of Wgt.	89
50%	30.23622		Mean	32.31707
		Largest	Std. Dev.	18.74344
75%	43.77928	74.23313		
90%	58.87446	77.5	Variance	351.3167
95%	62.58993	79.70863	Skewness	.6566953
99%	85.49142	85.49142	Kurtosis	2.940942

crowd

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	89
25%	.4033885	0	Sum of Wgt.	89
50%	1.670951		Mean	2.085592
		Largest	Std. Dev.	2.336711
75%	3.003684	6.338028		
90%	4.748603	6.842105	Variance	5.460217
95%	6.206897	7.157464	Skewness	2.701018
99%	15.87983	15.87983	Kurtosis	15.08002

rent

	Percentiles	Smallest		
1%	6.284153	6.284153		
5%	12.09302	7.20339		
10%	15.94621	11.69102	Obs	89
25%	31.36373	11.93634	Sum of Wgt.	89
50%	43.86423		Mean	48.18127
		Largest	Std. Dev.	23.79734
75%	62.87425	92.4337		
90%	86.15665	96.31579	Variance	566.3134
95%	91.15504	97.1223	Skewness	.357849
99%	100	100	Kurtosis	2.270763

profm

	Percentiles	Smallest		
1%	0	0		
5%	2.846975	0		
10%	4.72441	0	Obs	89
25%	7.188353	0	Sum of Wgt.	89
50%	11.48036		Mean	14.31862
		Largest	Std. Dev.	11.21075
75%	17.70574	40.29449		
90%	31.19565	41.51015	Variance	125.6808
95%	38.31241	51.59236	Skewness	1.72278

```
99%     58.62069       58.62069       Kurtosis       6.144788

                            pov_h
-------------------------------------------------------------
      Percentiles      Smallest
 1%     3.139014       3.139014
 5%     6.332454       3.913043
10%     7.210751       4.300292       Obs                  89
25%     11.43791       5.355885       Sum of Wgt.          89

50%     19.69952                      Mean           23.72499
                        Largest       Std. Dev.      15.96198
75%     32.08333       60.46511
90%     54.98595       61.62121       Variance       254.7848
95%     60.27397       62.33037       Skewness       1.055066
99%     70.08648       70.08648       Kurtosis       3.439134

                             fhh
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     .9228188              0
10%     1.670435              0       Obs                  89
25%     4.329004       .4675468       Sum of Wgt.          89

50%     7.929515                      Mean            11.9026
                        Largest       Std. Dev.      11.77181
75%     17.42679       38.61386
90%     26.90909       44.17373       Variance       138.5756
95%           32       55.57769       Skewness       2.085188
99%      64.8855        64.8855       Kurtosis       8.374506

                           pbasst
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     .4775802              0
10%     1.470588              0       Obs                  89
25%     2.283771              0       Sum of Wgt.          89

50%     5.918367                      Mean           7.758673
                        Largest       Std. Dev.      8.418079
75%     9.580838       21.90238
90%     17.91908       27.01271       Variance       70.86406
95%     21.22137       35.75064       Skewness       2.993107
99%     57.14286       57.14286       Kurtosis       15.83756

                           inclow
-------------------------------------------------------------
      Percentiles      Smallest
 1%     20.70796       20.70796
 5%     30.36929       25.43824
10%     36.42157        28.7648       Obs                  89
25%     42.84342        28.9732       Sum of Wgt.          89

50%     55.72139                      Mean           55.19035
                        Largest       Std. Dev.      15.82564
75%     65.19916       89.19492
90%     74.43609       90.07633       Variance        250.451
95%     86.18182       90.45802       Skewness       .2455389
99%     93.06931       93.06931       Kurtosis       2.677721

                           edulow
-------------------------------------------------------------
      Percentiles      Smallest
 1%     1.352875       1.352875
 5%     6.728111       3.214163
10%       9.9404       3.968834       Obs                  89
25%     14.23729       5.307349       Sum of Wgt.          89

50%     20.77158                      Mean           21.87987
```

```
                        Largest       Std. Dev.      10.90195
75%     28.02607       40.89347
90%     33.12946       48.75445       Variance       118.8525
95%     39.05358       50.20833       Skewness       1.282013
99%     72.13115       72.13115       Kurtosis       7.098214

                            black
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%      1.96793       1.212344
10%      2.58306       1.780726       Obs                  89
25%     5.573628       1.785714       Sum of Wgt.          89

50%     19.16996                      Mean           33.80416
                        Largest       Std. Dev.      33.57955
75%     66.98412       95.33459
90%     90.27107       95.84415       Variance       1127.586
95%      94.8526       96.37427       Skewness       .7705983
99%     97.46446       97.46446       Kurtosis       1.984386

                            und18
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     3.708134       1.942668
10%     7.983132       2.318424       Obs                  89
25%     16.13856       2.607284       Sum of Wgt.          89

50%     21.00473                      Mean           21.76762
                        Largest       Std. Dev.      10.12642
75%     27.45452       40.89184
90%     32.70563       48.08362       Variance       102.5445
95%     38.55873       49.31034       Skewness       .5905948
99%     57.81676       57.81676       Kurtosis        4.59818


.
end of do-file

.
. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Box Plots.log
  log type:  text
 closed on:  20 Jul 2009, 11:22:15
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

4.1.2 Brown and Forsythe's Test of Homogeneity

```
----------------------------------------------------------------------------------------------------
------------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Brown and Forsythe.log
  log type:  text
 opened on:  20 Jul 2009, 11:48:06

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0d000000.tmp"

. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"

. *Test for homogeneity of variances. Use median test b/c of skewed data
. robvar unemp, by(neigh)

            |          Summary of unemp
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   15.662651           0           1
          2 |    3.768116           0           1
          3 |   10.570185   5.7518734           4
          4 |   6.9311303   4.8854549           3
          5 |     20.3125           0           1
          6 |    7.235476   1.5282509           3
          7 |    26.01626           0           1
          8 |   5.4046151   2.7657386          10
          9 |   9.2630285   3.7334112           4
         10 |    5.145906   3.7144437          10
         11 |    16.81119   3.7359256           2
         12 |   1.2224939           0           1
         13 |    6.220993   2.5708506           7
         14 |   4.2740536   3.1872497          15
         15 |   31.127451           0           1
         16 |   6.4066857   3.2501514          13
         17 |   6.9335582     5.38383           6
         18 |   16.105206   3.8955136           3
         19 |   8.5401686   1.5905075           3
         20 |          15           0           1
         22 |   3.7340049   2.7923863           4
         23 |   13.889483   12.081554           2
         24 |   3.7816621   2.7446629           3
         25 |   17.205029   3.3938787           2
         26 |   14.509804           0           1
         27 |    15.55783   1.3994558           3
         28 |   13.556159   9.2980957           8
         29 |   7.1182248   1.2877734           3
         30 |   8.6206894           0           1
         31 |   28.783382           0           1
         32 |   16.630036   14.193938           2
         33 |   6.7369812   1.9390669           2
         34 |   10.925491   4.8683731           5
         35 |    26.87747           0           1
         36 |   24.121553   25.761867           4
         37 |   6.7685272   5.1831218           9
         38 |   7.2340426           0           1
         39 |   10.955693   4.2667812           7
         40 |   6.1185049   4.3764356           7
         41 |   16.653268   2.4453831           5
         42 |   23.085387   10.796081           6
         43 |   13.721955   9.8303704           2
         44 |    11.29818   3.6990266           7
         45 |    12.99657   6.8496195           4
         46 |   19.974811   13.156178           4
         47 |   8.2774416    4.835328           5
         48 |   6.2640798   3.5268823           2
```

```
         49 |   12.195593   1.2340274           2
         50 |    8.953476   4.4235758           4
         51 |   24.225171   16.093363           3
         52 |   5.2363397    2.322934           4
         53 |           0           0           1
         54 |   5.5789951   2.1745554          11
         55 |   5.6338029           0           1
         56 |   19.358615   28.653867           5
         57 |           0           0           1
         58 |   31.587301           0           1
         59 |   3.8369305           0           1
         60 |    6.207536   3.6545847           5
         61 |   5.2929109   1.6832292           5
         62 |   9.9833174   7.8620314           6
         63 |   4.9436628   4.7733555           6
         64 |   7.7012197   1.0838538           3
         65 |   10.911122   5.3822972           2
         66 |   .58997053           0           1
         67 |           0           0           1
         68 |   20.202021           0           1
         69 |   5.3613616   6.0049024          12
         70 |   5.4025496   2.1361646           6
         71 |   9.5256364   6.8121617           4
         72 |           0           0           1
         73 |   4.8130858   3.9837308           5
         74 |    7.041068   4.2023409           7
         75 |    5.050658   1.2089459           2
         76 |   7.8574228   2.4259104           3
         77 |   9.0529211   19.661008           9
         78 |   2.8924988   1.7289887          12
         79 |   5.3307924   2.5913838           4
         80 |   15.333333           0           1
         81 |   3.1088083           0           1
         82 |   3.0701754           0           1
         83 |   20.105363   20.227627           3
         84 |   7.6973579   2.7082826           2
         85 |   6.8715615   3.5449764           3
         86 |   9.4677618   2.6639577           3
         87 |   6.6298342           0           1
         88 |   16.847877   3.2881245           2
         89 |   3.9088212   .30390019           2
         90 |   3.9106145    5.530444           2
------------+------------------------------------
      Total |   9.0068709   8.8237378         341

W0  =  2.3896030   df(88, 252)     Pr > F = 0.00000006

W50 =  0.9220974   df(88, 252)     Pr > F = 0.66682529

W10 =  2.3681769   df(88, 252)     Pr > F = 0.00000008

. robvar nocar, by(neigh)

            |          Summary of nocar
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   60.085838           0           1
          2 |   21.269842           0           1
          3 |   39.553593   9.9759716           4
          4 |   25.271009   4.8427033           3
          5 |   56.799999           0           1
          6 |   7.3834068   2.8190511           3
          7 |   79.708633           0           1
          8 |   21.522024   7.2902639          10
          9 |    34.76174   7.6200816           4
         10 |   35.150352   7.7454205          10
         11 |   57.011494   4.2263862           2
         12 |   15.649867           0           1
         13 |   18.761587   7.2296593           7
         14 |   17.083726   7.4523999          15
         15 |   51.724136           0           1
```

16	20.36751	10.181469	13
17	42.218694	5.2689866	6
18	43.831008	6.1299382	3
19	41.512187	9.7555877	3
20	15.811966	0	1
22	16.956903	11.114104	4
23	56.449543	9.8444141	2
24	13.35108	6.8303067	3
25	59.673683	.17412246	2
26	12.234042	0	1
27	36.281731	16.601902	3
28	50.312959	13.4686	8
29	26.406141	9.2076479	3
30	33.333332	0	1
31	51.396648	0	1
32	45.735605	27.332724	2
33	40.907848	1.1472521	2
34	41.56632	10.22315	5
35	62.589928	0	1
36	52.473832	26.769985	4
37	18.581065	8.333658	9
38	25.603865	0	1
39	32.233774	16.660644	7
40	18.604785	10.963405	7
41	49.874993	1.5552497	5
42	57.606802	11.770539	6
43	55.597832	1.3387943	2
44	30.478004	7.3909061	7
45	45.890054	14.545511	4
46	30.716236	4.8813472	4
47	8.6338624	4.6010893	5
48	37.06127	5.8439917	2
49	39.879984	.03039698	2
50	24.455992	9.5919815	4
51	55.027794	5.9064911	3
52	18.395239	6.4833652	4
53	25.112108	0	1
54	19.792735	6.5054149	11
55	3.2786884	0	1
56	27.281213	25.507747	5
57	5.9210525	0	1
58	77.5	0	1
59	26.112186	0	1
60	8.1095984	3.2042595	5
61	15.613306	1.9212894	5
62	31.817004	11.58125	6
63	8.043477	4.1410313	6
64	25.295099	7.2067446	3
65	32.269883	10.055975	2
66	7.9566002	0	1
67	9.7457628	0	1
68	74.233131	0	1
69	19.268367	9.0490309	12
70	23.728069	6.5854801	6
71	28.655723	3.9893968	4
72	0	0	1
73	40.314729	7.0603084	5
74	22.17905	8.7841112	7
75	25.811321	15.823182	2
76	30.809146	12.11882	3
77	8.0565955	5.914701	9
78	20.456803	14.535091	12
79	14.452621	6.1456811	4
80	33.802818	0	1
81	13.987473	0	1
82	8.5427132	0	1
83	84.099401	6.057881	3
84	31.325055	12.182647	2
85	30.741899	8.1394919	3
86	30.74814	3.7106124	3
87	29.655172	0	1

```
        88 |   45.572264   23.097641           2
        89 |   12.188819   1.3475534           2
        90 |   14.403852   9.1104608           2
------------+------------------------------------
      Total |   28.460503   17.606454         341

W0  =  2.9527746   df(88, 252)     Pr > F = 0.00000000

W50 =  1.7726260   df(88, 252)     Pr > F = 0.0003028

W10 =  2.9263614   df(88, 252)     Pr > F = 0.00000000

. robvar crowd, by(neigh)

            |          Summary of crowd
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   15.879828           0           1
          2 |           0           0           1
          3 |   4.4403741   1.9411505           4
          4 |   3.0978261   3.1253544           3
          5 |           0           0           1
          6 |   1.7932956   1.6114839           3
          7 |   2.7055151           0           1
          8 |   .91101949   1.3104148          10
          9 |   3.4572029   2.3149848           4
         10 |   2.3381203   1.7605703          10
         11 |   .66666669   .94280907           2
         12 |           0           0           1
         13 |    .4547177     1.20307           7
         14 |   .51101499   .99621957          15
         15 |   3.9787798           0           1
         16 |   .77218579   1.1192408          13
         17 |   .24582104   .60213611           6
         18 |   1.1890378    1.141256           3
         19 |   5.5544398   3.7026162           3
         20 |   4.7008548           0           1
         22 |   1.7104457   1.8590199           4
         23 |   2.2350993   3.1609078           2
         24 |   1.3803293   1.7570406           3
         25 |   5.7233655   5.0152218           2
         26 |           0           0           1
         27 |   1.6406781   1.7234533           3
         28 |   2.8225556   1.9863448           8
         29 |   1.0065127   1.7433312           3
         30 |           0           0           1
         31 |   4.7486033           0           1
         32 |           0           0           2
         33 |   3.2084586   3.1710558           2
         34 |   3.4386199   1.8709805           5
         35 |           0           0           1
         36 |   1.0166359   2.0332718           4
         37 |   1.0599162    1.262161           9
         38 |           0           0           1
         39 |   1.1035794   1.5296593           7
         40 |   .88686989   .85927995           7
         41 |   1.6530615   2.5227232           5
         42 |   4.2470119   3.9779729           6
         43 |           0           0           2
         44 |   3.8337934   4.0936059           7
         45 |   2.6259559   3.1762715           4
         46 |   1.5881173   2.1836999           4
         47 |   1.3141366   1.8982544           5
         48 |    2.412216   1.9408026           2
         49 |   .23584905   .33354093           2
         50 |   .55754323   .76011667           4
         51 |   2.1276596   3.6852146           3
         52 |    .9385916   1.0842062           4
         53 |           0           0           1
         54 |   1.9891554   2.1056844          11
         55 |           0           0           1
```

```
         56 |   2.2681711   2.7367809           5
         57 |   5.9210525           0           1
         58 |   6.8421054           0           1
         59 |           0           0           1
         60 |   .48780489   1.0907649           5
         61 |   1.0730838   1.4807031           5
         62 |   3.3976469   3.8783386           6
         63 |   .50170811   .78769235           6
         64 |   .33167495   .57447787           3
         65 |     .955414   1.3511594           2
         66 |           0           0           1
         67 |           0           0           1
         68 |    7.157464           0           1
         69 |   2.1559972   1.6894041          12
         70 |   2.7730909   2.7236845           6
         71 |   1.2531481    1.569409           4
         72 |           0           0           1
         73 |   1.4597017   1.9008762           5
         74 |   1.4921364   1.4315218           7
         75 |   3.4150944   .82718147           2
         76 |   2.8677637   4.1839199           3
         77 |   1.4825866   1.6285634           9
         78 |   1.3714824   1.4705374          12
         79 |   .29761904   .59523809           4
         80 |    6.338028           0           1
         81 |           0           0           1
         82 |           0           0           1
         83 |   2.6619399   2.3233775           3
         84 |           0           0           2
         85 |   1.9085189   .13891029           3
         86 |   1.0033445   1.7378436           3
         87 |   6.2068968           0           1
         88 |    2.503655   .59442465           2
         89 |   1.9865953   .05073722           2
         90 |    1.433121   2.0267391           2
------------+------------------------------------
      Total |   1.7741716    2.306099         341

W0  =  2.9017801   df(88, 252)     Pr > F = 0.00000000

W50 =  1.3144416   df(88, 252)     Pr > F = 0.05262266

W10 =  2.7788563   df(88, 252)     Pr > F = 0.00000000

. robvar rent, by(neigh)

            |          Summary of rent
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   89.055794           0           1
          2 |   63.809525           0           1
          3 |   38.679543   15.107397           4
          4 |   23.006882   8.3483431           3
          5 |   75.199997           0           1
          6 |    31.24494   30.654434           3
          7 |   91.155045           0           1
          8 |   33.717378   10.302144          10
          9 |   29.434965     11.6067           4
         10 |   61.643701   14.905633          10
         11 |   86.933334   18.479056           2
         12 |   11.936339           0           1
         13 |   28.515869   14.255345           7
         14 |   22.960268   13.814032          15
         15 |   55.702919           0           1
         16 |   29.101538   12.897664          13
         17 |   48.761549   14.217113           6
         18 |   60.439761   9.8898875           3
         19 |   87.462008   2.2763969           3
         20 |   19.658119           0           1
         22 |   27.994855   12.796135           4
         23 |   81.767544   10.565402           2
```

24	34.213297	13.590371	3
25	71.567757	4.0842171	2
26	22.872341	0	1
27	40.105364	25.793134	3
28	77.852027	10.923748	8
29	33.523018	4.1933173	3
30	37.5	0	1
31	75.418991	0	1
32	45.314251	37.692014	2
33	85.671314	5.23353	2
34	55.779729	18.554737	5
35	97.122299	0	1
36	84.201973	18.346146	4
37	32.811356	11.498517	9
38	22.705315	0	1
39	35.337626	13.308177	7
40	47.413045	22.259021	7
41	41.854653	9.0593465	5
42	64.96365	11.690549	6
43	46.421324	13.575911	2
44	31.881065	8.7926264	7
45	54.72112	19.164828	4
46	36.114838	10.217623	4
47	13.25408	3.8766021	5
48	61.10144	.87139992	2
49	56.488173	1.1641081	2
50	31.484101	5.4080343	4
51	57.149612	8.4729303	3
52	31.28201	21.205374	4
53	35.874439	0	1
54	46.225351	14.681296	11
55	6.284153	0	1
56	49.530136	47.891612	5
57	89.473686	0	1
58	96.315788	0	1
59	53.578335	0	1
60	14.179336	6.4589253	5
61	29.95871	8.2867268	5
62	42.432308	14.141719	6
63	25.93909	20.139358	6
64	66.589699	4.641997	3
65	41.738064	16.690206	2
66	30.922243	0	1
67	7.2033896	0	1
68	75.869118	0	1
69	72.98957	11.598032	12
70	33.639625	6.2494544	6
71	53.34678	16.051643	4
72	100	0	1
73	56.227769	14.605491	5
74	35.722324	8.4969898	7
75	29.808175	13.470606	2
76	38.222123	32.007373	3
77	39.118994	18.424719	9
78	52.071639	23.813556	12
79	16.555154	9.9450996	4
80	52.112675	0	1
81	11.691023	0	1
82	13.065327	0	1
83	90.665222	9.5805878	3
84	37.336868	13.950286	2
85	29.766809	5.7276085	3
86	34.56956	2.3789882	3
87	62.068966	0	1
88	51.759605	21.923558	2
89	25.3132	10.374207	2
90	12.060539	1.7430365	2
Total	44.18024	23.793791	341

W0 = 2.6613388 df(88, 252) Pr > F = 0.00000000

```
W50 =  1.5531730   df(88, 252)     Pr > F = 0.00437566

W10 =  2.6452432   df(88, 252)     Pr > F = 0.00000000

. robvar profm, by(neigh)

            |          Summary of profm
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   18.214285           0           1
          2 |   20.180723           0           1
          3 |    12.58565   2.8863877           4
          4 |   6.5598107   4.4971494           3
          5 |           0           0           1
          6 |   18.037506   8.6918964           3
          7 |           0           0           1
          8 |   11.169071   2.9302086          10
          9 |   5.6591011   3.9061081           4
         10 |    17.02907   8.6345062          10
         11 |   6.5337266   4.1015521           2
         12 |   7.9207921           0           1
         13 |   12.492505    3.757551           7
         14 |   11.803969   3.5928381          15
         15 |   2.8469751           0           1
         16 |   9.1902726   3.6645571          13
         17 |   14.196748   6.1432079           6
         18 |   14.651059   12.257161           3
         19 |   26.305127   4.9067601           3
         20 |   13.903744           0           1
         22 |   9.1842587   3.2259991           4
         23 |   6.2761507   8.8758174           2
         24 |   15.448056   11.345034           3
         25 |   18.780834    10.51988           2
         26 |   12.844037           0           1
         27 |   9.9427899   9.0458964           3
         28 |   10.178397    5.777494           8
         29 |   4.5646439   1.8901314           3
         30 |           0           0           1
         31 |   4.5833335           0           1
         32 |   6.1591403   2.5201796           2
         33 |   30.178352   3.0038659           2
         34 |   6.4939067   2.2631294           5
         35 |           0           0           1
         36 |   29.232804   16.658811           4
         37 |   20.169021    6.425333           9
         38 |   5.9633026           0           1
         39 |   12.090625   7.2646737           7
         40 |   26.494011   5.7373037           7
         41 |   6.2641975   2.9596462           5
         42 |   7.0910594    5.754815           6
         43 |   6.8274927    4.915152           2
         44 |   6.9678024   3.7437662           7
         45 |   4.7856658   3.9108316           4
         46 |   8.8646114    6.538977           4
         47 |   11.595091   7.3333147           5
         48 |   13.778294   8.4039268           2
         49 |   7.8747629   5.5906609           2
         50 |   7.7870027   2.8186552           4
         51 |   9.7958517   1.2390768           3
         52 |   13.426209   2.4856859           4
         53 |    8.467742           0           1
         54 |    15.18466   7.5205314          11
         55 |   7.2139301           0           1
         56 |   40.051165   9.5258161           5
         57 |   51.592358           0           1
         58 |   4.8723898           0           1
         59 |   17.705736           0           1
         60 |    9.136272   3.1123802           5
         61 |   13.045258   4.6258115           5
         62 |   9.4557069    1.799794           6
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         63 |   36.617435   3.6922269           6
         64 |   18.720098   10.712782           3
         65 |   13.781368   1.3428094           2
         66 |   37.685459           0           1
         67 |   10.769231           0           1
         68 |   7.0886078           0           1
         69 |   39.862998     6.18748          12
         70 |    8.112188   1.5447512           6
         71 |   18.566052   6.3599751           4
         72 |   58.620689           0           1
         73 |   19.628572   6.8562369           5
         74 |   13.361116   7.7394061           7
         75 |   5.9997555   4.9346088           2
         76 |   5.3865266   4.5754939           3
         77 |   42.427768   6.1061166           9
         78 |   37.772995   6.6314318          12
         79 |   17.509447   6.8432563           4
         80 |   17.322834           0           1
         81 |   8.1996431           0           1
         82 |   20.663651           0           1
         83 |   5.7331627   5.8880258           3
         84 |   8.5385563   5.2832359           2
         85 |   18.547979   7.1863248           3
         86 |   8.1685683   3.0805385           3
         87 |   15.384615           0           1
         88 |   3.1553397   4.4623242           2
         89 |    11.31389   4.3765834           2
         90 |   12.173913   3.0743773           2
------------+------------------------------------
      Total |   16.001476    12.25763         341

W0  =  2.2482543   df(88, 252)     Pr > F = 0.00000046

W50 =  1.3296137   df(88, 252)     Pr > F = 0.0456929

W10 =  2.2588907   df(88, 252)     Pr > F = 0.00000040

. robvar pov_h, by(neigh)

            |          Summary of pov_h
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |    47.36842           0           1
          2 |    19.32271           0           1
          3 |   26.573396    12.08229           4
          4 |   22.248354   13.006802           3
          5 |   20.689655           0           1
          6 |   7.2834344   2.4396094           3
          7 |   62.330368           0           1
          8 |   10.098223   5.1940519          10
          9 |   25.891804   7.9718198           4
         10 |   18.675651   7.1221048          10
         11 |   71.029497   36.440964           2
         12 |   11.731207           0           1
         13 |   9.6365526   3.4810195           7
         14 |   9.1854906   3.1632852          15
         15 |   39.850426           0           1
         16 |   11.591656   5.5959758          13
         17 |   20.265584   8.0076898           6
         18 |   28.909842   4.3482181           3
         19 |   56.282352   6.6634385           3
         20 |   13.915857           0           1
         22 |   12.269674   9.7625833           4
         23 |   34.153356   10.149262           2
         24 |   15.861512   3.2560013           3
         25 |   33.685898   12.465023           2
         26 |   29.535866           0           1
         27 |   30.122153   14.262623           3
         28 |   27.470836   12.341928           8
         29 |   14.388201   2.8802237           3
         30 |   15.268817           0           1
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         31 |   55.123341           0           1
         32 |   30.741064   27.630543           2
         33 |   24.534332   3.2231887           2
         34 |   33.123023   21.434954           5
         35 |   60.465115           0           1
         36 |   31.295619   18.073016           4
         37 |     7.64216    3.627733           9
         38 |   15.618221           0           1
         39 |   25.347396   10.392882           7
         40 |   11.284433   5.3195509           7
         41 |   35.771025   10.880093           5
         42 |    38.02929   13.697361           6
         43 |   14.317345   3.5044518           2
         44 |   17.983337   6.2360752           7
         45 |   28.569907   11.645301           4
         46 |   26.631958   9.2806763           4
         47 |   6.0280627   4.0500281           5
         48 |   28.282827   3.6629995           2
         49 |   25.710135   6.4632941           2
         50 |   15.595924   6.0808866           4
         51 |   33.652735   14.847283           3
         52 |   6.8999989    1.978864           4
         53 |   32.357471           0           1
         54 |   15.546872   5.5652144          11
         55 |   3.1390135           0           1
         56 |   24.598534   22.562586           5
         57 |   3.9130435           0           1
         58 |   70.086479           0           1
         59 |   7.5961537           0           1
         60 |   10.063714   5.5655484           5
         61 |   12.481485    4.764115           5
         62 |   28.897234   7.9753445           6
         63 |   5.1289198   4.0537348           6
         64 |   8.8298434   4.1080447           3
         65 |   21.564246   7.8833886           2
         66 |   6.3324537           0           1
         67 |   8.9285717           0           1
         68 |   54.985954           0           1
         69 |   18.674581   7.2956396          12
         70 |    17.67825   8.1679731           6
         71 |   37.828696   22.269331           4
         72 |   60.273972           0           1
         73 |   21.640513   3.4510571           5
         74 |   15.227458   2.1155082           7
         75 |   19.001363   5.4917478           2
         76 |   25.189922   12.620487           3
         77 |   12.046096   6.8668149           9
         78 |   11.149918    7.394531          12
         79 |   7.4113808   5.4581291           4
         80 |   36.507938           0           1
         81 |   7.6923075           0           1
         82 |   4.3002915           0           1
         83 |   58.830434   7.7397942           3
         84 |    10.81196   4.6015973           2
         85 |   17.611824   6.3657339           3
         86 |   22.060996   3.4059558           3
         87 |   11.437908           0           1
         88 |   29.457051   11.639877           2
         89 |    7.908746   2.6628524           2
         90 |   11.487415   9.0777255           2
------------+------------------------------------
      Total |   19.826379   14.676125         341

W0  =  3.4003644   df(88, 252)     Pr > F = 0.00000000

W50 =  1.3855068   df(88, 252)     Pr > F = 0.02657687

W10 =  3.3453382   df(88, 252)     Pr > F = 0.00000000

. robvar fhh, by(neigh)
```

neigh	Summary of fhh Mean	Std. Dev.	Freq.
1	3.1954887	0	1
2	0	0	1
3	12.234439	6.6812941	4
4	8.8815816	7.2598102	3
5	38.613861	0	1
6	2.9303026	3.3529268	3
7	44.173729	0	1
8	5.9138625	2.6210776	10
9	15.208833	9.8368902	4
10	5.1423869	4.2030463	10
11	2.3869348	3.3756355	2
12	5.5696201	0	1
13	7.7606896	3.5024152	7
14	6.2883238	4.2822837	15
15	30.327869	0	1
16	7.1432797	3.4566325	13
17	7.1652176	3.3634604	6
18	14.975116	7.831049	3
19	.69841274	1.2096863	3
20	19.09091	0	1
22	12.754994	13.06826	4
23	13.375245	11.897023	2
24	2.3763503	2.7085261	3
25	9.1842132	9.1333374	2
26	12.637362	0	1
27	21.112803	12.536278	3
28	16.634708	8.7943882	8
29	10.363611	3.9141561	3
30	13.793103	0	1
31	32	0	1
32	18.174825	18.233647	2
33	5.9926668	7.1365383	2
34	23.126749	10.251303	5
35	26.90909	0	1
36	1.3048388	1.836682	4
37	4.974532	3.6968065	9
38	3.6529679	0	1
39	10.813418	3.862026	7
40	5.5900962	2.6421949	7
41	20.104592	8.9350393	5
42	25.984407	8.4245405	6
43	19.53125	9.9436891	2
44	12.081894	3.3593583	7
45	17.143371	5.6010145	4
46	17.947842	4.6895005	4
47	4.9036096	4.4008304	5
48	12.897521	2.2066128	2
49	17.803051	12.000463	2
50	9.8377348	5.1162564	4
51	19.024723	2.5130562	3
52	6.7384716	7.4577289	4
53	7.9295154	0	1
54	5.2690045	4.1812109	11
55	3.0379746	0	1
56	.29876976	.66806949	5
57	0	0	1
58	64.885498	0	1
59	3.7267082	0	1
60	4.4094965	3.3051184	5
61	7.8032094	4.0589628	5
62	17.885736	8.1576554	6
63	5.4202578	5.5588325	6
64	10.29922	4.7731607	3
65	6.3554604	2.3257302	2
66	3.716814	0	1
67	4.3290043	0	1
68	55.57769	0	1
69	1.6623683	1.3564831	12

```
        70 |   11.912659    6.596106           6
        71 |   9.5645283   9.2538942           4
        72 |           0           0           1
        73 |   2.6388773   .81750823           5
        74 |   3.9531317   3.3828973           7
        75 |   9.8415653   9.4788395           2
        76 |   23.753465   23.082988           3
        77 |   1.9151465   1.0014216           9
        78 |   1.6996844   1.3355933          12
        79 |   7.9466082   5.0635924           4
        80 |   24.817518           0           1
        81 |   1.4553014           0           1
        82 |   4.0609136           0           1
        83 |   26.881236   10.704653           3
        84 |   6.2505822   1.5808629           2
        85 |   8.9818994   4.1419152           3
        86 |   6.8027922   2.0526399           3
        87 |   8.1632652           0           1
        88 |   17.125845   9.4110844           2
        89 |   3.0210762   .68459025           2
        90 |   4.9498607   1.4851213           2
------------+-----------------------------------
      Total |   9.4386652    9.581384         341

W0  =  3.9795792   df(88, 252)     Pr > F = 0.00000000

W50 =  1.6216206   df(88, 252)     Pr > F = 0.00196451

W10 =  3.9350268   df(88, 252)     Pr > F = 0.00000000

. robvar pbasst, by(neigh)

            |          Summary of pbasst
      neigh |        Mean   Std. Dev.       Freq.
------------+-----------------------------------
          1 |   7.5187969           0           1
          2 |   1.7361112           0           1
          3 |   7.5039322   7.3327297           4
          4 |    6.834734   5.9636901           3
          5 |   4.9504952           0           1
          6 |   .81632654    1.413919           3
          7 |   27.012712           0           1
          8 |   3.5103326   2.0895038          10
          9 |   5.7021101   3.9456687           4
         10 |   3.8038549   3.6126988          10
         11 |   3.6432161   5.1522857           2
         12 |   7.0886078           0           1
         13 |   2.9408103   1.4182464           7
         14 |   2.2136609    1.885348          15
         15 |   16.393442           0           1
         16 |   3.1969601   2.4086574          13
         17 |   2.4924978   3.5987399           6
         18 |   8.0052638   4.5810575           3
         19 |   2.1247947   1.2964683           3
         20 |           5           0           1
         22 |   7.3108984    5.762349           4
         23 |   10.549371   .88220502           2
         24 |   3.4516176   1.7595534           3
         25 |   13.641364   1.8423945           2
         26 |   3.2967033           0           1
         27 |   12.537801   6.6524856           3
         28 |   10.940725   8.0429411           8
         29 |   7.5080317   2.2534369           3
         30 |   6.8965516           0           1
         31 |   12.941176           0           1
         32 |   18.569671    16.30223           2
         33 |   1.9480519   2.7549615           2
         34 |   12.004069   5.5220174           5
         35 |    21.09091           0           1
         36 |   .33081284   .66162568           4
         37 |   2.0532859    2.348567           9
```

```
         38 |          0           0           1
         39 |  8.4904451   3.7995303           7
         40 |   3.087233   2.2636177           7
         41 |  11.785431   6.1325171           5
         42 |  13.282829   5.7825357           6
         43 |  9.1145834   9.2071195           2
         44 |  7.6374015   4.0348044           7
         45 |  14.757801   4.3569086           4
         46 |  9.9600719   2.6829446           4
         47 |  2.0156889   1.3159346           5
         48 |  8.3345428   6.9186183           2
         49 |  10.586556   1.7947976           2
         50 |  4.2077319   3.0301832           4
         51 |  13.145054   6.6462398           3
         52 |  1.8889088   1.5577421           4
         53 |  5.7268724           0           1
         54 |  3.2657759   2.5295681          11
         55 |  1.5189873           0           1
         56 |   2.044033   2.8468234           5
         57 |          0           0           1
         58 |  35.750637           0           1
         59 |  2.2774327           0           1
         60 |  2.4115963   1.8671034           5
         61 |  2.0393286   1.5755097           5
         62 |  8.8364191   3.4670257           6
         63 |  .94904657   1.0502516           6
         64 |   3.048812   4.3962239           3
         65 |  6.8190577   .25589105           2
         66 |          0           0           1
         67 |          0           0           1
         68 |  18.525896           0           1
         69 |   1.846328   1.7268402          12
         70 |  5.7812183   3.1216914           6
         71 |  9.5594428   7.5814132           4
         72 |  57.142857           0           1
         73 |  3.5091866   2.5196083           5
         74 |  6.6715624   4.0156552           7
         75 |  5.8823528   8.3189031           2
         76 |  8.3448908   12.438923           3
         77 |  .60551511   1.2077846           9
         78 |  2.1672845   2.2294196          12
         79 |  2.6248068   2.0242865           4
         80 |  8.7591238           0           1
         81 |  4.5738044           0           1
         82 |  .84602368           0           1
         83 |  19.351746   10.035636           3
         84 |  3.4460043   .86853343           2
         85 |  6.2423016   4.6823059           3
         86 |   4.847569   4.7002315           3
         87 |  20.408163           0           1
         88 |  14.832876   16.534299           2
         89 |  1.9796866   .40779495           2
         90 |  6.2260911    4.865709           2
------------+------------------------------------
      Total |  5.7393112    6.578321         341

W0  =  3.7462744   df(88, 252)     Pr > F = 0.00000000

W50 =  1.9207695   df(88, 252)     Pr > F = 0.00004337

W10 =  3.6851021   df(88, 252)     Pr > F = 0.00000000

. robvar inclow, by(neigh)

            |          Summary of inclow
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |  74.436089           0           1
          2 |  53.472221           0           1
          3 |  64.235843   7.0380636           4
          4 |  52.145902   10.780444           3
```

5	93.069305	0	1
6	33.795492	7.3584132	3
7	89.194916	0	1
8	43.412058	7.9020005	10
9	53.202602	10.210454	4
10	59.120661	4.8867281	10
11	88.316582	16.522849	2
12	42.025318	0	1
13	44.209798	10.634321	7
14	38.592083	7.8050724	15
15	57.650272	0	1
16	48.219898	7.5608515	13
17	63.296332	9.4048868	6
18	55.829661	11.522369	3
19	74.623342	5.1145156	3
20	44.090908	0	1
22	39.313686	13.017576	4
23	73.597923	8.6325377	2
24	30.950069	2.4907741	3
25	69.100616	2.9154128	2
26	51.64835	0	1
27	64.287529	12.079862	3
28	67.586886	9.0045851	8
29	49.783932	2.0785261	3
30	52.298851	0	1
31	80.941177	0	1
32	61.90209	35.754675	2
33	63.925192	.50985414	2
34	63.212031	12.097737	5
35	86.181816	0	1
36	60.694252	19.762022	4
37	39.630594	8.8582362	9
38	61.643837	0	1
39	59.585929	9.5266733	7
40	35.079929	8.458989	7
41	69.526659	4.2325132	5
42	70.360385	17.963452	6
43	67.122395	8.1943346	2
44	59.020145	12.09052	7
45	71.786102	18.01826	4
46	62.230443	13.063643	4
47	38.437025	5.7559674	5
48	63.192972	3.8577732	2
49	58.161139	3.037926	2
50	50.180139	2.1616764	4
51	65.515079	8.0815624	3
52	39.516695	8.3177523	4
53	53.303967	0	1
54	48.127279	8.3441463	11
55	41.518986	0	1
56	47.154018	33.190577	5
57	33.103447	0	1
58	90.076332	0	1
59	50.517597	0	1
60	36.917643	10.932931	5
61	34.866138	9.9708953	5
62	58.689037	9.8861528	6
63	23.660857	10.397376	6
64	43.944213	12.906873	3
65	66.26017	7.4390037	2
66	20.707964	0	1
67	47.619049	0	1
68	70.717133	0	1
69	43.177423	11.319885	12
70	46.454932	7.2242399	6
71	66.476014	13.684598	4
72	57.142857	0	1
73	57.227674	6.9837341	5
74	48.173828	6.3042314	7
75	49.766716	1.8897055	2
76	63.413967	15.19024	3

```
         77 |   27.127995   11.061927           9
         78 |   36.507909   15.642501          12
         79 |   30.274047   3.7508204           4
         80 |   41.605839           0           1
         81 |   36.798336           0           1
         82 |   28.764805           0           1
         83 |   90.232658   2.3386782           3
         84 |   53.036797    .9155833           2
         85 |   53.467513   5.1355324           3
         86 |   61.021993   6.1256517           3
         87 |    63.94558           0           1
         88 |   58.505461   27.207268           2
         89 |    40.03825   .78307091           2
         90 |   44.587744   1.9972319           2
------------+------------------------------------
      Total |   51.021562   16.993199         341

W0  =  2.6747780   df(88, 252)     Pr > F = 0.00000000

W50 =  1.2411592   df(88, 252)     Pr > F = 0.10015434

W10 =  2.6796842   df(88, 252)     Pr > F = 0.00000000

. robvar edulow, by(neigh)

            |         Summary of edulow
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   23.182711           0           1
          2 |   11.166253           0           1
          3 |   31.688647   3.7173291           4
          4 |   24.702561    7.067488           3
          5 |   23.728813           0           1
          6 |   11.368825   5.2885602           3
          7 |   50.208332           0           1
          8 |   17.164912   4.8731578          10
          9 |   19.405974   6.9994389           4
         10 |    20.15446   8.6040129          10
         11 |   22.859956   19.896213           2
         12 |   13.793103           0           1
         13 |   18.608323   3.7694124           7
         14 |   13.310937   4.3600893          15
         15 |   19.793459           0           1
         16 |    19.63522   5.3280111          13
         17 |   24.841418   7.9329865           6
         18 |   16.988299    3.605926           3
         19 |   11.453316   1.8736954           3
         20 |   16.753927           0           1
         22 |   17.068565   1.2396096           4
         23 |   28.142904   2.9900471           2
         24 |   14.697008   2.8600544           3
         25 |   33.157404   1.0477909           2
         26 |   24.444445           0           1
         27 |   26.700966    8.092206           3
         28 |   21.638784   10.181842           8
         29 |   21.774108    3.333987           3
         30 |   30.232557           0           1
         31 |    32.26453           0           1
         32 |   28.001839   9.2015971           2
         33 |   12.998249   1.6397208           2
         34 |   25.344715    12.18615           5
         35 |   48.754448           0           1
         36 |   28.296694   24.609063           4
         37 |   14.140298   7.9847577           9
         38 |   29.768785           0           1
         39 |   29.054017   7.1598718           7
         40 |   10.031125   3.9092938           7
         41 |   22.020523   7.8602088           5
         42 |   30.951052   5.5512784           6
         43 |   24.433127    1.504103           2
         44 |   21.269646   5.2063745           7
```

```
         45 |    29.99411   7.0903127           4
         46 |   21.815866   2.8322803           4
         47 |   12.779863   3.2119925           5
         48 |   26.447556   2.2332341           2
         49 |   20.169815   .49689583           2
         50 |   23.661284   2.2031888           4
         51 |   28.759875    4.349304           3
         52 |   16.581999   2.3741341           4
         53 |   35.108959           0           1
         54 |   17.062061   6.6900998          11
         55 |   17.638691           0           1
         56 |   4.7924886   4.8682891           5
         57 |   9.1787443           0           1
         58 |   34.450867           0           1
         59 |   20.478724           0           1
         60 |   13.637322   3.7793787           5
         61 |   12.496074   3.7058767           5
         62 |   24.319638   8.8256862           6
         63 |   4.0973563   2.7901633           6
         64 |   12.145186   6.5893836           3
         65 |   31.457658   .87773745           2
         66 |   1.3528749           0           1
         67 |   12.626263           0           1
         68 |   34.020618           0           1
         69 |   4.6654072   4.0001374          12
         70 |   18.578081   6.1496064           6
         71 |   22.267334   11.758572           4
         72 |   72.131149           0           1
         73 |   25.212019   6.8100689           5
         74 |   25.641865   2.5761176           7
         75 |   25.101506   1.9159822           2
         76 |   21.613254   7.6291639           3
         77 |   3.5452416    2.744783           9
         78 |   6.7374234   5.0453127          12
         79 |   11.526587    3.138363           4
         80 |   8.9473686           0           1
         81 |   15.438597           0           1
         82 |   10.311284           0           1
         83 |   42.190648   5.1390637           3
         84 |   28.039054   3.1624284           2
         85 |   17.531731   6.0730795           3
         86 |   30.033216   1.2669604           3
         87 |   29.213484           0           1
         88 |   24.339173   4.7639709           2
         89 |   14.381918   .01836524           2
         90 |   18.156525   .57145732           2
------------+------------------------------------
      Total |   18.899575   10.506948         341

W0  =  2.6055696   df(88, 252)     Pr > F = 0.00000000

W50 =  1.4699695   df(88, 252)     Pr > F = 0.01104471

W10 =  2.5809086   df(88, 252)     Pr > F = 0.00000000

. robvar black, by(neigh)

            |          Summary of black
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |          25           0           1
          2 |   11.553785           0           1
          3 |   21.225186   16.678188           4
          4 |   9.8819097   6.0752216           3
          5 |   53.448277           0           1
          6 |   4.3684942   4.3300757           3
          7 |     94.8526           0           1
          8 |   4.5621004   4.1927343          10
          9 |   79.986715    16.47778           4
         10 |   8.1844945     5.84565          10
         11 |   25.581156   27.656363           2
```

12	4.5558085	0	1
13	9.9552519	5.5350819	7
14	1.7075693	2.2118005	15
15	81.410255	0	1
16	2.4810369	3.5814248	13
17	5.1574962	2.9794182	6
18	60.785802	20.762821	3
19	4.8716098	1.6462801	3
20	71.682846	0	1
22	15.487164	16.818821	4
23	90.896759	7.5170556	2
24	1.547576	1.4703114	3
25	29.496307	2.2956046	2
26	19.16996	0	1
27	93.18881	3.015392	3
28	72.608834	17.969266	8
29	15.173741	3.1045134	3
30	17.634409	0	1
31	86.812141	0	1
32	43.07299	20.344274	2
33	29.655602	17.615946	2
34	82.057285	11.813122	5
35	75.400459	0	1
36	30.710125	22.141173	4
37	2.2319442	2.8498792	9
38	4.9891539	0	1
39	36.11697	13.753318	7
40	27.439928	11.070465	7
41	95.666394	1.9649002	5
42	91.099974	7.2707755	6
43	93.877903	2.1056161	2
44	38.272644	27.543455	7
45	86.328836	8.8170265	4
46	89.046055	9.1698815	4
47	0	0	5
48	21.399487	2.7582907	2
49	86.458332	11.351834	2
50	17.018587	9.447436	4
51	95.369494	1.3224142	3
52	8.7376299	15.345486	4
53	19.791666	0	1
54	5.0549575	6.488006	11
55	7.7354259	0	1
56	9.8034191	5.3696002	5
57	7.1161051	0	1
58	96.374268	0	1
59	4.7115383	0	1
60	2.6669449	3.6188732	5
61	20.738045	10.030037	5
62	62.832842	15.177875	6
63	5.6650664	5.6520234	6
64	69.009187	16.666839	3
65	13.958268	4.6645988	2
66	7.0360599	0	1
67	1.7857143	0	1
68	85.296165	0	1
69	6.6000483	5.8299027	12
70	22.574415	4.8902258	6
71	31.169275	12.315288	4
72	6.8493152	0	1
73	2.2508425	1.759967	5
74	3.2579515	4.1269689	7
75	7.4533698	8.3897615	2
76	24.309004	27.874743	3
77	3.6969941	2.9891888	9
78	2.6784354	3.6746945	12
79	41.9949	29.062996	4
80	66.984123	0	1
81	10.640217	0	1
82	1.9679301	0	1
83	97.492963	2.2560897	3

```
         84 |   1.8194542   2.5730968           2
         85 |   84.196719    9.078316           3
         86 |   2.8298249   2.4531408           3
         87 |   29.099308           0           1
         88 |    62.50841    42.01476           2
         89 |    3.880993    .5513177           2
         90 |   18.668252   6.7265736           2
------------+------------------------------------
      Total |   27.293104   32.972284         341

W0  =  6.6008958   df(88, 252)     Pr > F = 0.00000000

W50 =  3.3035198   df(88, 252)     Pr > F = 0.00000000

W10 =  6.4643508   df(88, 252)     Pr > F = 0.00000000

. robvar und18, by(neigh)

            |          Summary of und18
      neigh |        Mean   Std. Dev.       Freq.
------------+------------------------------------
          1 |   3.7081339           0           1
          2 |   5.7768927           0           1
          3 |   29.910017    6.243609           4
          4 |     23.5987   5.2310317           3
          5 |   49.310345           0           1
          6 |   15.581582   5.8065669           3
          7 |   38.558727           0           1
          8 |   20.099987   4.2634604          10
          9 |   28.741436   7.5103955           4
         10 |   13.876744   6.0666376          10
         11 |   5.1122193   7.2297699           2
         12 |   20.501139           0           1
         13 |   22.475117   2.8390916           7
         14 |   21.618743   5.1790094          15
         15 |   31.623932           0           1
         16 |   21.273533    6.196195          13
         17 |   15.597742   7.4511853           6
         18 |   21.650144   8.4930641           3
         19 |   4.6113213   1.1810176           3
         20 |   31.067961           0           1
         22 |    24.34598   10.011422           4
         23 |   23.811844   15.727207           2
         24 |   14.896533   2.6924706           3
         25 |     19.6437   12.740723           2
         26 |   17.786562           0           1
         27 |   29.786533    9.617945           3
         28 |     24.2848   10.329858           8
         29 |   23.814881   6.9518889           3
         30 |    29.67742           0           1
         31 |   40.891842           0           1
         32 |   27.079361   14.183562           2
         33 |   11.758643   8.9201735           2
         34 |   34.147133   9.5842267           5
         35 |   24.828375           0           1
         36 |   2.1108986   1.0836506           4
         37 |   16.104218   3.9714967           9
         38 |   18.438177           0           1
         39 |   24.238321   5.0502205           7
         40 |   21.202452   4.2618358           7
         41 |   30.873555   10.978894           5
         42 |   30.869658   6.6219073           6
         43 |   24.653897   7.2914412           2
         44 |    29.27595   5.4558253           7
         45 |   27.547205    5.966243           4
         46 |   26.065275   3.1493066           4
         47 |   21.804335   3.0184514           5
         48 |   20.806293   1.6220481           2
         49 |   30.085785   7.8856282           2
         50 |   22.947814   4.0041764           4
         51 |   20.481373   5.2450379           3
```

```
         52 |    19.21431   6.4298671           4
         53 |       31.25           0           1
         54 |   16.427899   6.7921699          11
         55 |   17.488789           0           1
         56 |   5.3772171   5.7888775           5
         57 |   11.235955           0           1
         58 |   57.816765           0           1
         59 |   25.096153           0           1
         60 |   18.627451   5.7254155           5
         61 |   23.815428   2.5433438           5
         62 |   28.850532   10.112004           6
         63 |   23.048846   5.4338949           6
         64 |   19.762597   5.8319032           3
         65 |   19.379371    7.844478           2
         66 |   17.590149           0           1
         67 |   16.468254           0           1
         68 |   48.083622           0           1
         69 |   8.0462638   3.1208749          12
         70 |   27.399821   4.4791201           6
         71 |   13.112188   7.5038331           4
         72 |           0           0           1
         73 |   8.8449259     2.09495           5
         74 |   14.401567   6.4865044           7
         75 |   21.365678   2.5228564           2
         76 |   26.988601   11.950906           3
         77 |    16.15445   7.4158037           9
         78 |   16.291002    7.625951          12
         79 |   23.079473   4.9012416           4
         80 |   28.571428           0           1
         81 |   18.665464           0           1
         82 |   20.116617           0           1
         83 |   33.623691   3.6512137           3
         84 |   19.951863   .20902814           2
         85 |    23.97444    5.179209           3
         86 |   20.808226   3.5778987           3
         87 |   12.471131           0           1
         88 |   19.547975   18.041768           2
         89 |   16.071631   1.9574574           2
         90 |   15.869467   2.1013866           2
------------+-----------------------------------
      Total |   20.602645   9.4760708         341

W0  =  2.0611118   df(88, 252)     Pr > F = 0.00000639

W50 =  1.2148981   df(88, 252)     Pr > F = 0.1240672

W10 =  2.0551090   df(88, 252)     Pr > F = 0.00000695

.
. *Calculate the variance of each variable for each neighborhood (using block group data)
. *Calculate SD then square to obtain the variance
. collapse (sd) unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18 (count)
nbg=cfbwn, by (neigh)

. g varunemp = unemp*unemp
(25 missing values generated)

. g varnocar = nocar*nocar
(25 missing values generated)

. g varcrowd = crowd*crowd
(25 missing values generated)

. g varrent = rent*rent
(25 missing values generated)

. g varprofm = profm*profm
(25 missing values generated)

. g varpov_h = pov_h*pov_h
(25 missing values generated)
```

```
. g varfhh = fhh*fhh
(25 missing values generated)

. g varpbasst = pbasst*pbasst
(25 missing values generated)

. g varinclow = inclow*inclow
(25 missing values generated)

. g varedulow = edulow*edulow
(25 missing values generated)

. g varblack = black*black
(25 missing values generated)

. g varund18 = und18*und18
(25 missing values generated)

. save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\variance of SEP.dta", replace
file C:\MSTHESIS\Final\Dataset\Test of homogeneity\variance of SEP.dta saved

.
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"

. collapse (median) unempmd=unemp nocarmd=nocar crowdmd=crowd rentmd=rent profmmd=profm
pov_hmd=pov_h fhhmd=fhh pbasstmd=pbasst inclowmd=inclow edulowmd=edu
> low blackmd=black und18md=und18 (count) nbg=cfbwn, by (neigh)

. save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\median of SEP.dta", replace
file C:\MSTHESIS\Final\Dataset\Test of homogeneity\median of SEP.dta saved

.
. merge neigh using "C:\MSTHESIS\Final\Dataset\Test of homogeneity\variance of SEP.dta", unique

. drop _merge

. sort neigh

. merge neigh using "C:\MSTHESIS\NeighLookup.dta"

. save "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta", replace
file C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta saved

.
. *Obtin min, max, median, mean, and Q1, Q2, and Q3 for each variable
. summarize varunemp varnocar varcrowd varrent varprofm varpov_h varfhh varpbasst varinclow
varedulow varblack varund18, detail

                          varunemp
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .0923553       .0923553
 5%     1.522824       1.174739
10%     2.335551        1.46155       Obs                  64
25%     6.294586       1.522824       Sum of Wgt.          64

50%     13.86772                      Mean           64.60987
                        Largest       Std. Dev.      147.6722
75%     31.83493       386.5553
90%      173.085       409.1569       Variance       21807.07
95%     386.5553       663.6738       Skewness       3.607837
99%     821.0441       821.0441       Kurtosis       16.39259

                          varnocar
-------------------------------------------------------------
      Percentiles      Smallest
 1%      .000924        .000924
 5%      1.79237       .0303186
```

```
10%     3.691353       1.316187       Obs                  64
25%     25.79489        1.79237       Sum of Wgt.          64

50%     55.08187                      Mean           109.9818
                        Largest       Std. Dev.      159.4354
75%     112.3545        533.501
90%     250.3731       650.6452       Variance       25419.64
95%      533.501       716.6321       Skewness       2.796492
99%     747.0778       747.0778       Kurtosis       10.53192

                         varcrowd
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%     .0025743              0
10%     .3300248              0       Obs                  64
25%     1.083978       .0025743       Sum of Wgt.          64

50%     2.912189                      Mean           4.447942
                        Largest       Std. Dev.      5.187571
75%      5.06385       15.82427
90%     13.58081       16.75761       Variance       26.91089
95%     15.82427       17.50519       Skewness       1.892447
99%     25.15245       25.15245       Kurtosis       6.430227

                          varrent
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .7593378       .7593378
 5%     5.181983       1.355147
10%     16.68083       3.038176       Obs                  64
25%     70.74269       5.181983       Sum of Wgt.          64

50%      150.205                      Mean            250.152
                        Largest       Std. Dev.      363.7092
75%     268.1091       939.6943
90%     495.4641       1024.472       Variance       132284.3
95%     939.6943       1420.688       Skewness       3.601803
99%     2293.607       2293.607       Kurtosis       18.42938

                         varprofm
-------------------------------------------------------------
      Percentiles      Smallest
 1%     1.535311       1.535311
 5%     3.239258       1.803137
10%     6.178634       2.386256       Obs                  64
25%     10.04699       3.239258       Sum of Wgt.          64

50%     24.25454                      Mean           39.04769
                        Largest       Std. Dev.       44.5322
75%     49.32562       114.7637
90%     81.82825       128.7098       Variance       1983.117
95%     114.7637        150.238       Skewness       2.920866
99%      277.516        277.516       Kurtosis        14.5634

                         varpov_h
-------------------------------------------------------------
      Percentiles      Smallest
 1%     3.915903       3.915903
 5%     7.090782       4.475374
10%     10.38894       5.951694       Obs                  64
25%      16.6544       7.090782       Sum of Wgt.          64

50%     45.77728                      Mean           115.3909
                        Largest       Std. Dev.      207.5526
75%     126.9316       495.9231
90%     220.4418       509.0703       Variance       43078.08
95%     495.9231       763.4469       Skewness       3.924694
99%     1327.944       1327.944       Kurtosis       20.87412

                          varfhh
```

	Percentiles	Smallest		
1%	.4463168	.4463168		
5%	1.002845	.4686638		
10%	1.840046	.6683197	Obs	64
25%	7.158654	1.002845	Sum of Wgt.	64
50%	18.00178		Mean	51.62192
		Largest	Std. Dev.	83.39532
75%	74.15707	157.1583		
90%	114.5896	170.7794	Variance	6954.779
95%	157.1583	332.4659	Skewness	3.747588
99%	532.8243	532.8243	Kurtosis	20.16047

varpbasst

	Percentiles	Smallest		
1%	.0654802	.0654802		
5%	.7543503	.1662967		
10%	1.458744	.4377486	Obs	64
25%	3.307858	.7543503	Sum of Wgt.	64
50%	9.463484		Mean	28.30339
		Largest	Std. Dev.	51.66172
75%	31.84867	100.714		
90%	64.6889	154.7268	Variance	2668.934
95%	100.714	265.7627	Skewness	3.520727
99%	273.3831	273.3831	Kurtosis	16.07061

varinclow

	Percentiles	Smallest		
1%	.2599512	.2599512		
5%	3.570987	.6132001		
10%	4.672845	.8382928	Obs	64
25%	26.26598	3.570987	Sum of Wgt.	64
50%	70.58964		Mean	135.2901
		Largest	Std. Dev.	224.6616
75%	139.344	390.5375		
90%	273.0045	740.2354	Variance	50472.85
95%	390.5375	1101.615	Skewness	3.681201
99%	1278.397	1278.397	Kurtosis	17.25318

varedulow

	Percentiles	Smallest		
1%	.0003373	.0003373		
5%	.7704231	.2469055		
10%	1.605189	.3265635	Obs	64
25%	7.659422	.7704231	Sum of Wgt.	64
50%	18.96341		Mean	44.47663
		Largest	Std. Dev.	90.43455
75%	49.47077	138.264		
90%	77.89274	148.5022	Variance	8178.408
95%	138.264	395.8593	Skewness	4.771662
99%	605.606	605.606	Kurtosis	27.64369

varblack

	Percentiles	Smallest		
1%	0	0		
5%	2.161816	.3039512		
10%	3.860833	1.748779	Obs	64
25%	8.906091	2.161816	Sum of Wgt.	64
50%	35.53997		Mean	161.2726
		Largest	Std. Dev.	290.4946
75%	209.7608	764.8744		
90%	431.0948	777.0013	Variance	84387.12

```
95%     764.8744       844.6577       Skewness       3.315683
99%      1765.24        1765.24       Kurtosis       16.48704

                          varund18
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .0436928       .0436928
 5%      2.63104       1.174299
10%     4.415825       1.394803       Obs                  64
25%     14.55207        2.63104       Sum of Wgt.          64

50%     33.86366                      Mean           51.05464
                        Largest       Std. Dev.        59.078
75%     57.28058        162.326
90%      106.706       201.1734       Variance        3490.21
95%      162.326        247.345       Skewness       2.553154
99%     325.5054       325.5054       Kurtosis       10.61499

.
. *Identify min and max neighborhood for each variable
. *obtain minimum and maximum of SEP variables
. sort varunemp

. summarize varunemp

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varunemp |        64    64.60987    147.6722   .0923553   821.0441

. list neigh varunemp in 1

     +------------------+
     | neigh   varunemp |
     |------------------|
  1. |    89   .0923553 |
     +------------------+

. list nbg neigh varunemp if varunemp>820 & varunemp~=.

     +------------------------+
     | nbg   neigh   varunemp |
     |------------------------|
 64. |   5      56   821.0441 |
     +------------------------+

.
. sort varnocar

. list neigh varnocar in 1

     +------------------+
     | neigh   varnocar |
     |------------------|
  1. |    49    .000924 |
     +------------------+

. summarize varnocar

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varnocar |        64    109.9818    159.4354    .000924   747.0778

. list neigh varnocar in 1

     +------------------+
     | neigh   varnocar |
     |------------------|
  1. |    49    .000924 |
     +------------------+

. list nbg neigh varnocar if varnocar>740 & varnocar~=.
```

```
     +------------------------+
     | nbg   neigh   varnocar |
     |------------------------|
 64. |   2      32   747.0778 |
     +------------------------+

.
. summarize varcrowd

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varcrowd |        64    4.447942    5.187571          0   25.15245

. list nbg neigh crowd varcrowd if varcrowd ==0

     +--------------------------------+
     | nbg   neigh   crowd   varcrowd |
     |--------------------------------|
  4. |   2      43       0          0 |
 54. |   2      84       0          0 |
 64. |   2      32       0          0 |
     +--------------------------------+

. *Check 43, 84, 32
. list nbg neigh varcrowd if varcrowd >=25 & varcrowd ~=.

     +------------------------+
     | nbg   neigh   varcrowd |
     |------------------------|
  2. |   2      25   25.15245 |
     +------------------------+

.
. sort varrent

. summarize varrent

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     varrent |        64     250.152    363.7092   .7593378   2293.607

. list nbg neigh varrent in 1

     +------------------------+
     | nbg   neigh    varrent |
     |------------------------|
  1. |   2      48   .7593378 |
     +------------------------+

. list nbg neigh varrent if varrent>=2293 & varrent~=.

     +------------------------+
     | nbg   neigh    varrent |
     |------------------------|
 64. |   5      56   2293.607 |
     +------------------------+

.
. sort varprofm

. summarize varprofm

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varprofm |        64    39.04769     44.5322   1.535311    277.516

. list nbg neigh varprofm in 1

     +------------------------+
     | nbg   neigh   varprofm |
```

```
     |------------------------|
  1. |   3      51   1.535311 |
     +------------------------+

. list nbg neigh varprofm if varprofm>=277 & varprofm~=.

     +------------------------+
     | nbg   neigh   varprofm |
     |------------------------|
 64. |   4      36    277.516 |
     +------------------------+

.
. sort varpov_h

. summarize varpov_h

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varpov_h |        64    115.3909    207.5526   3.915903   1327.944

. list nbg neigh varpov_h in 1

     +------------------------+
     | nbg   neigh   varpov_h |
     |------------------------|
  1. |   4      52   3.915903 |
     +------------------------+

. list nbg neigh varpov_h if varpov_h>=1327 & varpov_h~=.

     +------------------------+
     | nbg   neigh   varpov_h |
     |------------------------|
 64. |   2      11   1327.944 |
     +------------------------+

.
. sort varfhh

. summarize varfhh

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
      varfhh |        64    51.62192    83.39532   .4463168   532.8243

. list nbg neigh varfhh in 1

     +------------------------+
     | nbg   neigh     varfhh |
     |------------------------|
  1. |   5      56   .4463168 |
     +------------------------+

. list nbg neigh varfhh if varfhh>=532 & varfhh~=.

     +------------------------+
     | nbg   neigh     varfhh |
     |------------------------|
 64. |   3      76   532.8243 |
     +------------------------+

.
. sort varpbasst

. summarize varpbasst

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
   varpbasst |        64    28.30339    51.66172   .0654802   273.3831
```

```
. list nbg neigh varpbasst in 1

     +------------------------+
     | nbg   neigh   varpba~t |
     |------------------------|
  1. |   2      65   .0654802 |
     +------------------------+

. list nbg neigh varpbasst if varpbasst>=273 & varpbasst~=.

     +------------------------+
     | nbg   neigh   varpba~t |
     |------------------------|
 64. |   2      88   273.3831 |
     +------------------------+

.
. sort varinclow

. summarize varinclow

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
   varinclow |        64    135.2901    224.6616   .2599512   1278.397

. list nbg neigh varinclow in 1

     +------------------------+
     | nbg   neigh   varinc~w |
     |------------------------|
  1. |   2      33   .2599512 |
     +------------------------+

. list nbg neigh varinclow if varinclow>=1278 & varinclow~=.

     +------------------------+
     | nbg   neigh   varinc~w |
     |------------------------|
 64. |   2      32   1278.397 |
     +------------------------+

.
. sort varedulow

. summarize varedulow

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
   varedulow |        64    44.47663    90.43455   .0003373    605.606

. list nbg neigh varedulow in 1

     +------------------------+
     | nbg   neigh   varedu~w |
     |------------------------|
  1. |   2      89   .0003373 |
     +------------------------+

. list nbg neigh varedulow if varedulow>=605 & varedulow~=.

     +------------------------+
     | nbg   neigh   varedu~w |
     |------------------------|
 64. |   4      36    605.606 |
     +------------------------+

.
. sort varblack

. summarize varblack
```

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varblack |        64    161.2726    290.4946          0    1765.24

. list nbg neigh varblack in 1

     +------------------------+
     | nbg   neigh   varblack |
     |------------------------|
  1. |   5      47          0 |
     +------------------------+

. list nbg neigh varblack if varblack <0.50

     +------------------------+
     | nbg   neigh   varblack |
     |------------------------|
  1. |   5      47          0 |
  2. |   2      89   .3039512 |
     +------------------------+

.
. list nbg neigh varblack if varblack>=1765 & varblack~=.

     +------------------------+
     | nbg   neigh   varblack |
     |------------------------|
 64. |   2      88    1765.24 |
     +------------------------+

.
. sort varund18

. summarize varund18

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    varund18 |        64    51.05464      59.078   .0436928   325.5054

. list nbg neigh varund18 in 1

     +------------------------+
     | nbg   neigh   varund18 |
     |------------------------|
  1. |   2      84   .0436928 |
     +------------------------+

. list nbg neigh varund18 if varund18>=325 & varund18~=.

     +------------------------+
     | nbg   neigh   varund18 |
     |------------------------|
 64. |   2      88   325.5054 |
     +------------------------+

.
. *UNEMPLOYMENT
. graph hbox varunemp, ysc (r(0 1000)) fysize(15) l1title(" ") l2title(" ") ylabel(none)
ytitle("")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\unempdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\unempdot.gph saved)

.
. graph box unempmd if nbg~=1, fxsize(15) ysc(r(0 25)) caption(" " " ") ytitle(" ") ylabel (none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\unempmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\unempmd.gph saved)

.
. twoway (scatter unempmd varunemp if nbg~=1) ///
```

```
> (scatteri 10.38062 821.0441 "N_Oakland"  13.49206   663.6738 "Golden Triangle" 2.190923
386.5553 "Squirrel Hill N" ///
> 19.86301   409.1569 "Terrace Village" 19.9408   116.5554 "Homewood South" 21.75439   258.9963
"Middle Hill"), ///
> xsc (r(0 1000)) xlabel (0 (200) 1000) ysc (r(0 25)) ylabel (0 (5) 25) ///
> legend (off) xtitle(Unemployment Variance) ytitle (Unemployment Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unemp.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\unemp.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\unempmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unemp.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\unempdot.gph", cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unempvarmd.gph"
file C:\MSTHESIS\Final\Graphs\Test of homogeneity\unempvarmd.gph already exists
r(602);

end of do-file
r(602);

.
.
. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0d000000.tmp"

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\unempvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\unempvarmd.gph saved)

.
end of do-file

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0d000000.tmp"

. *NO CAR
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter nocarmd varnocar if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name nocarmd varnocar if varnocar >400 & varnocar ~=.

     +---------------------------------------------+
     | neigh        neigh_name    nocarmd   varnocar |
     |---------------------------------------------|
  2. |    36   Golden Triangle   50.45296   716.6321 |
 31. |    56     North Oakland   37.11467   650.6452 |
 62. |    32          Fineview    45.7356   747.0778 |
 64. |    88      West Oakland   45.57227    533.501 |
     +---------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name nocarmd varnocar if nocarmd > 70 & varnocar ~=.

     +---------------------------------------------+
     | neigh        neigh_name    nocarmd   varnocar |
     |---------------------------------------------|
 16. |    83   Terrace Village   83.12236   36.69792 |
     +---------------------------------------------+

.
. graph hbox varnocar, ysc (r(0 1000)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\nocardot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\nocardot.gph saved)

.
. graph box nocarmd if nbg~=1 , fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)
```

```
. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\\nocarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\nocarmd.gph saved)

.
. *Graph with Possible Outliers
. twoway (scatter nocarmd varnocar if nbg~=1)  ///
> (scatteri 45.7356   747.0778 "Fineview"  50.45296   716.6321 "Golden Triangle" 37.11467
650.6452 ///
> "N_Oakland"  45.57227    533.501  "W_Oakland" 83.12236   36.69792 "Terrace Village" ), ///
> ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 1000)) xlabel (0 (200) 1000) ///
> legend (off) xtitle(No Car Variance) ytitle (No Car Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocar.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocar.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\nocarmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocar.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\nocardot.gph", cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocarvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\nocarvarmd.gph saved)

.
. *CROWD
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter crowdmd varcrowd if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name crowdmd varcrowd if varcrowd > 15 & varcrowd ~=.

     +---------------------------------------------------+
     | neigh              neigh_name    crowdmd   varcrowd |
     |---------------------------------------------------|
 29. |    44               Knoxville   4.090909   16.75761 |
 40. |    42           Homewood South   4.558332   15.82427 |
 57. |    62             Perry South   2.747053   15.04151 |
 60. |    76   Spring Hill-City View   .9345794   17.50519 |
 61. |    25           East Allegheny   5.723366   25.15245 |
     +---------------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name crowdmd varcrowd if crowdmd > 4 & varcrowd ~=.

     +--------------------------------------------+
     | neigh        neigh_name    crowdmd   varcrowd |
     |--------------------------------------------|
  3. |    19   Central Oakland   5.355494   13.70937 |
 29. |    44         Knoxville   4.090909   16.75761 |
 37. |     3         Allentown   4.464889   3.768065 |
 40. |    42    Homewood South   4.558332   15.82427 |
 48. |     9       Beltzhoover   4.500613   5.359155 |
     |--------------------------------------------|
 61. |    25    East Allegheny   5.723366   25.15245 |
     +--------------------------------------------+

.
. graph hbox varcrowd, ysc (r(0 30)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\crowddot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\crowddot.gph saved)

.
. graph box crowdmd if nbg~=1, fxsize(15) ysc (r(0 6)) caption(" " " ") ytitle(" ") ylabel (none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\crowdmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\crowdmd.gph saved)

.
```

```
. *Graph with Possible Outliers
. twoway (scatter crowdmd varcrowd if nbg~=1)  ///
> (scatteri  5.723366   25.15245 "E Allegheny"  4.558332   15.82427 "Homewood S" 4.090909
16.75761 ///
> "Knoxville"   ///
>  5.355494   13.70937 "C. Oakland"), ///
> ysc (r(0 6)) ylabel (0(2)6) xsc (r(0 30)) xlabel (0 (5) 30) ///
> legend (off) xtitle(Crowd Variance) ytitle (Crowd Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\crowd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\crowd.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\crowdmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\crowd.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\crowddot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\crowdvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\crowdvarmd.gph saved)

.
.
. *RENT
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter rentmd varrent if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name rentmd varrent if varrent > 1200 & varrent ~=.

     +---------------------------------------------+
     | neigh      neigh_name     rentmd    varrent |
     |---------------------------------------------|
 31. |    56   North Oakland   57.15166   2293.607 |
 62. |    32        Fineview   45.31425   1420.688 |
     +---------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name rentmd varrent if rentmd > 80 & varrent ~=.

     +------------------------------------------------+
     | neigh         neigh_name     rentmd    varrent |
     |------------------------------------------------|
  2. |    36    Golden Triangle   85.39742   336.5811 |
  3. |    19    Central Oakland   87.44229   5.181983 |
 16. |    83    Terrace Village   91.13924   91.78765 |
 43. |    11              Bluff   86.93333   341.4755 |
 53. |    33         Friendship   85.67131   27.38984 |
     |------------------------------------------------|
 63. |    23   Crawford Roberts   81.76755   111.6277 |
     +------------------------------------------------+

.
. graph hbox varrent, ysc (r(0 2500)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\rentdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\rentdot.gph saved)

.
. graph box rentmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\rentmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\rentmd.gph saved)

.
. *Graph with Possible Outliers
. twoway (scatter rentmd varrent if nbg~=1)  ///
> (scatteri  45.31425   1420.688 "Fineview"  57.15166   2293.607 "N Oakland" 86.93333   341.4755
///
```

```
> "Bluff" 87.44229   5.181983  "C Oakland" 91.13924   91.78765  "Terrace Village"), ///
> xsc (r(0 2500)) xlabel (0(500)2500) ysc (r(0 100)) ylabel (0 (20) 100) ///
> legend (off) xtitle(Rent Variance) ytitle (Rent Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\rent.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\rent.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\rentmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\rent.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\rentdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\rentvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\rentvarmd.gph saved)

.
. *PROFM
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter profmmd varprofm if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name profmmd varprofm if varprofm > 200 & varprofm ~=.

     +-------------------------------------------------+
     | neigh        neigh_name    profmmd   varprofm |
     |-------------------------------------------------|
  2. |    36   Golden Triangle   30.66627    277.516 |
     +-------------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name profmmd varprofm if profmmd > 40 & varprofm ~=.

     +------------------------------------------------------+
     | neigh            neigh_name    profmmd   varprofm |
     |------------------------------------------------------|
 31. |    56         North Oakland   42.68657   90.74117 |
 45. |    77   Squirrel Hill North   42.29765   37.28466 |
     +------------------------------------------------------+

.
. graph hbox varprofm, ysc (r(0 325)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\profmdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\profmdot.gph saved)

.
. graph box profmmd if nbg~=1, fxsize(15) ysc (r(0 50)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\profmmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\profmmd.gph saved)

.
. *Graph with Possible Outliers
. twoway (scatter profmmd varprofm if nbg~=1)  ///
> (scatteri  30.66627    277.516 "Golden Triangle"  42.68657   90.74117 "N Oakland" 42.29765
37.28466 "Squirrel Hill N."), ///
> xsc (r(0 325)) xlabel (0(100)325) ysc (r(0 50)) ylabel (0 (10) 50) ///
> legend (off) xtitle(Professional Variance) ytitle (Professional Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\profm.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\profm.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\profmmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\profm.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\profmdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\profmvarmd.gph", replace
```

```
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\profmvarmd.gph saved)

.
. *POV_H
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter pov_hmd varpov_h if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name pov_hmd varpov_h if varpov_h > 1000 & varpov_h ~=.

     +--------------------------------------+
     | neigh   neigh_~e   pov_hmd   varpov_h |
     |--------------------------------------|
 43. |    11      Bluff   71.0295   1327.944 |
     +--------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name pov_hmd varpov_h if pov_hmd > 50 & varpov_h ~=.

     +----------------------------------------------+
     | neigh        neigh_name    pov_hmd   varpov_h |
     |----------------------------------------------|
  3. |    19   Central Oakland   52.92803   44.40141 |
 16. |    83   Terrace Village   56.55271   59.90442 |
 43. |    11             Bluff    71.0295   1327.944 |
     +----------------------------------------------+

.
. graph hbox varpov_h, ysc (r(0 1500)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pov_hdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pov_hdot.gph saved)

.
. graph box pov_hmd if nbg~=1, fxsize(15) ysc (r(0 80)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pov_hmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pov_hmd.gph saved)

.
. *Graph with Possible Outliers
. twoway (scatter pov_hmd varpov_h if nbg~=1)  ///
> (scatteri  71.0295   1327.944 "Bluff"  52.92803   44.40141 "C Oakland" 56.55271   59.90442
"Terrace Village"), ///
> ysc (r(0 80)) ylabel (0(20)80) xsc (r(0 1500)) xlabel (0 (500) 1500) ///
> legend (off) xtitle(Poverty Variance) ytitle (Poverty Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\povh.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\povh.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pov_hmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\povh.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\pov_hdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\povhvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\povhvarmd.gph saved)

.
. *FHH
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter fhhmd varfhh if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name fhhmd varfhh if varfhh > 300 & varfhh ~=.

     +------------------------------------------------------+
     | neigh              neigh_name      fhhmd     varfhh |
```

```
     |---------------------------------------------------|
 60. |    76   Spring Hill-City View   12.39892   532.8243 |
 62. |    32                Fineview   18.17483   332.4659 |
     +---------------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name fhhmd varfhh if fhhmd > 30 & varfhh ~=.

     +--------------------------------------------+
     | neigh        neigh_name     fhhmd     varfhh |
     |--------------------------------------------|
 16. |    83   Terrace Village   32.5779   114.5896 |
     +--------------------------------------------+

.
. graph hbox varfhh, ysc (r(0 650)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\fhhdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\fhhdot.gph saved)

.
. graph box fhhmd if nbg~=1, fxsize(15) ysc (r(0 40)) caption(" " " ") ytitle(" ") ylabel (none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\fhhmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\fhhmd.gph saved)

.
. *Graph with Possible Outliers
. twoway (scatter fhhmd varfhh if nbg~=1)  ///
> (scatteri  18.17483   332.4659 "Fineview"  12.39892   532.8243 "Spring Hill-City View" 32.5779
114.5896 "Terrace Village"), ///
> ysc (r(0 40)) ylabel (0(10)40) xsc (r(0 650)) xlabel (0 (200) 650) ///
> legend (off) xtitle(Female-Headed Household Variance) ytitle (Female-Headed Household Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\fhh.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\fhh.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\fhhmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\fhh.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\fhhdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\fhhvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\fhhvarmd.gph saved)

.
. *PBASST
. graph hbox varpbasst,ysc (r(0 325)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pbasstdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\pbasstdot.gph saved)

.
. graph box pbasstmd if nbg~=1,fxsize(15) ysc (r(0 30)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\pbasstmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\pbasstmd.gph saved)

.
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter pbasstmd varpbasst if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name pbasstmd varpbasst if varpbasst > 100 & varpbasst ~=.

     +---------------------------------------------------+
     | neigh              neigh_name   pbasstmd   varpba~t |
     |---------------------------------------------------|
```

```
 16. |    83         Terrace Village   22.14533    100.714 |
 60. |    76   Spring Hill-City View   2.393162   154.7268 |
 62. |    32                Fineview   18.56967   265.7627 |
 64. |    88            West Oakland   14.83288   273.3831 |
     +-------------------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name pbasstmd varpbasst if pbasstmd > 17 & varpbasst ~=.

     +-----------------------------------------------+
     | neigh        neigh_name   pbasstmd   varpba~t |
     |-----------------------------------------------|
 16. |    83   Terrace Village   22.14533    100.714 |
 62. |    32          Fineview   18.56967   265.7627 |
     +-----------------------------------------------+

.
. *Graph with Possible Outliers
. twoway (scatter pbasstmd varpbasst if nbg~=1)  ///
> (scatteri  18.56967   265.7627 "Fineview"  2.393162   154.7268 "Spring Hill-City View" 22.14533
100.714 "Terrace Village" 14.83288   273.3831 "West Oak
> land"), ///
> ysc (r(0 30)) ylabel (0(05)30) xsc (r(0 325)) xlabel (0 (100) 325) ///
> legend (off) xtitle(Public Assistance Variance) ytitle (Public Assistance Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\pbasst.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\pbasst.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\pbasstmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\pbasst.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\pbasstdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\pbasstvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\pbasstvarmd.gph saved)

.
. *INCLOW
. graph hbox varinclow, ysc (r(0 1500)) fysize(15) l1title(" ") l2title(" ") ylabel(none)
ytitle(" ")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\inclowdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\inclowdot.gph saved)

.
. graph box inclowmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\inclowmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\inclowmd.gph saved)

.
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter inclowmd varinclow if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name inclowmd varinclow if varinclow > 500 & varinclow ~=.

     +---------------------------------------------+
     | neigh      neigh_name   inclowmd   varinc~w |
     |---------------------------------------------|
 31. |    56   North Oakland   64.20119   1101.615 |
 62. |    32        Fineview   61.90209   1278.397 |
 64. |    88    West Oakland   58.50546   740.2354 |
     +---------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name inclowmd varinclow if inclowmd > 79 & varinclow ~=.
```

```
     +----------------------------------------------+
     | neigh        neigh_name   inclowmd   varinc~w |
     |----------------------------------------------|
 16. |    83   Terrace Village   91.46706   5.469415 |
 34. |    45           Larimer   79.66516   324.6577 |
 40. |    42    Homewood South   79.43376   322.6856 |
 43. |    11             Bluff   88.31658   273.0045 |
     +----------------------------------------------+

.
. *Graph with Possible Outliers
. twoway (scatter inclowmd varinclow if nbg~=1)  ///
> (scatteri  61.90209   1278.397 "Fineview" 64.20119   1101.615 "N Oakland" 58.50546   740.2354
"W Oakland" ///
> 88.31658   273.0045 "Bluff" 91.46706   5.469415 "Terrace Village"), ///
> ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 1500)) xlabel (0 (500) 1500) ///
> legend (off) xtitle(Low Income Variance) ytitle (Low Income Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\inclow.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\inclow.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\inclowmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\inclow.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\inclowdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\inclowvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\inclowvarmd.gph saved)

.
.
. *EDULOW
. graph hbox varedulow, ysc (r(0 700)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\edulowdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\edulowdot.gph saved)

.
. graph box edulowmd if nbg~=1, fxsize(15) ysc (r(0 50)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\edulowmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\edulowmd.gph saved)

.
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter edulowmd varedulow if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name edulowmd varedulow if varedulow > 300 & varedulow ~=.

     +----------------------------------------------+
     | neigh        neigh_name   edulowmd   varedu~w |
     |----------------------------------------------|
  2. |    36   Golden Triangle   19.25591    605.606 |
 43. |    11             Bluff   22.85996   395.8593 |
     +----------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name edulowmd varedulow if edulowmd > 40 & varedulow ~=.

     +----------------------------------------------+
     | neigh        neigh_name   edulowmd   varedu~w |
     |----------------------------------------------|
 16. |    83   Terrace Village   42.99065   26.40998 |
     +----------------------------------------------+

.
. *Graph with Possible Outliers
```

```
. twoway (scatter edulowmd varedulow if nbg~=1)  ///
> (scatteri  22.85996   395.8593 "Bluff" 19.25591    605.606 "Golden Triangle" 42.99065
26.40998 "Terrace Village"), ///
> ysc (r(0 50)) ylabel (0(10)50) xsc (r(0 700)) xlabel (0 (200) 700) ///
> legend (off) xtitle(Low Education Variance) ytitle (Low Education Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\edulow.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\edulow.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\edulowmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\edulow.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\edulowdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\edulowvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\edulowvarmd.gph saved)

.
. *BLACK
. graph hbox varblack, ysc (r(0 2000)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\blackdot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\blackdot.gph saved)

.
. graph box blackmd if nbg~=1, fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\blackmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\blackmd.gph saved)

.
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter blackmd varblack if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name blackmd varblack if varblack > 500 & varblack ~=.

     +-------------------------------------------------------+
     | neigh              neigh_name    blackmd   varblack |
     |-------------------------------------------------------|
 22. |    79         Stanton Heights   44.85184   844.6577 |
 29. |    44              Knoxville   47.38372   758.6419 |
 43. |    11                  Bluff   25.58116   764.8744 |
 60. |    76   Spring Hill-City View   13.14433   777.0013 |
 64. |    88            West Oakland   62.50841    1765.24 |
     +-------------------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name blackmd varblack if blackmd > 80 & varblack ~=.

     +-----------------------------------------------------------+
     | neigh                  neigh_name    blackmd   varblack |
     |-----------------------------------------------------------|
 14. |    46   Lincoln-Lemington-
Belmar   92.47581   84.08673 |
 16. |    83             Terrace Village   96.85265   5.089941 |
 25. |    85                 Upper Hill    81.73804   82.41582 |
 27. |    51                 Middle Hill   94.94681   1.748779 |
 34. |    45                     Larimer   86.00433   77.73995 |
     |-----------------------------------------------------------|
 40. |    42              Homewood South   92.09064   52.86417 |
 44. |    43              Homewood West     93.8779   4.433619 |
 48. |     9                 Beltzhoover   87.04886   271.5172 |
 51. |    49                  Manchester   86.45833   128.8641 |
 54. |    34                    Garfield   89.06009   139.5499 |
     |-----------------------------------------------------------|
 55. |    27                  East Hills   94.41154   9.092589 |
 59. |    41              Homewood North   95.95828   3.860833 |
```

```
 63. |    23            Crawford Roberts   90.89676   56.50612 |
     +-----------------------------------------------------------+

. list neigh neigh_name blackmd varblack if blackmd > 95 & varblack ~=.

     +-------------------------------------------------+
     | neigh        neigh_name    blackmd   varblack |
     |-------------------------------------------------|
 16. |    83   Terrace Village   96.85265   5.089941 |
 59. |    41    Homewood North   95.95828   3.860833 |
     +-------------------------------------------------+

. list neigh neigh_name blackmd varblack if blackmd < 5 & varblack ~=.

     +---------------------------------------------------------+
     | neigh                 neigh_name    blackmd   varblack |
     |---------------------------------------------------------|
  1. |    84   Herrs Island - Troy Hill   1.819454   6.620827 |
  5. |    89                   Westwood   3.880993   .3039512 |
  6. |    73           South Side Flats   2.773246   3.097484 |
 10. |    24           Duquesne Heights   1.716738   2.161816 |
 12. |    47              Lincoln Place          0          0 |
     |---------------------------------------------------------|
 15. |    86       Upper Lawrenceville   4.135338     6.0179 |
 17. |    37                 Greenfield   1.797753   8.121812 |
 20. |     8                  Beechview   3.296234   17.57902 |
 24. |    14                  Brookline   .6024097   4.892062 |
 28. |    63               Point Breeze   4.680042   31.94537 |
     |---------------------------------------------------------|
 30. |    60                  Overbrook         .4   13.09624 |
 32. |     6                 Banksville   4.446382   18.74956 |
 36. |    16                    Carrick     1.3089    12.8266 |
 38. |    52                Morningside   1.613915    235.484 |
 39. |    74          South Side Slopes          0   17.03187 |
     |---------------------------------------------------------|
 41. |    54           Mount Washington   2.103961   42.09422 |
 45. |    77        Squirrel Hill North   2.377972   8.935249 |
 49. |    78        Squirrel Hill South   1.638079   13.50338 |
     +---------------------------------------------------------+

. list neigh neigh_name blackmd varblack if blackmd > 90 & varblack ~=.

     +-----------------------------------------------------------+
     | neigh                 neigh_name    blackmd   varblack |
     |-----------------------------------------------------------|
 14. |    46   Lincoln-Lemington-
Belmar   92.47581   84.08673 |
 16. |    83            Terrace Village   96.85265   5.089941 |
 27. |    51                Middle Hill   94.94681   1.748779 |
 40. |    42             Homewood South   92.09064   52.86417 |
 44. |    43              Homewood West    93.8779   4.433619 |
     |-----------------------------------------------------------|
 55. |    27                 East Hills   94.41154   9.092589 |
 59. |    41             Homewood North   95.95828   3.860833 |
 63. |    23           Crawford Roberts   90.89676   56.50612 |
     +-----------------------------------------------------------+

. *list neigh neigh_name blackmd varblack if neigh_name=="East Liberty" | neigh_name=="Squirrel
Hill North"
.
. *Graph with Possible Outliers
. twoway (scatter blackmd varblack if nbg~=1)  ///
> (scatteri  25.58116   764.8744 "Bluff" 47.38372   758.6419 "Knoxville" 13.14433   777.0013
"Spring Hill City View" ///
> 44.85184   844.6577 "Stanton Heights" 62.50841    1765.24 "West Oakland" 96.85265   5.089941
"Terrace Village"), ///
> ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 2000)) xlabel (0 (500) 2000) ///
> legend (off) xtitle(Black Variance) ytitle (Black Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\black.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\black.gph saved)
```

```
.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\blackmd.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\black.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\blackdot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\blackvarmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\blackvarmd.gph saved)

.
. *UND18
. graph hbox varund18, ysc (r(0 400)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle("
")

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\und18dot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Var\und18dot.gph saved)

.
. graph box und18md if nbg~=1, fxsize(15) ysc (r(0 40)) caption(" " " ") ytitle(" ") ylabel
(none)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\und18md.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\Med\und18md.gph saved)

.
. *Graph of median vs. variance for neighborhoods with > 1 block groups
. graph twoway scatter und18md varund18 if nbg~=1

. *List neighborhoods with a high variance
. list neigh neigh_name und18md varund18 if varund18 > 200 & varund18 ~=.

     +-----------------------------------------------+
     | neigh         neigh_name    und18md   varund18 |
     |-----------------------------------------------|
 62. |    32           Fineview   27.07936   201.1734 |
 63. |    23   Crawford Roberts   23.81184    247.345 |
 64. |    88       West Oakland   19.54798   325.5054 |
     +-----------------------------------------------+

.
. *List neighborhoods with a high median
. list neigh neigh_name und18md varund18 if und18md > 33 & varund18 ~=.

     +----------------------------------------------+
     | neigh        neigh_name    und18md   varund18 |
     |----------------------------------------------|
 16. |    83   Terrace Village   35.40773   13.33136 |
 54. |    34          Garfield   34.87545    91.8574 |
     +----------------------------------------------+

.
. *Graph with Possible Outliers
. twoway (scatter und18md varund18 if nbg~=1)  ///
> (scatteri  23.81184    247.345 "Crawford Heights"  27.07936   201.1734 "Fineview" 19.54798
325.5054 "West Oakland" ///
> 35.40773   13.33136 "Terrace Vilage" 34.87545    91.8574 "Garfield"),  ///
> ysc (r(0 40)) ylabel (0(10)40) xsc (r(0 400)) xlabel (0 (100) 400) ///
> legend (off) xtitle(Under 18 Years Variance) ytitle (Under 18 Years Median)

. graph save "C:\MSTHESIS\Final\Graphs\Test of Homogeneity\und18.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of Homogeneity\und18.gph saved)

.
. gr combine "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Med\und18md.gph" ///
> "C:\MSTHESIS\Final\Graphs\Test of homogeneity\und18.gph" ///
>  "C:\MSTHESIS\Final\Graphs\Test of homogeneity\Var\und18dot.gph",  cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Test of homogeneity\und18varmd.gph", replace
(file C:\MSTHESIS\Final\Graphs\Test of homogeneity\und18varmd.gph saved)

.
```

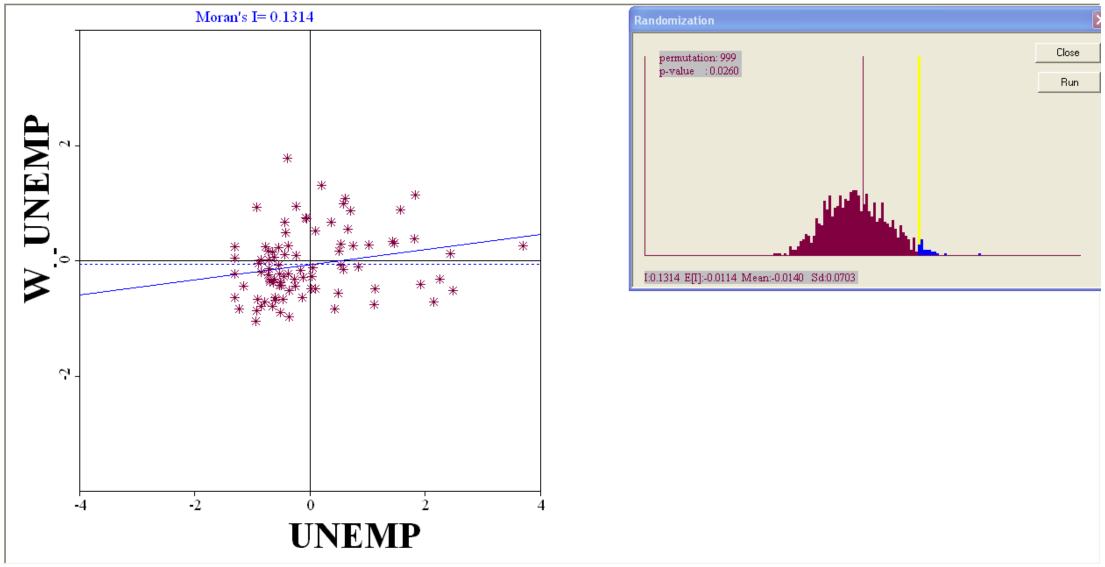
```
. *Example neighborhoods representing various percentiles
. clear

. use "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta"

. list neigh neigh_name blackmd varblack if varblack <9.00

     +---------------------------------------------------------+
     | neigh                 neigh_name    blackmd    varblack |
     |---------------------------------------------------------|
 14. |    14                  Brookline   .6024097    4.892062 |
 17. |    17      Central Lawrenceville   5.524622    8.876933 |
 19. |    19            Central Oakland   5.677246    2.710238 |
 23. |    24           Duquesne Heights   1.716738    2.161816 |
 24. |    25             East Allegheny   29.49631    5.269801 |
     |---------------------------------------------------------|
 36. |    37                 Greenfield   1.797753    8.121812 |
 40. |    41              Homewood North   95.95828    3.860833 |
 42. |    43              Homewood West    93.8779    4.433619 |
 46. |    47             Lincoln Place           0           0 |
 47. |    48        Lower Lawrenceville   21.39949    7.608168 |
     |---------------------------------------------------------|
 50. |    51                Middle Hill   94.94681    1.748779 |
 72. |    73           South Side Flats   2.773246    3.097484 |
 76. |    77        Squirrel Hill North   2.377972    8.935249 |
 82. |    83            Terrace Village   96.85265    5.089941 |
 83. |    84   Herrs Island - Troy Hill   1.819454    6.620827 |
     |---------------------------------------------------------|
 85. |    86        Upper Lawrenceville   4.135338      6.0179 |
 88. |    89                   Westwood   3.880993   .3039512 |
     +---------------------------------------------------------+

. *Central Lawrenceville (17) had a varblack ==8.87, around 25th percentile
.
. list neigh neigh_name blackmd varblack if varblack >209

     +--------------------------------------------------------+
     | neigh                neigh_name    blackmd    varblack |
     |--------------------------------------------------------|
  1. |     1          Allegheny Center         25           . |
  2. |     2            Allegheny West   11.55379           . |
  3. |     3                 Allentown   18.16311     278.162 |
  5. |     5        Arlington Heights   53.44828           . |
  7. |     7         Bedford Dwellings    94.8526           . |
     |--------------------------------------------------------|
  9. |     9               Beltzhoover   87.04886    271.5172 |
 11. |    11                     Bluff   25.58116    764.8744 |
 12. |    12                    Bonair   4.555809           . |
 15. |    15      California Kirkbride   81.41026           . |
 18. |    18         Central Northside   63.73166    431.0948 |
     |--------------------------------------------------------|
 20. |    20            Chartiers City   71.68285           . |
 21. |    22           Crafton Heights   10.52842    282.8727 |
 25. |    26             East Carnegie   19.16996           . |
 27. |    28              East Liberty   71.79773    322.8945 |
 29. |    30                    Esplen   17.63441           . |
     |--------------------------------------------------------|
 30. |    31                 Fairywood   86.81214           . |
 31. |    32                  Fineview   43.07299    413.8895 |
 32. |    33                Friendship    29.6556    310.3215 |
 34. |    35                Glen Hazel   75.40046           . |
 35. |    36           Golden Triangle   32.71052    490.2315 |
     |--------------------------------------------------------|
 37. |    38                      Hays   4.989154           . |
 43. |    44                Knoxville   47.38372    758.6419 |
 51. |    52               Morningside   1.613915     235.484 |
 52. |    53   Mt. Oliver Neighborhood   19.79167           . |
 54. |    55             New Homestead   7.735426           . |
     |--------------------------------------------------------|
 56. |    57               North Shore   7.116105           . |
 57. |    58         Northview Heights   96.37427           . |
```

```
 58. |    59                  Oakwood   4.711538          . |
 61. |    62              Perry South   59.62207   230.3679 |
 63. |    64       Point Breeze North   71.27273   277.7835 |
     |------------------------------------------------------|
 65. |    66            Regent Square    7.03606          . |
 66. |    67                Ridgemont   1.785714          . |
 67. |    68                St. Clair   85.29617          . |
 71. |    72              South Shore   6.849315          . |
 75. |    76    Spring Hill-City View   13.14433   777.0013 |
     |------------------------------------------------------|
 78. |    79          Stanton Heights   44.85184   844.6577 |
 79. |    80           Strip District   66.98412          . |
 80. |    81              Summer Hill   10.64022          . |
 81. |    82           Swisshelm Park    1.96793          . |
 86. |    87                 West End   29.09931          . |
     |------------------------------------------------------|
 87. |    88             West Oakland   62.50841    1765.24 |
 90. |    21                  Chateau          .          . |
     +------------------------------------------------------+

. *Morningside (52) had a varblack==235.48, around 75th percentile
.
. *now obtain figures for these neighborhoods
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"

. list neigh neigh_name ctblock black if neigh_name=="Central Lawrenceville" |
neigh_name=="Morningside"

     +---------------------------------------------------+
     | neigh              neigh_name   ctblock      black |
     |---------------------------------------------------|
 78. |    17   Central Lawrenceville   0902004   2.670227 |
 79. |    17   Central Lawrenceville   0902002   9.024897 |
 80. |    17   Central Lawrenceville   0902003   6.321113 |
 81. |    17   Central Lawrenceville   0901004   .9803922 |
 82. |    17   Central Lawrenceville   0901001   4.728132 |
     |---------------------------------------------------|
 83. |    17   Central Lawrenceville   0902001   7.220217 |
201. |    52             Morningside   1014001          0 |
202. |    52             Morningside   1014004          2 |
203. |    52             Morningside   1014006   31.72269 |
204. |    52             Morningside   1014003   1.227831 |
     +---------------------------------------------------+

.
end of do-file

.
. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Brown and Forsythe.log
  log type:  text
 closed on:  20 Jul 2009, 13:50:52
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

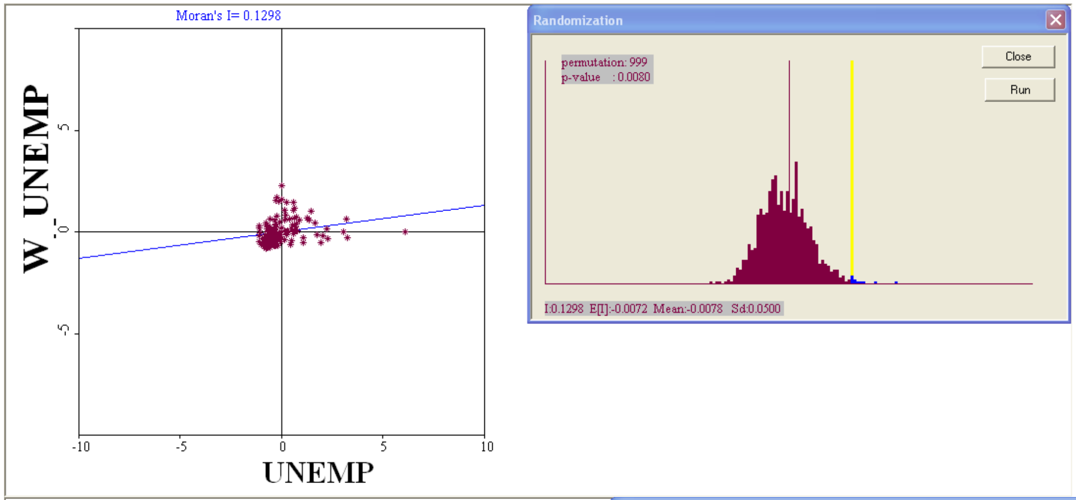
4.1.3. Spatial Autocorrelation

Moran's I Statistic

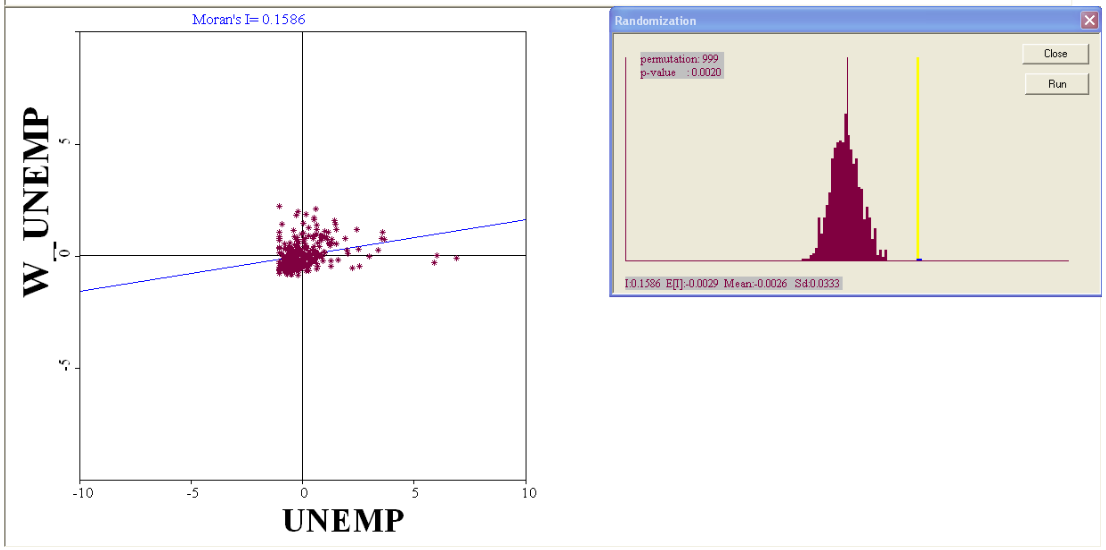
Neighborhood



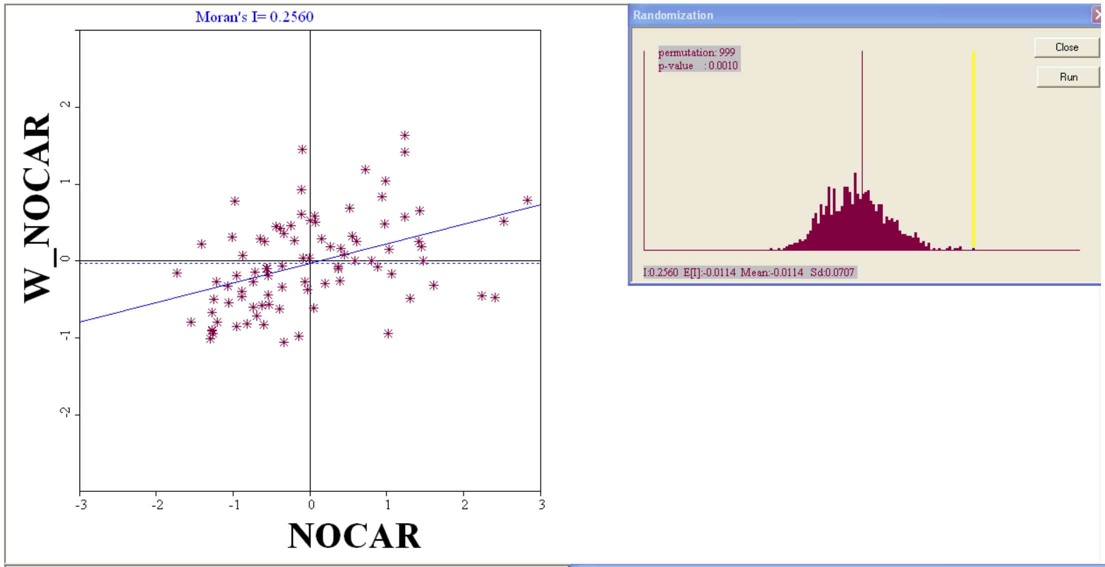
Census Tract



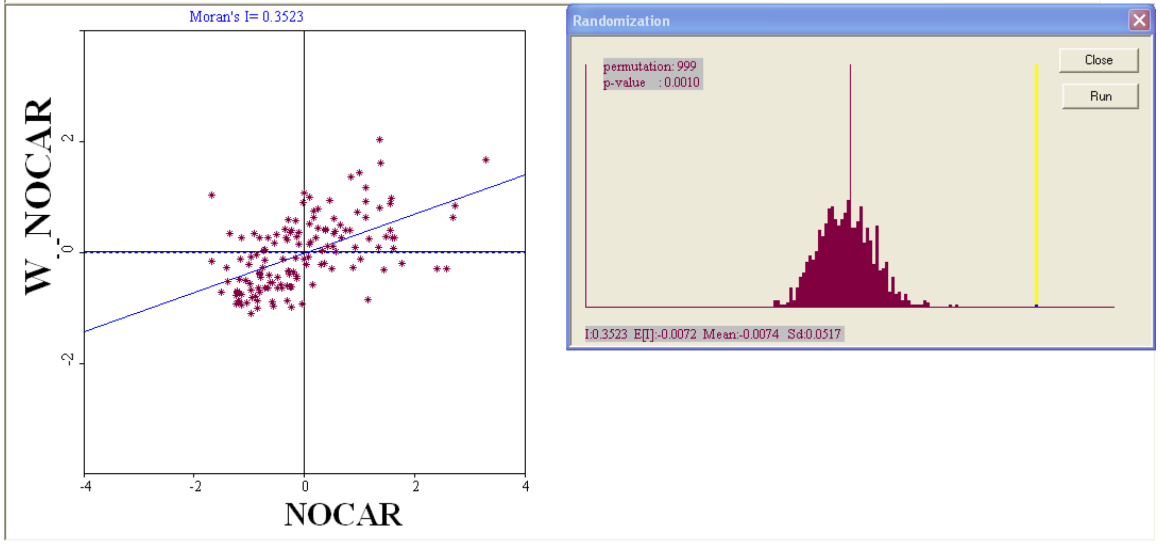
Block Group



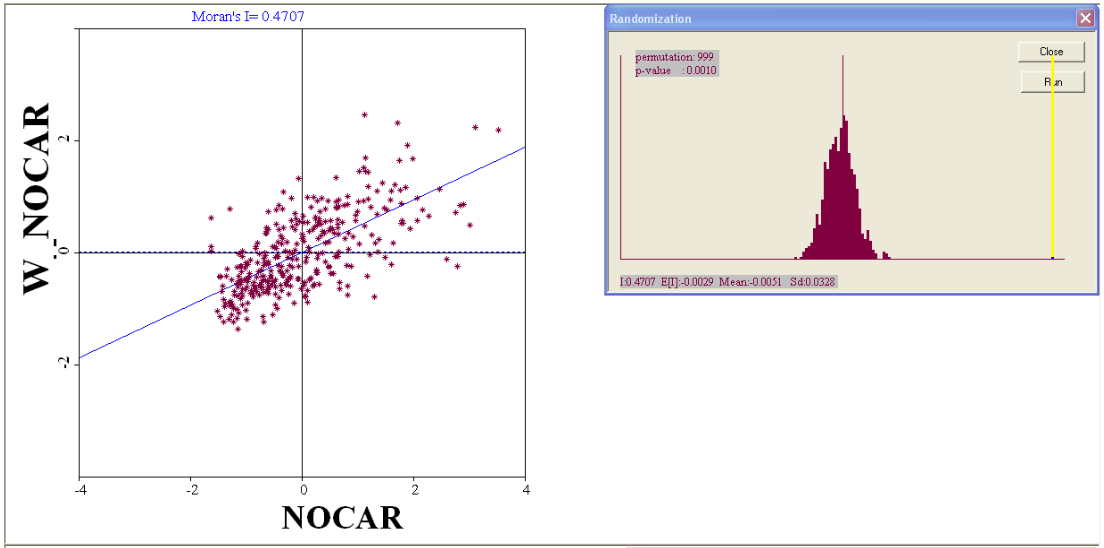
Neighborhood



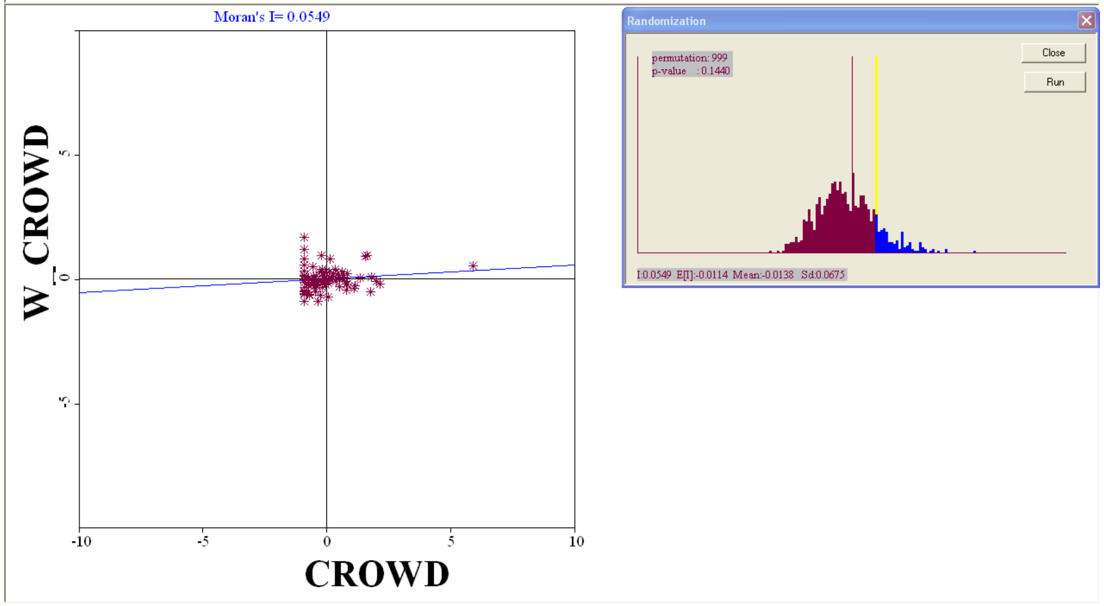
Census Tract



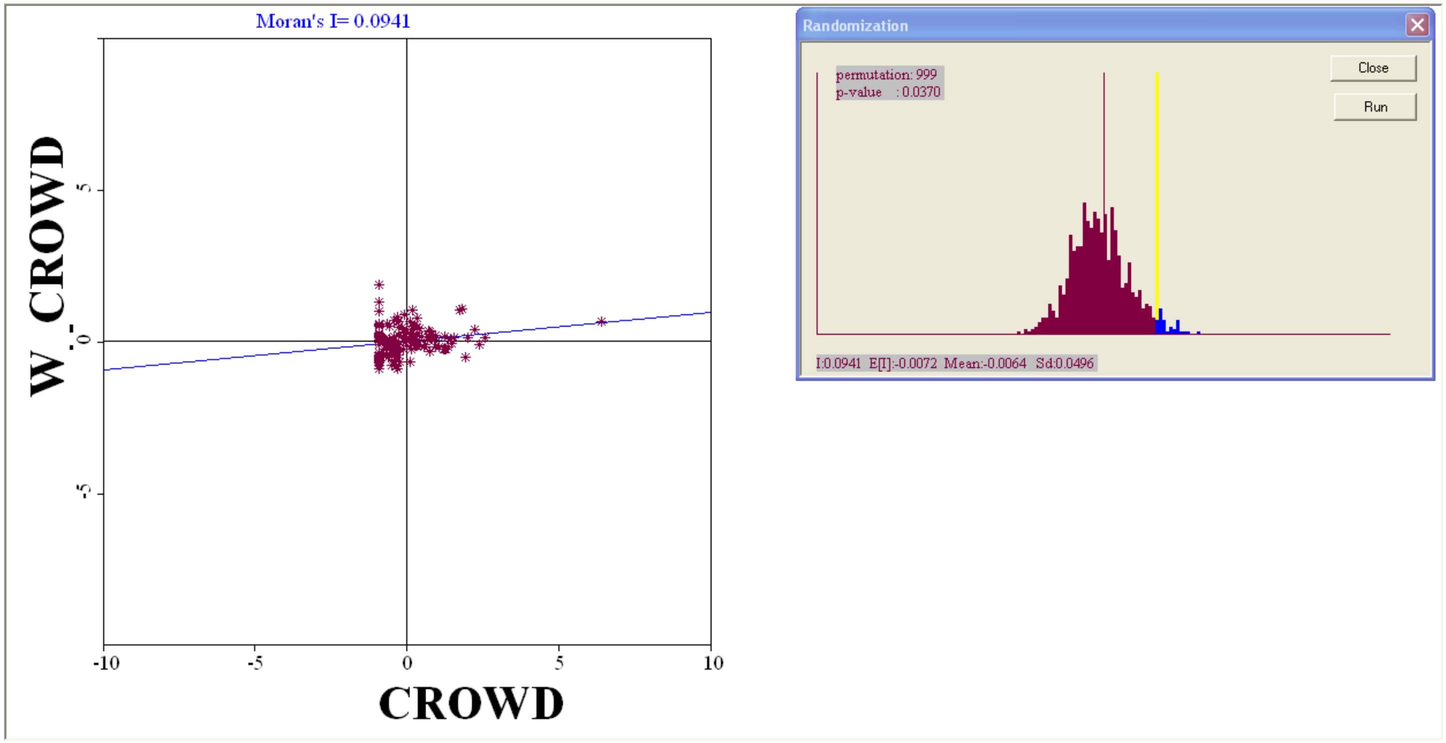
Block Group



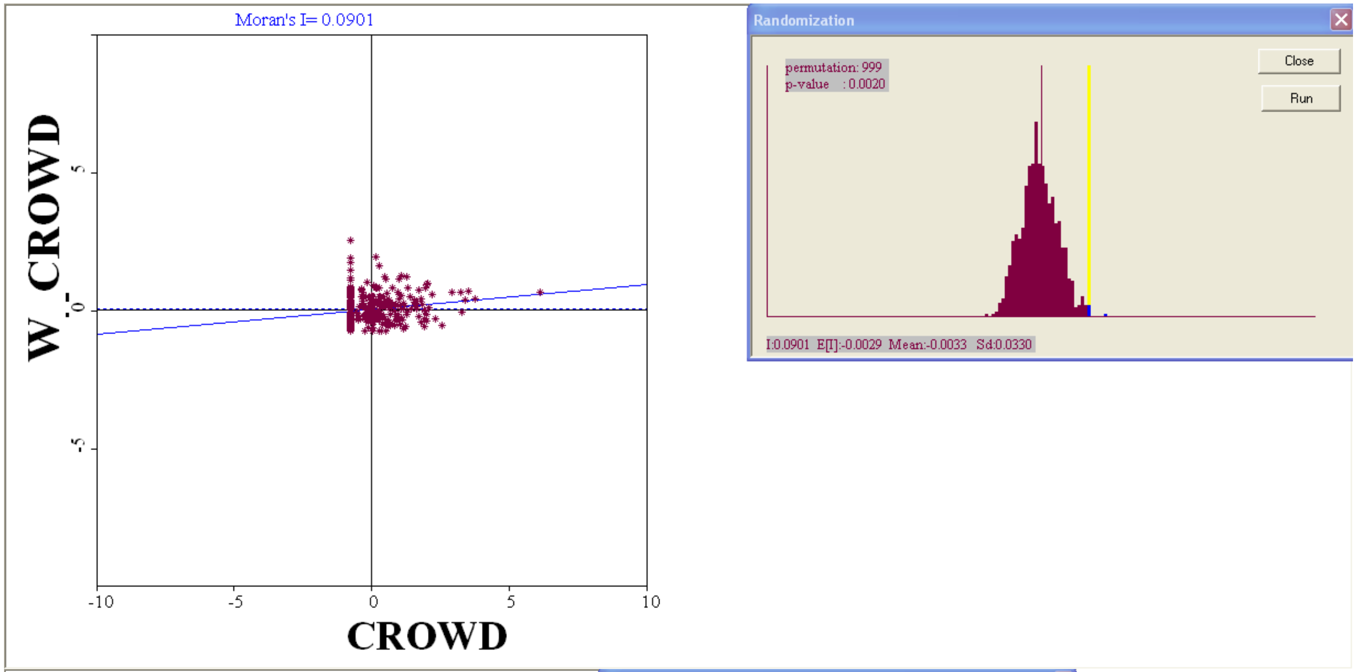
Neighborhood



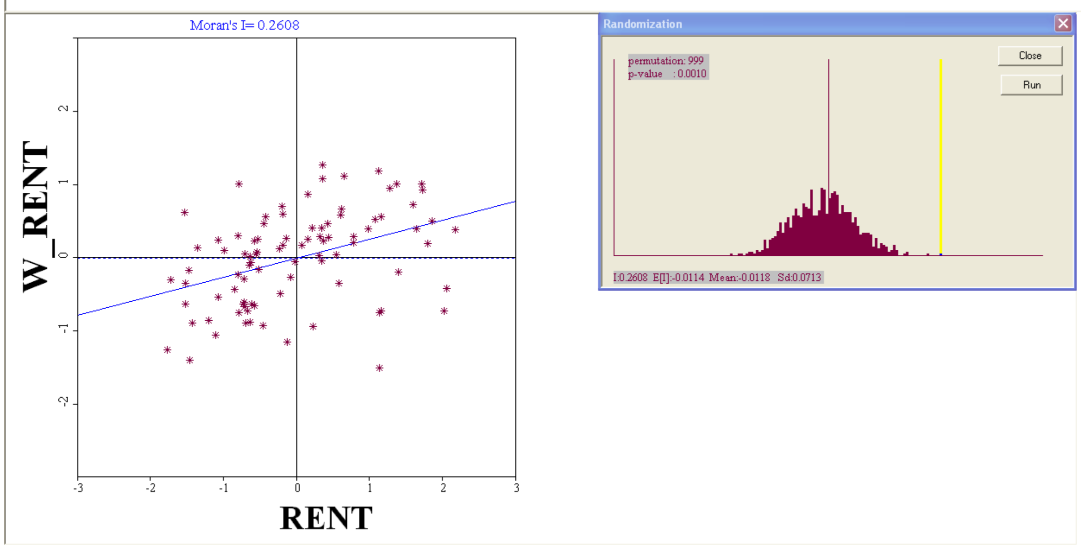
Census Tract



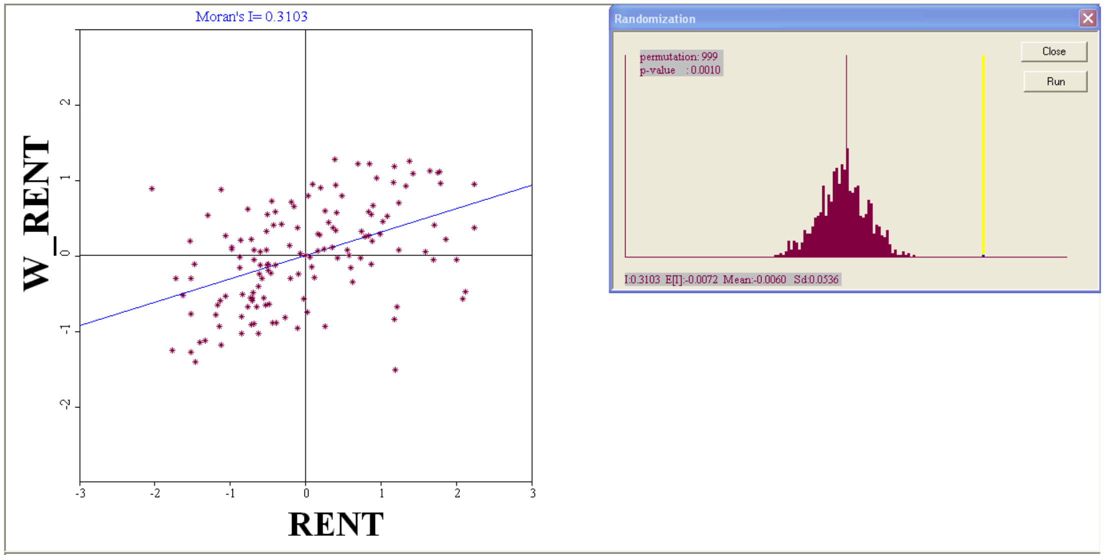
Block Group



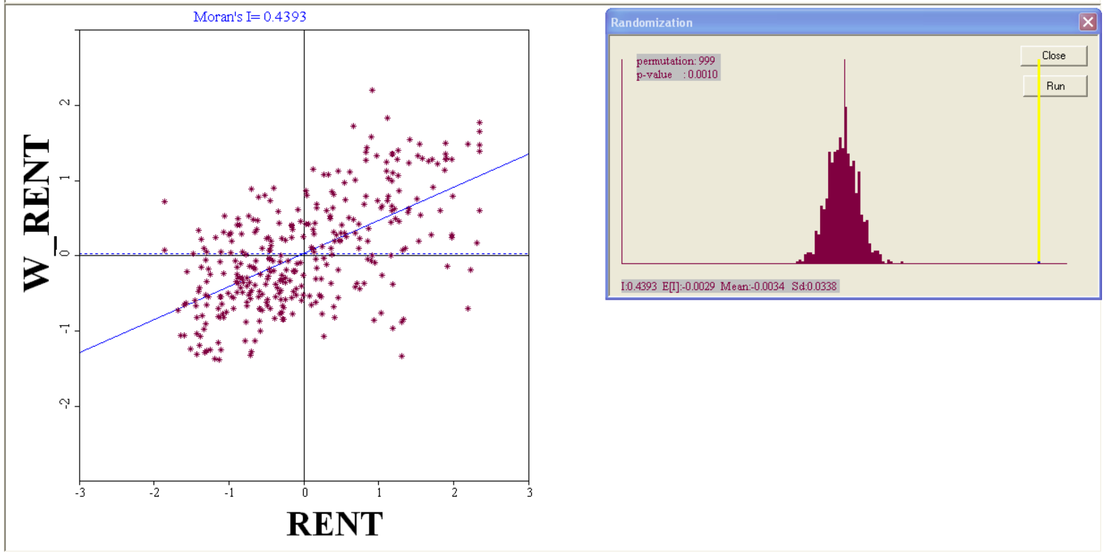
Neighborhood



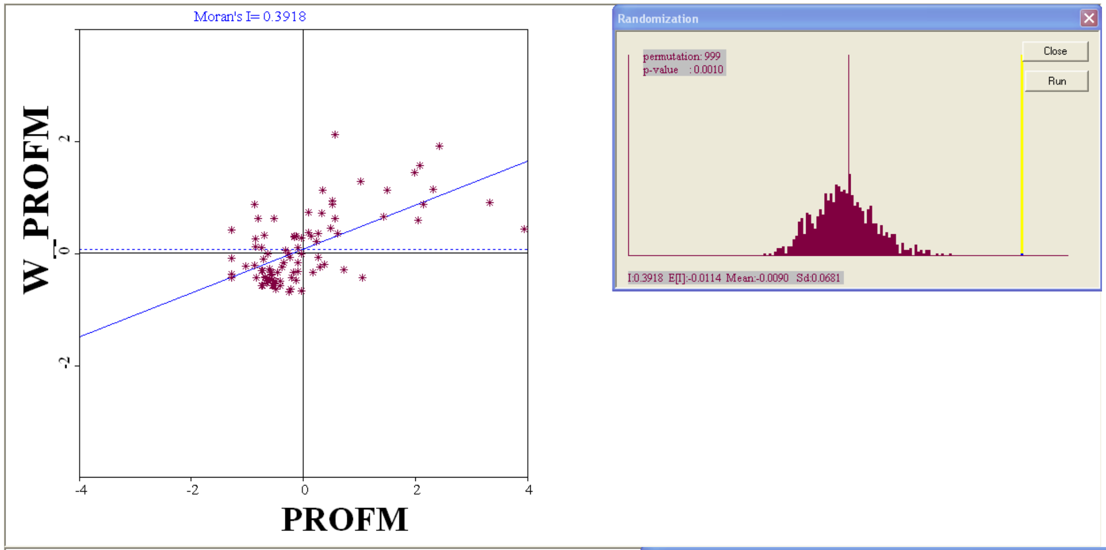
Census Tract



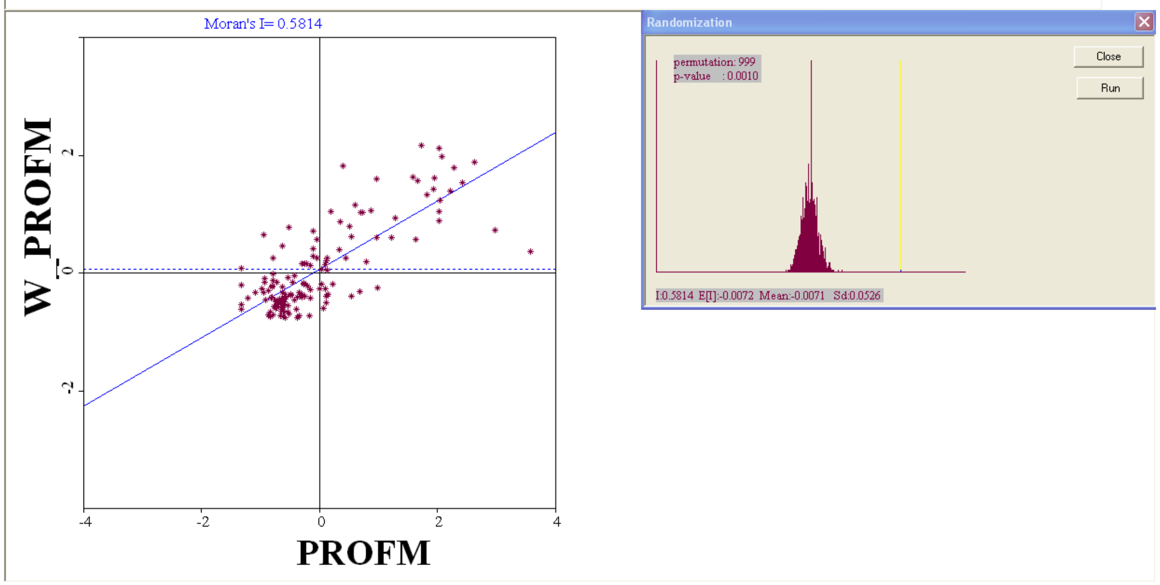
Block Group



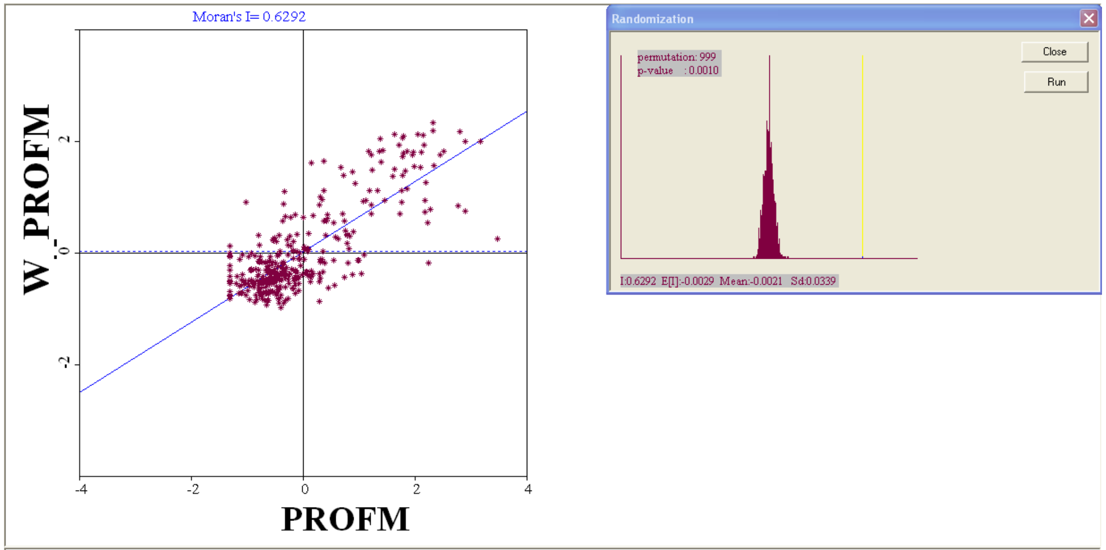
Neighborhood



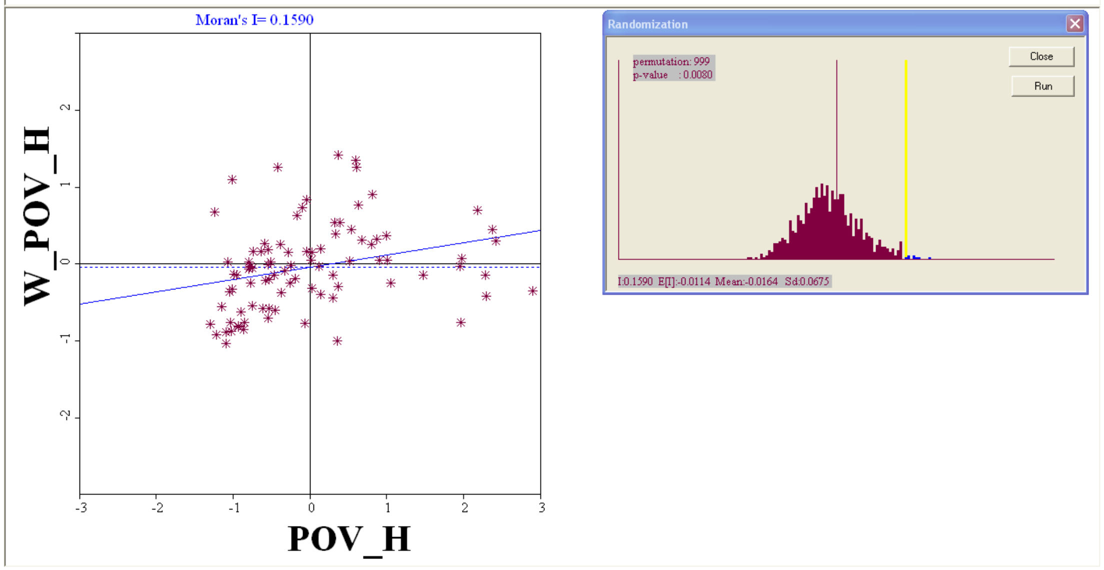
Census Tract



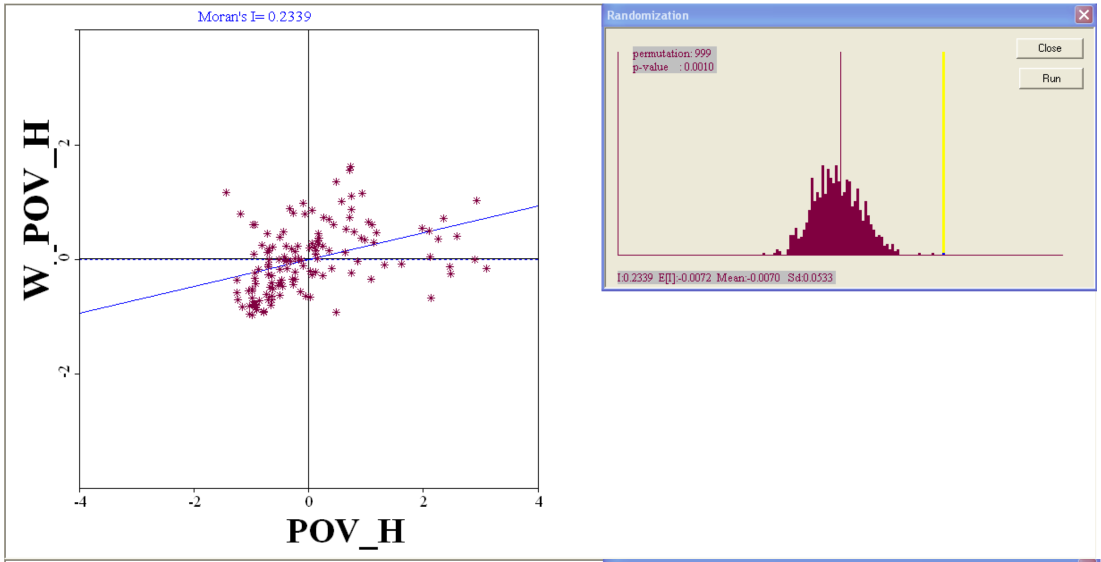
Block Group



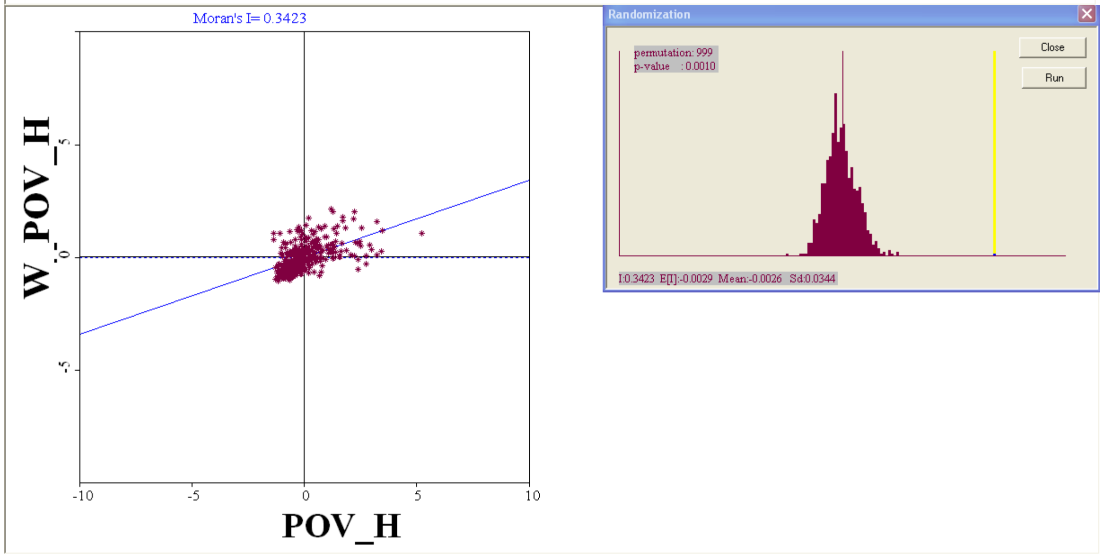
Neighborhood



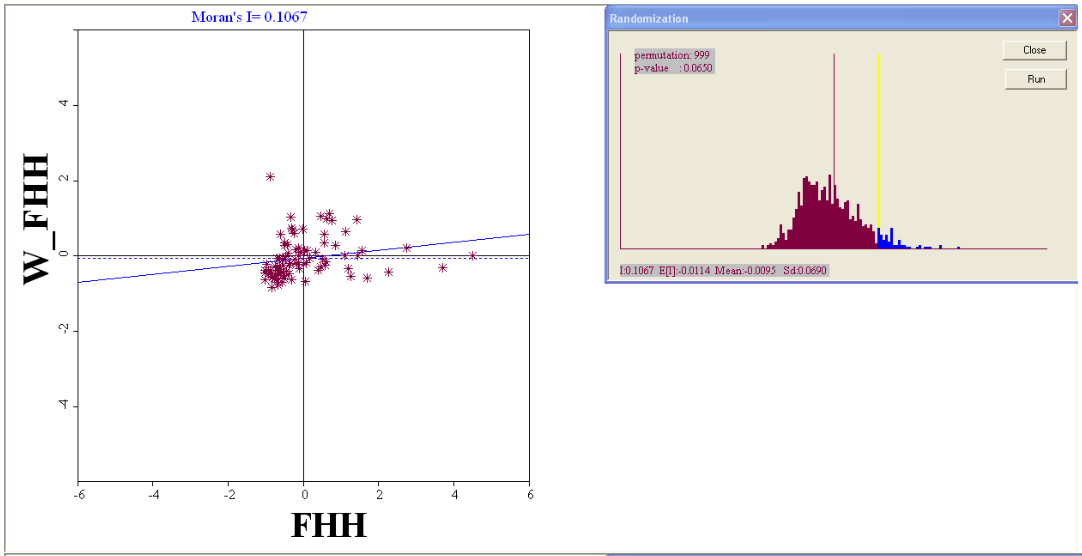
Census Tract



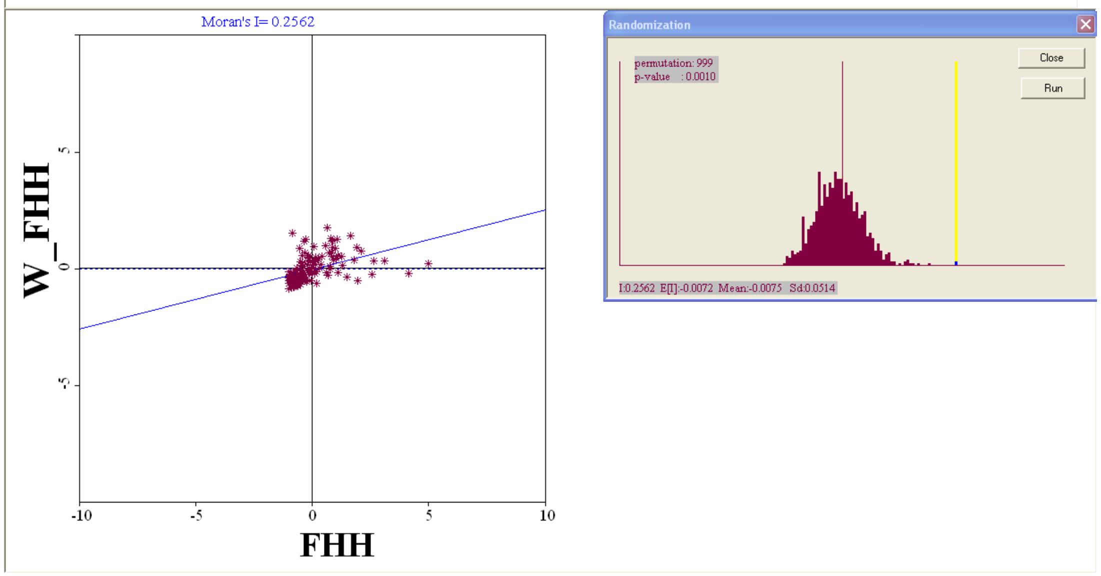
Block Group



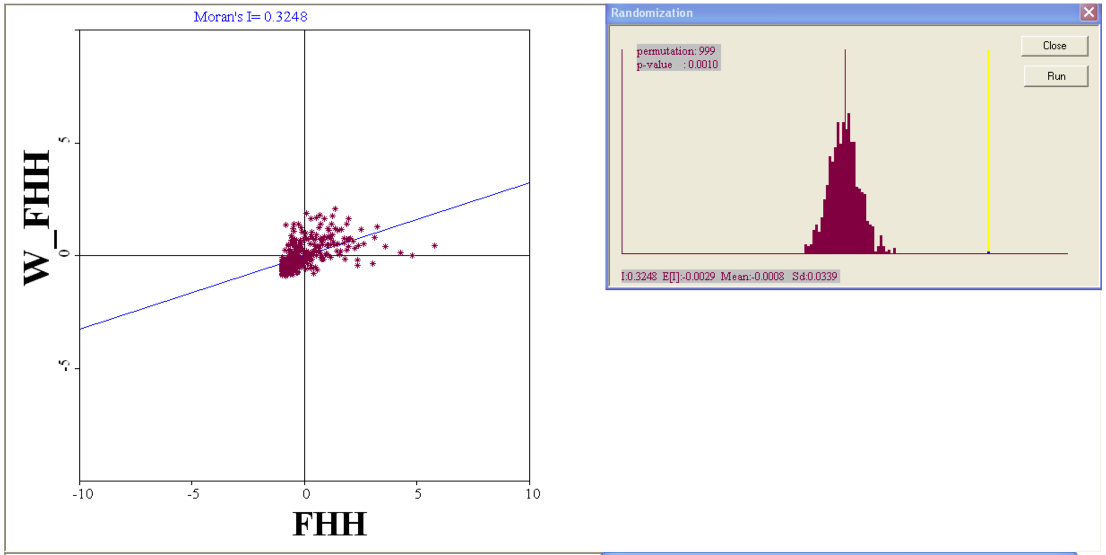
Neighborhood



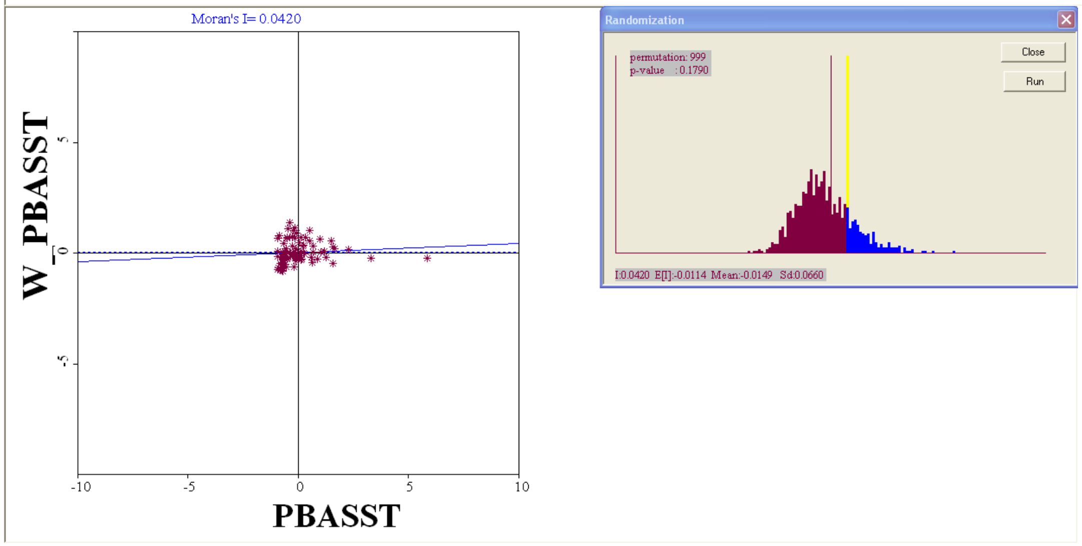
Census Tract



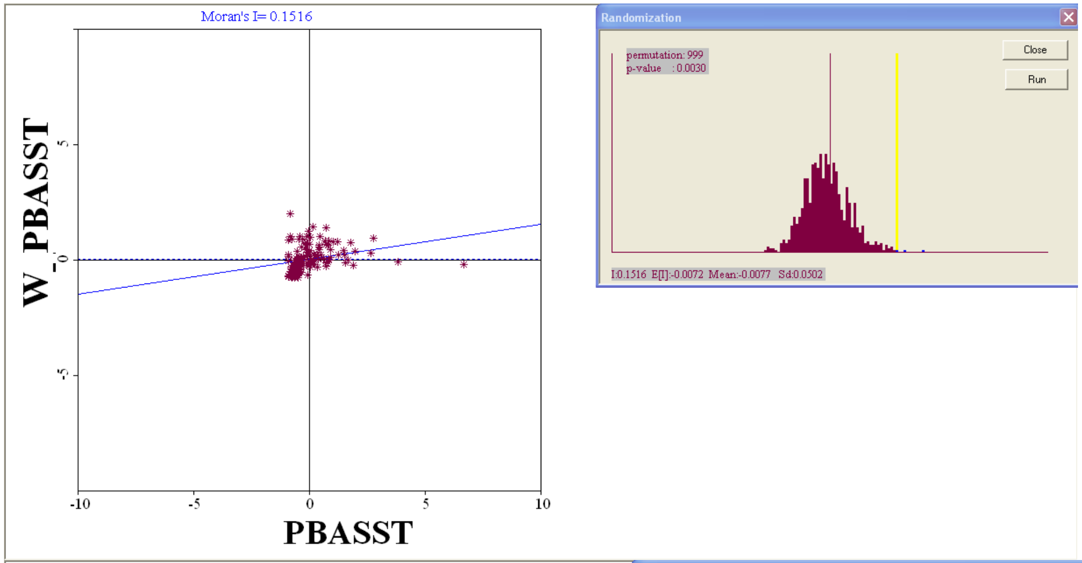
Block Group



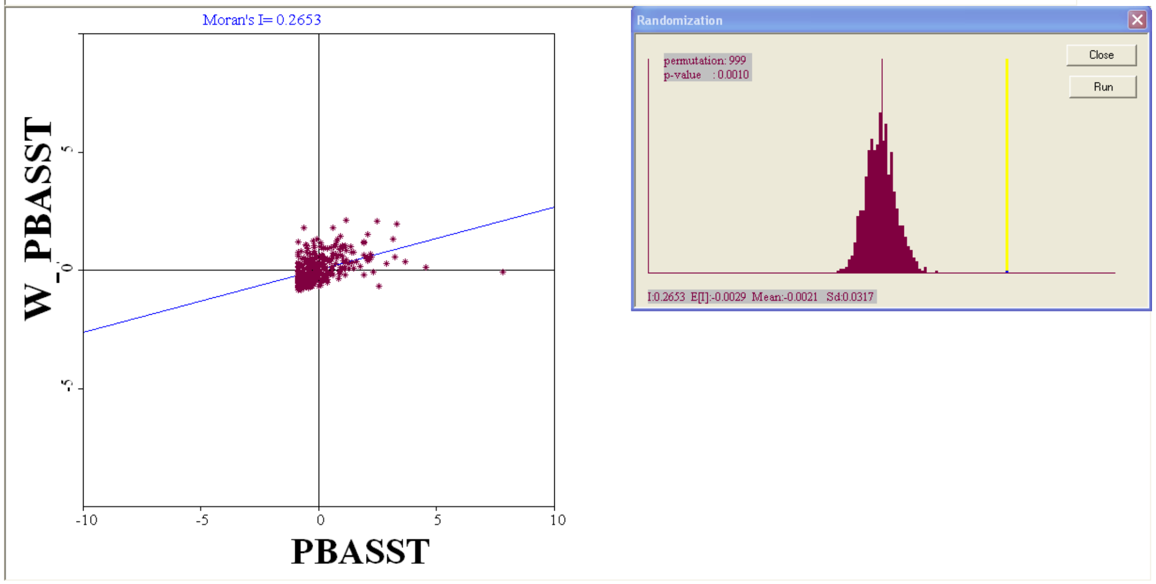
Neighborhood



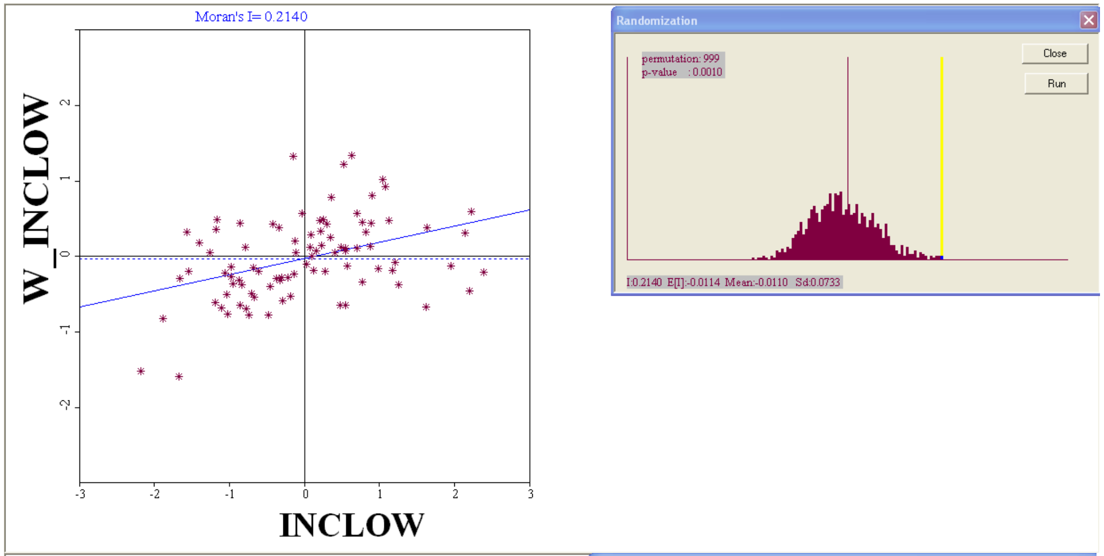
Census Tract



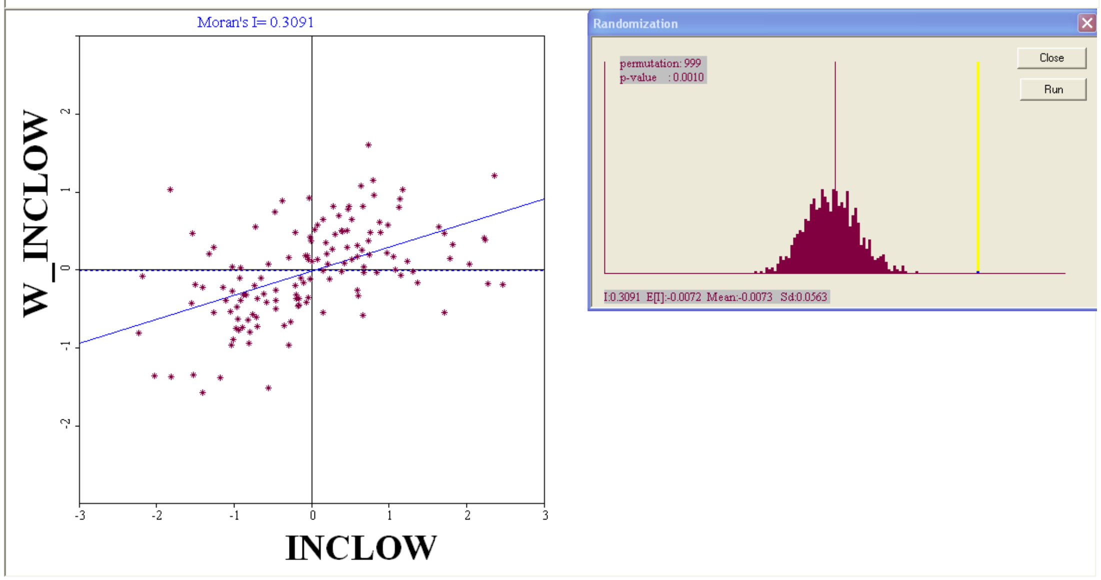
Block Group



Neighborhood



Census Tract



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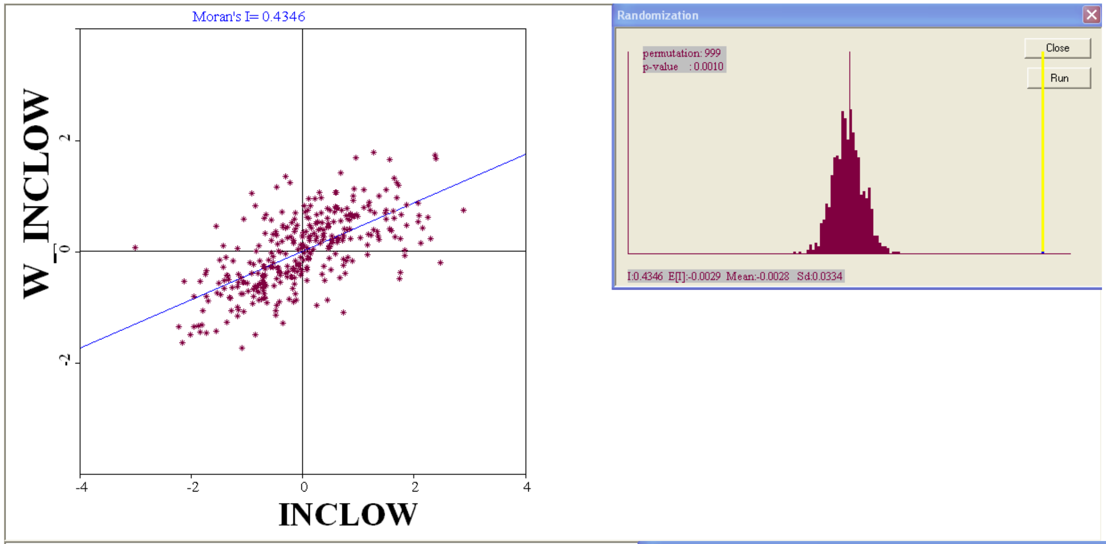
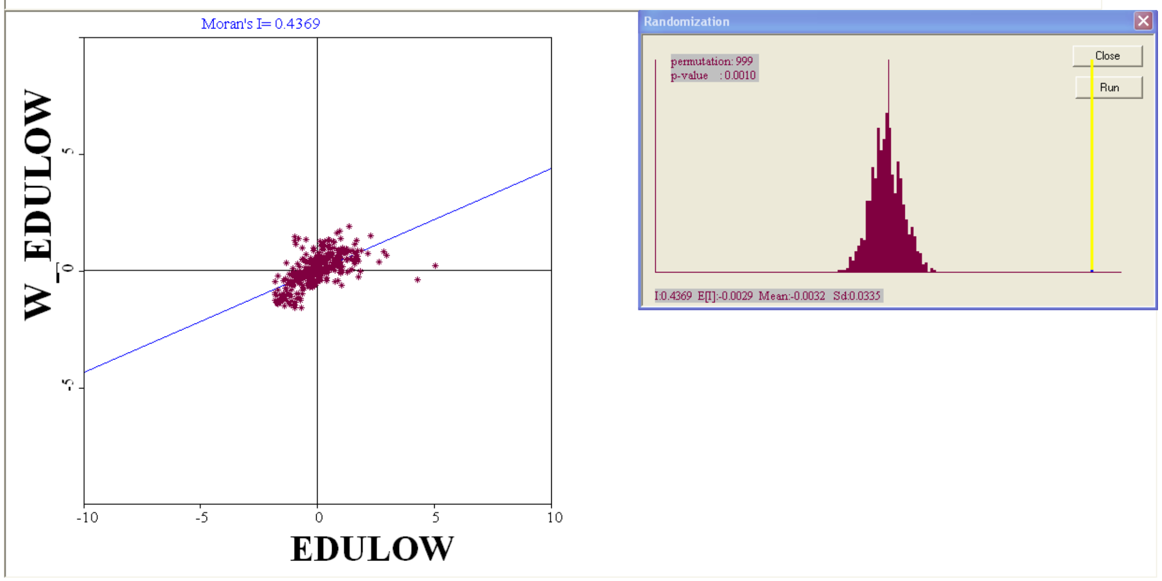
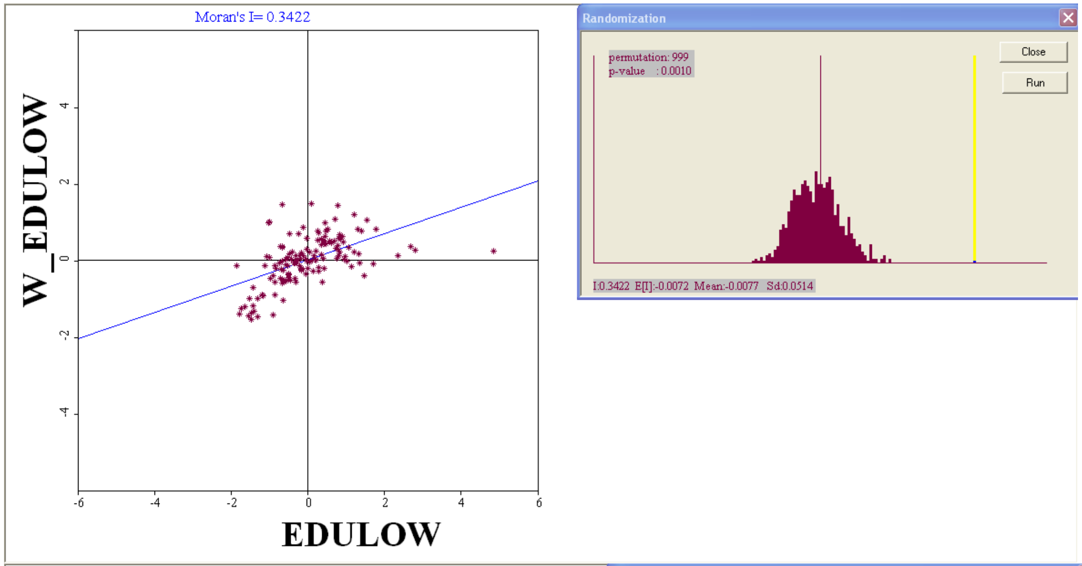


Neighborhood



Census Tract



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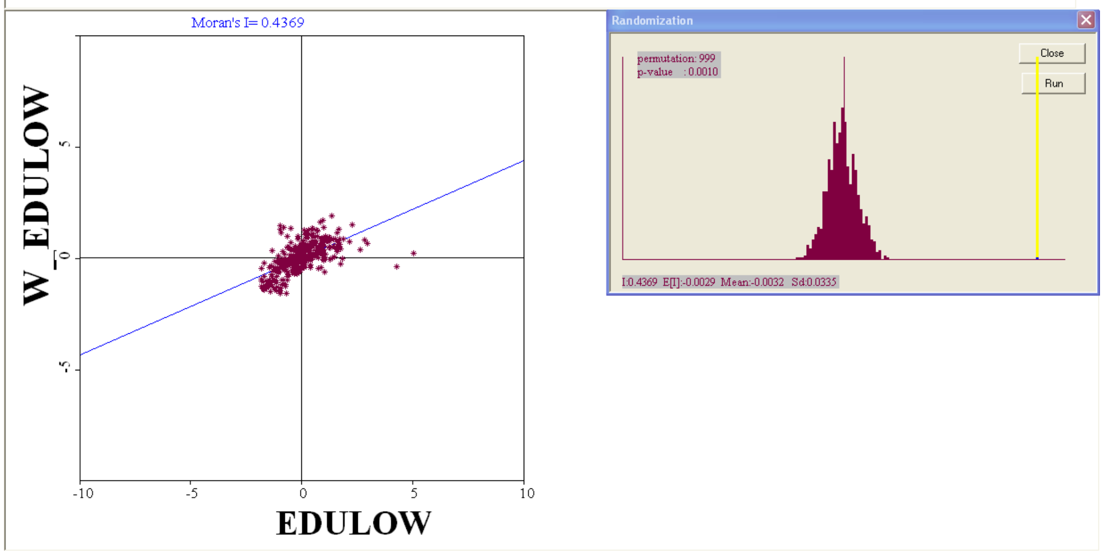
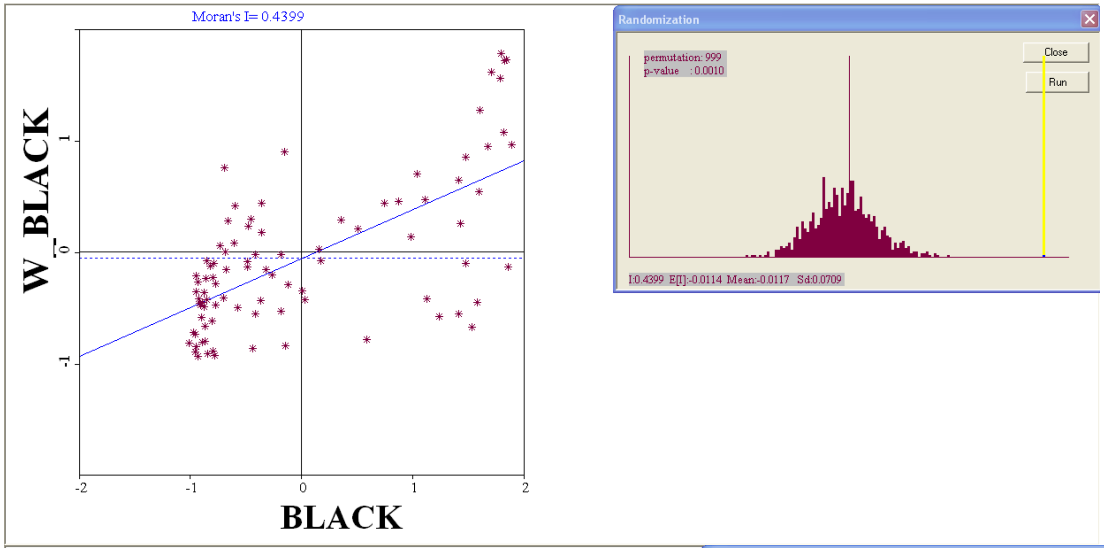
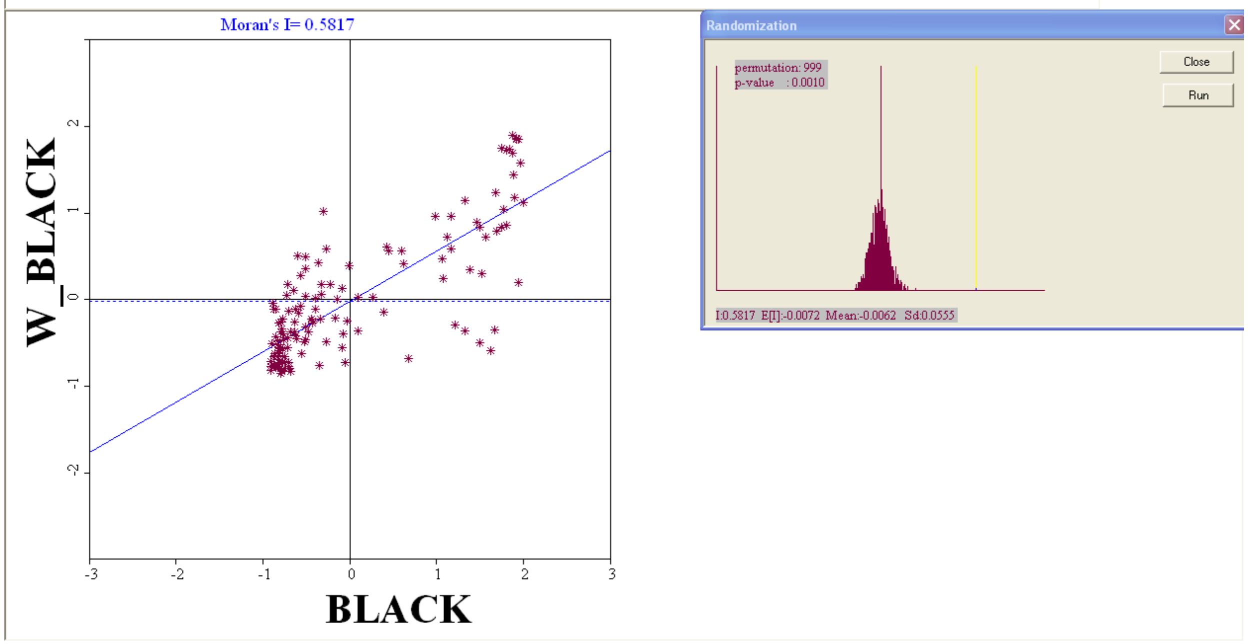


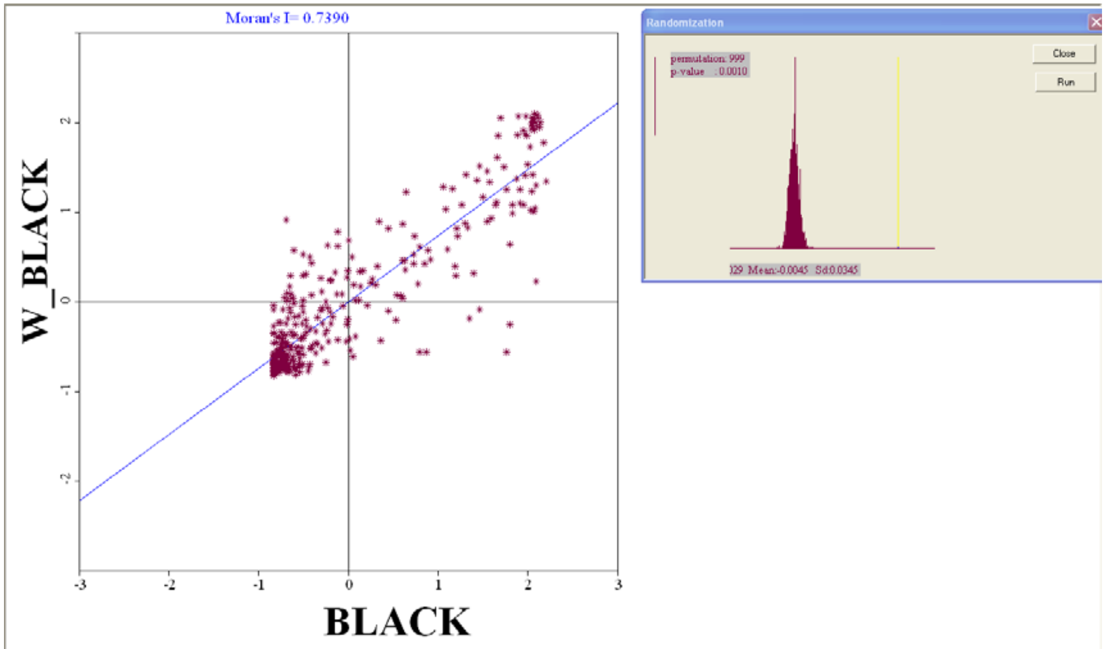
Neighborhood



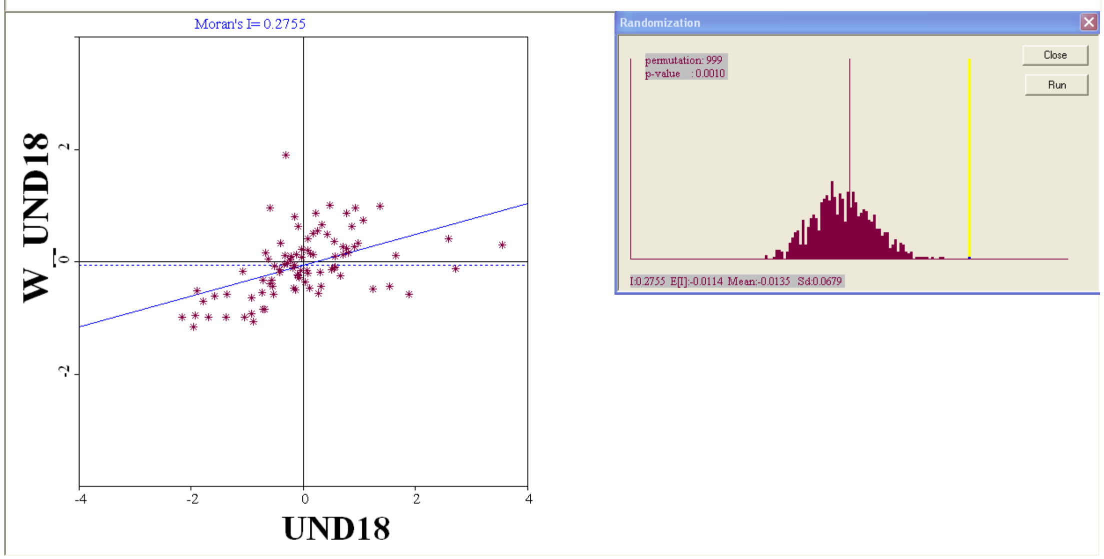
Census Tract



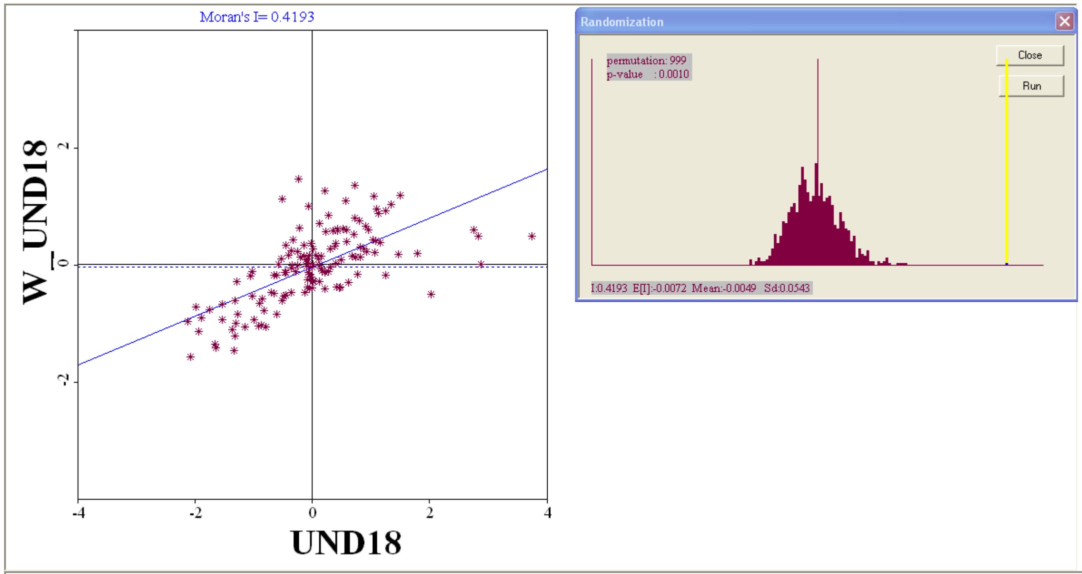
Block Group



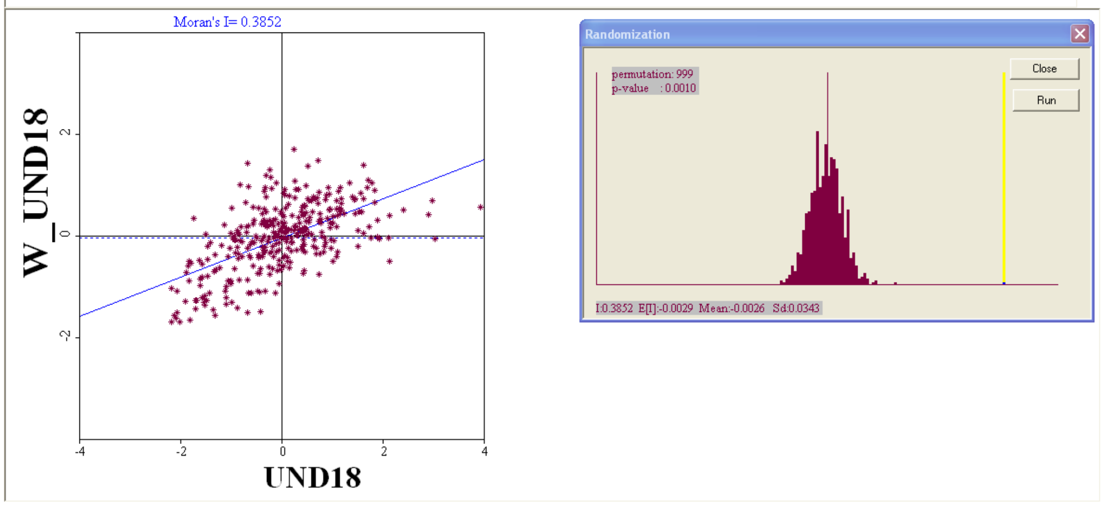
Neighborhood



Census Tract



Block Group



4.2. Variance Contribution

MLWIN Output

January 6, 2009

Three-Levels

$$\mathrm{unemp}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$

$$\mathrm{unemp}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\mathrm{cons}$$

$$\beta_{0blkgrp,\ tract,\ neigh} = 9.776(0.655) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[16.826(5.467)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[61.779(5.370)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2430.975(341 of 341 cases in use)

$$\mathrm{nocar}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$

$$\mathrm{nocar}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\mathrm{cons}$$

$$\beta_{0blkgrp,\ tract,\ neigh} = 31.451(1.878) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[266.564(47.227)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[3.844(12.529)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[100.305(12.066)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2738.950(341 of 341 cases in use)

$$\text{crowd}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{crowd}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 1.874(0.166) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v) \ : \ \Omega_v = \left[0.956(0.348)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_u) \ : \ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_e) \ : \ \Omega_e = \left[4.472(0.387)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 1526.654(341 of 341 cases in use)

$$\text{rent}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{rent}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 46.430(2.345) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v) \ : \ \Omega_v = \left[368.606(73.800)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_u) \ : \ \Omega_u = \left[36.380(32.017)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \mathrm{N}(0,\ \Omega_e) \ : \ \Omega_e = \left[225.978(27.673)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 3002.052(341 of 341 cases in use)

$$\text{profin}_{blkgrp,\ tract,\ neigh} \sim \text{N}(XB,\ \Omega)$$
$$\text{profin}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 14.270(1.156) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[102.617(17.804)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[36.573(3.252)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2392.008(341 of 341 cases in use)

$$\text{pov\_h}_{blkgrp,\ tract,\ neigh} \sim \text{N}(XB,\ \Omega)$$
$$\text{pov\_h}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 23.090(1.586) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[185.923(33.544)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1.025(10.226)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[84.668(10.136)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2662.052(341 of 341 cases in use)

$$\text{fhh}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{fhh}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 11.531(1.109) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\begin{bmatrix} v_{0neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 93.795(16.297) \end{bmatrix}$$

$$\begin{bmatrix} u_{0tract,\ neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 0.000(0.000) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract,\ neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 35.476(3.160) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2377.073(341 of 341 cases in use)

$$\text{pbasst}_{blkgrp,\ tract,\ neigh} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{pbasst}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 7.334(0.784) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\begin{bmatrix} v_{0neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 46.766(8.152) \end{bmatrix}$$

$$\begin{bmatrix} u_{0tract,\ neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 0.000(0.000) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract,\ neigh} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 17.877(1.591) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2142.566(341 of 341 cases in use)

$$\text{inclow}_{blkgrp,\ tract,\ neigh} \sim \text{N}(XB,\ \Omega)$$
$$\text{inclow}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 54.105(1.635) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[176.743(36.039)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[23.516(15.888)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[106.368(13.099)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2755.942(341 of 341 cases in use)

$$\text{edulow}_{blkgrp,\ tract,\ neigh} \sim \text{N}(XB,\ \Omega)$$
$$\text{edulow}_{blkgrp,\ tract,\ neigh} = \beta_{0blkgrp,\ tract,\ neigh}\text{cons}$$
$$\beta_{0blkgrp,\ tract,\ neigh} = 21.239(1.052) + v_{0neigh} + u_{0tract,\ neigh} + e_{0blkgrp,\ tract,\ neigh}$$

$$\left[v_{0neigh}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[79.701(14.596)\right]$$

$$\left[u_{0tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrp,\ tract,\ neigh}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[43.312(3.855)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2418.238(341 of 341 cases in use)

$\text{black}_{blkgrptractneigh} \sim \mathrm{N}(XB, \Omega)$

$\text{black}_{blkgrptractneigh} = \beta_{0blkgrptractneigh}\text{cons}$

$\beta_{0blkgrptractneigh} = 33.938(3.553) + v_{0neigh} + u_{0tractneigh} + e_{0blkgrptractneigh}$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[1069.972(168.416)\right]$$

$$\left[u_{0tractneigh}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrptractneigh}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[114.980(10.241)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2880.150(341 of 341 cases in use)

$\text{und18}_{blkgrptractneigh} \sim \mathrm{N}(XB, \Omega)$

$\text{und18}_{blkgrptractneigh} = \beta_{0blkgrptractneigh}\text{cons}$

$\beta_{0blkgrptractneigh} = 21.565(0.930) + v_{0neigh} + u_{0tractneigh} + e_{0blkgrptractneigh}$

$$\left[v_{0neigh}\right] \sim \mathrm{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[58.801(11.420)\right]$$

$$\left[u_{0tractneigh}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.000(0.000)\right]$$

$$\left[e_{0blkgrptractneigh}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[43.103(3.825)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2395.613(341 of 341 cases in use)

MLWIN Output

January 8, 2009

Two-Levels

Census Tracts

$$\text{unemp}_{blkgrp,\, tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{unemp}_{blkgrp,\, tract} = \beta_{0blkgrp,\, tract}\text{cons}$$
$$\beta_{0blkgrp,\, tract} = 8.929(0.509) + u_{0tract} + e_{0blkgrp,\, tract}$$

$$\left[u_{0tract}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[11.175(6.567)\right]$$

$$\left[e_{0blkgrp,\, tract}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[66.578(7.597)\right]$$

$-2*loglikelihood(IGLS\ Deviance) = 2448.761$(341 of 341 cases in use)

$$\text{nocar}_{blkgrp,\, tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{nocar}_{blkgrp,\, tract} = \beta_{0blkgrp,\, tract}\text{cons}$$
$$\beta_{0blkgrp,\, tract} = 28.030(1.148) + u_{0tract} + e_{0blkgrp,\, tract}$$

$$\left[u_{0tract}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[205.554(29.241)\right]$$

$$\left[e_{0blkgrp,\, tract}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[110.209(14.118)\right]$$

$-2*loglikelihood(IGLS\ Deviance) = 2854.187$(341 of 341 cases in use)

$$\text{crowd}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{crowd}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 1.772(0.131) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\left[u_{0tract}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[0.543(0.434)\right]$$

$$\left[e_{0blkgrp,\ tract}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[4.761(0.533)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 1534.862(341 of 341 cases in use)

$$\text{rent}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{rent}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 45.665(1.542) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\left[u_{0tract}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[347.729(53.665)\right]$$

$$\left[e_{0blkgrp,\ tract}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[230.229(29.143)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 3073.526(341 of 341 cases in use)

$$\text{profin}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{profin}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 17.256(0.842) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\left[u_{0tract}\right] \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[124.296(15.334)\right]$$

$$\left[e_{0blkgrp,\ tract}\right] \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[40.824(5.232)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 2596.835(341 of 341 cases in use)

$$\text{pov\_h}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{pov\_h}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 20.164(0.964) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 134.232(21.026) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 92.336(11.692) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2756.422(341 of 341 cases in use)

$$\text{fhh}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{fhh}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 9.431(0.621) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 47.645(9.014) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 49.714(6.222) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2489.411(341 of 341 cases in use)

$$\text{pbasst}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{pbasst}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 5.767(0.415) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 18.207(4.131) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 26.672(3.288) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2238.156(341 of 341 cases in use)

$$\text{inclow}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{inclow}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 50.710(1.110) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 187.815(27.546) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 108.884(13.826) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2838.020(341 of 341 cases in use)

$$\text{edulow}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{edulow}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 18.282(0.677) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 61.481(10.543) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 52.276(6.597) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2532.917(341 of 341 cases in use)

$$\text{black}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{black}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 26.207(2.200) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 944.002(102.631) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 153.548(19.702) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 3179.170(341 of 341 cases in use)

$$\text{und18}_{blkgrp,\ tract} \sim \mathrm{N}(XB,\ \Omega)$$
$$\text{und18}_{blkgrp,\ tract} = \beta_{0blkgrp,\ tract}\text{cons}$$
$$\beta_{0blkgrp,\ tract} = 20.408(0.598) + u_{0tract} + e_{0blkgrp,\ tract}$$

$$\begin{bmatrix} u_{0tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 39.926(8.513) \end{bmatrix}$$

$$\begin{bmatrix} e_{0blkgrp,\ tract} \end{bmatrix} \sim \mathrm{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 52.384(6.500) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 2480.311(341 of 341 cases in use)

z-tests

Computes exact two-tailed p-value for any z-value.

z	p
1.901	0.057

Three Level

Variable	Unemp				No Car				Crowd			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	16.83	5.47	3.08	0.00	266.56	47.23	5.64	0.00	0.96	0.35	2.75	0.01
Census Tract	0.00	0.00			3.84	12.53	0.31	0.76	0.00	0.00		
Block Groups	61.78	5.37	11.50	0.00	100.31	12.07	8.31	0.00	4.47	0.39	11.56	0.00
Total	78.61				370.71				5.43			

Variable	Rent				Professional				Pov_h			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	368.61	73.80	4.99	0.00	102.62	17.80	5.76	0.00	185.92	33.54	5.54	0.00
Census Tract	36.38	32.02	1.14	0.26	0.00	0.00			1.03	10.23	0.10	0.92
Block Groups	225.98	27.67	8.17	0.00	36.57	3.25	11.25	0.00	84.67	10.14	8.35	0.00
Variance Decomp	630.96				139.19				271.62			

Variable	FHH				Pbasst				<$30K			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	93.80	16.30	5.76	0.00	46.77	8.15	5.74	0.00	176.74	36.04	4.90	0.00
Census Tract	0.00	0.00			0.00	0.00			23.52	15.89	1.48	0.14
Block Groups	35.48	3.16	11.23	0.00	17.88	1.59	11.24	0.00	106.37	13.10	8.12	0.00
Total	129.27				64.64				306.63			

Variable	<HS				Black				Und18			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	79.70	14.60	5.46	0.00	1069.97	168.42	6.35	0.00	58.80	11.42	5.15	0.00
Census Tract	0.00	0.00			0.00	0.00			0.00	0.00		
Block Groups	43.31	3.86	11.24	0.00	114.98	10.24	11.23	0.00	43.10	3.83	11.27	0.00
Total	123.01				1184.95				101.90			

Two Level

Variable	Unemp				No Car				Crowd			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	16.83	5.47	3.08	0.00	267.96	46.86	5.72	0.00	0.96	0.35	2.75	0.01
Block Groups	61.78	5.37	11.50	0.00	102.92	9.15	11.24	0.00	4.47	0.39	11.56	0.00
Total	78.61				370.88				5.43			
Census Tracts	11.18	6.57	1.70	0.09	205.55	29.24	7.03	0.00	0.54	0.43	1.25	0.21
Block Groups	66.58	7.60	8.76	0.00	110.21	14.12	7.81	0.00	4.76	0.53	8.93	0.00
Total	77.75				315.76				5.30			

Two Level

Variable	Rent				Professional				Pov_h			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	383.06	72.49	5.28	0.00	102.62	17.80	5.76	0.00	186.24	33.26	5.60	0.00
Block Groups	250.29	22.25	11.25	0.00	36.57	3.25	11.25	0.00	85.37	7.60	11.24	0.00
Total	633.35				139.19				271.61			
Census Tracts	347.73	53.67	6.48	0.00	124.30	15.33	8.11	0.00	134.23	21.03	6.38	0.00
Block Groups	230.23	29.14	7.90	0.00	40.82	5.23	7.80	0.00	92.34	11.69	7.90	0.00
Total	577.96				165.12				226.57			

Two Level

Variable	FHH				Pbasst				<$30K			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	93.80	16.30	5.76	0.00	46.77	8.15	5.74	0.00	183.10	35.02	5.23	0.00
Block Groups	35.48	3.16	11.23	0.00	17.88	1.59	11.24	0.00	122.68	10.88	11.27	0.00
Total	129.27				64.64				305.79			
Census Tracts	47.65	9.01	5.29	0.00	18.21	4.13	4.41	0.00	187.82	27.55	6.82	0.00
Block Groups	49.71	6.22	7.99	0.00	26.67	3.29	8.11	0.00	108.88	13.83	7.88	0.00
Total	97.36				44.88				296.70			

Two Level

Variable	<HS				Black				Und18			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	79.70	14.60	5.46	0.00	1069.97	167.89	6.37	0.00	58.80	11.42	5.15	0.00
Block Groups	43.31	3.86	11.24	0.00	114.98	10.27	11.20	0.00	43.10	3.83	11.27	0.00
Total	123.01				1184.95				101.90			
Census Tracts	61.48	10.54	5.83	0.00	944.00	102.63	9.20	0.00	39.93	8.51	4.69	0.00
Block Groups	52.28	6.60	7.92	0.00	153.55	19.70	7.79	0.00	52.38	6.50	8.06	0.00
Total	113.76				1097.55				92.31			

Computes exact two-tailed p-value for any z-value.

z	p
1.901	=2*(1-NORMDIST(ABS(A4),0,1,1))

Three Level

Variable	Unemp				No Car				Crowd			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	16.826	5.467	=B9/C9	=2*(1-NORMDIST(ABS(D9),0,1,1))	266.564	47.227	=F9/G9	=2*(1-NORMDIST(ABS(H9),0,1,1))	0.956	0.348	=J9/K9	=2*(1-NORMDIST(ABS(L9),0,1,1))
Census Tract	0	0			3.844	12.529	=F10/G10	=2*(1-NORMDIST(ABS(H10),0,1,1))	0	0		
Block Groups	61.779	5.37	=B11/C11	=2*(1-NORMDIST(ABS(D11),0,1,1))	100.305	12.066	=F11/G11	=2*(1-NORMDIST(ABS(H11),0,1,1))	4.472	0.387	=J11/K11	=2*(1-NORMDIST(ABS(L11),0,1,1))
Total	=SUM(B9:B11)				=SUM(F9:F11)				=SUM(J9:J11)			

Variable	Rent				Professional				Pov_h			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	368.606	73.8	=B16/C16	=2*(1-NORMDIST(ABS(D16),0,1,1))	102.617	17.804	=F16/G16	=2*(1-NORMDIST(ABS(H16),0,1,1))	185.923	33.544	=J16/K16	=2*(1-NORMDIST(ABS(L16),0,1,1))
Census Tract	36.38	32.017	=B17/C17	=2*(1-NORMDIST(ABS(D17),0,1,1))	0	0			1.025	10.226	=J17/K17	=2*(1-NORMDIST(ABS(L17),0,1,1))
Block Groups	225.978	27.673	=B18/C18	=2*(1-NORMDIST(ABS(D18),0,1,1))	36.573	3.252	=F18/G18	=2*(1-NORMDIST(ABS(H18),0,1,1))	84.668	10.136	=J18/K18	=2*(1-NORMDIST(ABS(L18),0,1,1))
Variance Decomposition	=SUM(B16:B18)				=SUM(F16:F18)				=SUM(J16:J18)			

Variable	FHH				Pbasst				<$30K			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	93.795	16.297	=B23/C23	=2*(1-NORMDIST(ABS(D23),0,1,1))	46.766	8.152	=F23/G23	=2*(1-NORMDIST(ABS(H23),0,1,1))	176.743	36.039	=J23/K23	=2*(1-NORMDIST(ABS(L23),0,1,1))
Census Tract	0	0			0	0			23.516	15.888	=J24/K24	=2*(1-NORMDIST(ABS(L24),0,1,1))
Block Groups	35.476	3.16	=B25/C25	=2*(1-NORMDIST(ABS(D25),0,1,1))	17.877	1.591	=F25/G25	=2*(1-NORMDIST(ABS(H25),0,1,1))	106.368	13.099	=J25/K25	=2*(1-NORMDIST(ABS(L25),0,1,1))
Total	=SUM(B23:B25)				=SUM(F23:F25)				=SUM(J23:J25)			

Variable	<HS				Black				Und18			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhood	79.701	14.596	=B30/C30	=2*(1-NORMDIST(ABS(D30),0,1,1))	1069.972	168.416	=F30/G30	=2*(1-NORMDIST(ABS(H30),0,1,1))	58.801	11.42	=J30/K30	=2*(1-NORMDIST(ABS(L30),0,1,1))
Census Tract	0	0			0	0			0	0		
Block Groups	43.312	3.855	=B32/C32	=2*(1-NORMDIST(ABS(D32),0,1,1))	114.98	10.241	=F32/G32	=2*(1-NORMDIST(ABS(H32),0,1,1))	43.103	3.825	=J32/K32	=2*(1-NORMDIST(ABS(L32),0,1,1))
Total	=SUM(B30:B32)				=SUM(F30:F32)				=SUM(J30:J32)			

Two Level

Variable	Unemp				No Car				Crowd			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	16.826	5.467	=B38/C38	=2*(1-NORMDIST(ABS(D38),0,1,1))	267.956	46.857	=F38/G38	=2*(1-NORMDIST(ABS(H38),0,1,1))	0.956	0.348	=J38/K38	=2*(1-NORMDIST(ABS(L38),0,1,1))
Block Groups	61.779	5.37	=B39/C39	=2*(1-NORMDIST(ABS(D39),0,1,1))	102.919	9.154	=F39/G39	=2*(1-NORMDIST(ABS(H39),0,1,1))	4.472	0.387	=J39/K39	=2*(1-NORMDIST(ABS(L39),0,1,1))
Total	=SUM(B38:B39)				=SUM(F38:F39)				=SUM(J38:J39)			
Census Tracts	11.175	6.567	=B42/C42	=2*(1-NORMDIST(ABS(D42),0,1,1))	205.554	29.241	=F42/G42	=2*(1-NORMDIST(ABS(H42),0,1,1))	0.543	0.434	=J42/K42	=2*(1-NORMDIST(ABS(L42),0,1,1))
Block Groups	66.578	7.597	=B43/C43	=2*(1-NORMDIST(ABS(D43),0,1,1))	110.209	14.118	=F43/G43	=2*(1-NORMDIST(ABS(H43),0,1,1))	4.761	0.533	=J43/K43	=2*(1-NORMDIST(ABS(L43),0,1,1))
Total	=SUM(B42:B43)				=SUM(F42:F43)				=SUM(J42:J43)			

Two Level

Variable	Rent				Professional				Pov_h			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	383.058	72.488	=B49/C49	=2*(1-NORMDIST(ABS(D49),0,1,1))	102.617	17.804	=F49/G49	=2*(1-NORMDIST(ABS(H49),0,1,1))	186.244	33.26	=J49/K49	=2*(1-NORMDIST(ABS(L49),0,1,1))
Block Groups	250.291	22.252	=B50/C50	=2*(1-NORMDIST(ABS(D50),0,1,1))	36.573	3.252	=F50/G50	=2*(1-NORMDIST(ABS(H50),0,1,1))	85.368	7.598	=J50/K50	=2*(1-NORMDIST(ABS(L50),0,1,1))
Total	=SUM(B49:B50)				=SUM(F49:F50)				=SUM(J49:J50)			
Census Tracts	347.729	53.665	=B53/C53	=2*(1-NORMDIST(ABS(D53),0,1,1))	124.296	15.334	=F53/G53	=2*(1-NORMDIST(ABS(H53),0,1,1))	134.232	21.026	=J53/K53	=2*(1-NORMDIST(ABS(L53),0,1,1))
Block Groups	230.229	29.143	=B54/C54	=2*(1-NORMDIST(ABS(D54),0,1,1))	40.824	5.232	=F54/G54	=2*(1-NORMDIST(ABS(H54),0,1,1))	92.336	11.692	=J54/K54	=2*(1-NORMDIST(ABS(L54),0,1,1))
Total	=SUM(B53:B54)				=SUM(F53:F54)				=SUM(J53:J54)			

Two Level

Variable	FHH				Pbasst				<$30K			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	93.795	16.297	=B60/C60	=2*(1-NORMDIST(ABS(D60),0,1,1))	46.766	8.152	=F60/G60	=2*(1-NORMDIST(ABS(H60),0,1,1))	183.104	35.02	=J60/K60	=2*(1-NORMDIST(ABS(L60),0,1,1))
Block Groups	35.476	3.16	=B61/C61	=2*(1-NORMDIST(ABS(D61),0,1,1))	17.877	1.591	=F61/G61	=2*(1-NORMDIST(ABS(H61),0,1,1))	122.681	10.884	=J61/K61	=2*(1-NORMDIST(ABS(L61),0,1,1))
Total	=SUM(B60:B61)				=SUM(F60:F61)				=SUM(J60:J61)			
Census Tracts	47.645	9.014	=B64/C64	=2*(1-NORMDIST(ABS(D64),0,1,1))	18.207	4.131	=F64/G64	=2*(1-NORMDIST(ABS(H64),0,1,1))	187.815	27.546	=J64/K64	=2*(1-NORMDIST(ABS(L64),0,1,1))
Block Groups	49.714	6.222	=B65/C65	=2*(1-NORMDIST(ABS(D65),0,1,1))	26.672	3.288	=F65/G65	=2*(1-NORMDIST(ABS(H65),0,1,1))	108.884	13.826	=J65/K65	=2*(1-NORMDIST(ABS(L65),0,1,1))
Total	=SUM(B64:B65)				=SUM(F64:F65)				=SUM(J64:J65)			

Two Level

Variable	<HS				Black				Und18			
	Variance	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*	*Variance*	*SE*	*Z*	*p*
Neighborhoods	79.701	14.596	=B71/C71	=2*(1-NORMDIST(ABS(D71),0,1,1))	1069.969	167.893	=F71/G71	=2*(1-NORMDIST(ABS(H71),0,1,1))	58.801	11.42	=J71/K71	=2*(1-NORMDIST(ABS(L71),0,1,1))
Block Groups	43.312	3.855	=B72/C72	=2*(1-NORMDIST(ABS(D72),0,1,1))	114.98	10.268	=F72/G72	=2*(1-NORMDIST(ABS(H72),0,1,1))	43.103	3.825	=J72/K72	=2*(1-NORMDIST(ABS(L72),0,1,1))
Total	=SUM(B71:B72)				=SUM(F71:F72)				=SUM(J71:J72)			
Census Tracts	61.481	10.543	=B75/C75	=2*(1-NORMDIST(ABS(D75),0,1,1))	944.002	102.631	=F75/G75	=2*(1-NORMDIST(ABS(H75),0,1,1))	39.926	8.513	=J75/K75	=2*(1-NORMDIST(ABS(L75),0,1,1))
Block Groups	52.276	6.597	=B76/C76	=2*(1-NORMDIST(ABS(D76),0,1,1))	153.548	19.702	=F76/G76	=2*(1-NORMDIST(ABS(H76),0,1,1))	52.384	6.5	=J76/K76	=2*(1-NORMDIST(ABS(L76),0,1,1))
Total	=SUM(B75:B76)				=SUM(F75:F76)				=SUM(J75:J76)			

Three Levels												
	Variables											
	Unemp	No Car	Crowd	Rent	Profession	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance
Neighborhood	16.826	266.564	0.956	368.606	102.62	185.92	93.795	46.77	176.743	79.701	1069.972	58.801
Census Tract	0	3.844	0	36.38	0	1.025	0	0	23.516	0	0	0
Block Groups	61.779	100.305	4.472	225.978	36.573	84.668	35.476	17.88	106.368	43.312	114.98	43.103
Total	78.61	370.71	5.43	630.96	139.19	271.62	129.27	64.64	306.63	123.01	1184.95	101.90
Two Levels												
	Unemp	No Car	Crowd	Rent	Profession	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance
Neighborhoods	16.83	267.96	0.96	383.06	102.62	186.24	93.80	46.77	183.10	79.70	1069.97	58.80
Block Groups	61.78	102.92	4.47	250.29	36.57	85.37	35.48	17.88	122.68	43.31	114.98	43.10
Total	78.61	370.88	5.43	633.35	139.19	271.61	129.27	64.64	305.79	123.01	1184.95	101.90
Census Tracts	11.18	205.55	0.54	347.73	124.30	134.23	47.65	18.21	187.82	61.48	944.00	39.93
Block Groups	66.58	110.21	4.76	230.23	40.82	92.34	49.71	26.67	108.88	52.28	153.55	52.38
Total	77.75	315.76	5.30	577.96	165.12	226.57	97.36	44.88	296.70	113.76	1097.55	92.31
Intraclass Correl	Unemp	No Car	Crowd	Rent	Profession	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
Neighborhood	0.21	0.72	0.18	0.58	0.74	0.68	0.73	0.72	0.58	0.65	0.90	0.58
Census Tract	0.00	0.01	0.00	0.06	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
Block Groups	0.79	0.27	0.82	0.36	0.26	0.31	0.27	0.28	0.35	0.35	0.10	0.42
	Unemp	No Car	Crowd	Rent	Profession	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
Neighborhoods	0.21	0.72	0.18	0.60	0.74	0.69	0.73	0.72	0.60	0.65	0.90	0.58
Block Groups	0.79	0.28	0.82	0.40	0.26	0.31	0.27	0.28	0.40	0.35	0.10	0.42
Census Tracts	0.14	0.65	0.10	0.60	0.75	0.59	0.49	0.41	0.63	0.54	0.86	0.43
Block Groups	0.86	0.35	0.90	0.40	0.25	0.41	0.51	0.59	0.37	0.46	0.14	0.57

Three Levels												
						Variables						
	Unemp	No Car	Crowd	Rent	Professional	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance
Neighborhood	16.826	266.564	0.956	368.606	102.617	185.923	93.795	46.766	176.743	79.701	1069.972	58.801
Census Tract	0	3.844	0	36.38	0	1.025	0	0	23.516	0	0	0
Block Groups	61.779	100.305	4.472	225.978	36.573	84.668	35.476	17.877	106.368	43.312	114.98	43.103
Total	78.605	370.713	5.428	630.964	139.19	271.616	129.271	64.643	306.627	123.013	1184.952	101.904
Two Levels												
	Unemp	No Car	Crowd	Rent	Professional	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance	Variance
Neighborhoods	16.826	267.956	0.956	383.058	102.617	186.244	93.795	46.766	183.104	79.701	1069.969	58.801
Block Groups	61.779	102.919	4.472	250.291	36.573	85.368	35.476	17.877	122.681	43.312	114.98	43.103
Total	78.605	370.875	5.428	633.349	139.19	271.612	129.271	64.643	305.785	123.013	1184.949	101.904
Census Tracts	11.175	205.554	0.543	347.729	124.296	134.232	47.645	18.207	187.815	61.481	944.002	39.926
Block Groups	66.578	110.209	4.761	230.229	40.824	92.336	49.714	26.672	108.884	52.276	153.548	52.384
Total	77.753	315.763	5.304	577.958	165.12	226.568	97.359	44.879	296.699	113.757	1097.55	92.31
Intraclass Correlation	Unemp	No Car	Crowd	Rent	Professional	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
Neighborhood	=B5/B$8	=C5/C$8	=D5/D$8	=E5/E$8	=F5/F$8	=G5/G$8	=H5/H$8	=I5/I$8	=J5/J$8	=K5/K$8	=L5/L$8	=M5/M$8
Census Tract	=B6/B$8	=C6/C$8	=D6/D$8	=E6/E$8	=F6/F$8	=G6/G$8	=H6/H$8	=I6/I$8	=J6/J$8	=K6/K$8	=L6/L$8	=M6/M$8
Block Groups	=B7/B$8	=C7/C$8	=D7/D$8	=E7/E$8	=F7/F$8	=G7/G$8	=H7/H$8	=I7/I$8	=J7/J$8	=K7/K$8	=L7/L$8	=M7/M$8
	Unemp	No Car	Crowd	Rent	Professional	Pov_h	FHH	Pbasst	<$30K	<HS	Black	Und18
Neighborhoods	=B13/B$15	=C13/C$15	=D13/D$15	=E13/E$15	=F13/F$15	=G13/G$15	=H13/H$15	=I13/I$15	=J13/J$15	=K13/K$15	=L13/L$15	=M13/M$15
Block Groups	=B14/B$15	=C14/C$15	=D14/D$15	=E14/E$15	=F14/F$15	=G14/G$15	=H14/H$15	=I14/I$15	=J14/J$15	=K14/K$15	=L14/L$15	=M14/M$15
Census Tracts	=B17/B$19	=C17/C$19	=D17/D$19	=E17/E$19	=F17/F$19	=G17/G$19	=H17/H$19	=I17/I$19	=J17/J$19	=K17/K$19	=L17/L$19	=M17/M$19
Block Groups	=B18/B$19	=C18/C$19	=D18/D$19	=E18/E$19	=F18/F$19	=G18/G$19	=H18/H$19	=I18/I$19	=J18/J$19	=K18/K$19	=L18/L$19	=M18/M$19

4.3. Correlations of SEP Measures with Each Other

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INTRACLASS CORRELATION
12   Variables are selected from file   c:\msthesis\data files 12_10_08\birth data\pittbirthbglbwses.ess

 Number of cases in data file are ...........    341
 Number of cases used in this analysis are ..    341

 Cluster Size ......   1   2   3   4   5   6   7   8   9  10  11  12  13  15
 Number of Clusters   25  14  13  10   7   5   5   1   2   2   1   2   1   1

Pooled Within-Sample Covariance Matrix

                unemp     nocar     crowd      rent     profm     pov_h       fhh    pbasst    inclow    edulow
      unemp   60.6276
```

nocar	6.0706	101.9205								
crowd	0.4087	2.8505	3.9823							
rent	-3.9423	92.8050	8.5382	245.9189						
profm	-11.4291	-17.3305	-1.0010	-4.3827	36.4914					
pov_h	9.7731	39.4027	3.7306	67.4125	-6.2867	83.8396				
fhh	6.9526	16.8070	2.8161	19.2396	-7.8313	22.3779	34.4003			
pbasst	6.2060	16.8355	1.9128	19.8876	-3.4569	18.2846	13.6353	17.2623		
inclow	3.5856	75.3380	4.4737	108.7458	-19.0857	63.5275	16.6179	18.4478	122.2589	
edulow	5.3745	19.5074	1.0165	19.3457	-8.3995	4.3868	6.1371	6.3443	19.9053	42.4799
black	13.3649	33.0331	3.8122	39.8809	-10.4545	25.2598	29.3297	18.8663	32.6457	15.3994
und18	1.5766	3.4454	2.9540	-9.2117	-2.6641	12.7112	24.7987	11.3060	0.8226	1.8426

	black	und18
black	115.4243	
und18	26.1915	41.9394

Pooled Within-Sample Correlation Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow
unemp	1.0000									
nocar	0.0772	1.0000								
crowd	0.0263	0.1415	1.0000							
rent	-0.0323	0.5862	0.2728	1.0000						
profm	-0.2430	-0.2842	-0.0830	-0.0463	1.0000					
pov_h	0.1371	0.4263	0.2042	0.4695	-0.1137	1.0000				
fhh	0.1522	0.2838	0.2406	0.2092	-0.2210	0.4167	1.0000			
pbasst	0.1918	0.4014	0.2307	0.3052	-0.1377	0.4806	0.5595	1.0000		
inclow	0.0416	0.6749	0.2027	0.6272	-0.2857	0.6275	0.2562	0.4016	1.0000	
edulow	0.1059	0.2965	0.0782	0.1893	-0.2133	0.0735	0.1605	0.2343	0.2762	1.0000
black	0.1598	0.3046	0.1778	0.2367	-0.1611	0.2568	0.4655	0.4227	0.2748	0.2199
und18	0.0313	0.0527	0.2286	-0.0907	-0.0681	0.2144	0.6529	0.4202	0.0115	0.0437

	black	und18
black	1.0000	
und18	0.3764	1.0000

Regular Between-Sample Covariance Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow
unemp	127.8900									
nocar	256.1996	906.9729								
crowd	12.1528	39.7158	9.1886							
rent	196.5512	775.6595	48.9141	1485.9488						
profm	-66.2809	-258.3766	-3.6269	206.8004	476.4260					
pov_h	194.2013	591.1245	36.0086	639.4097	-116.3714	593.0498				
fhh	119.9721	326.0185	17.6245	153.3435	-198.8933	228.1714	256.5740			
pbasst	66.0583	194.7069	10.9622	166.0483	-80.9064	181.4713	121.9547	117.9595		
inclow	207.4955	750.2429	34.6214	635.2703	-296.8523	563.1290	275.8222	191.0393	766.9818	
edulow	93.7356	346.5340	10.3153	183.4961	-229.4641	261.1460	154.9370	142.4253	370.0513	305.3656
black	504.4013	1328.0398	63.0143	874.3141	-547.9410	919.5464	788.5468	436.2511	1079.1007	502.4794
und18	58.5268	155.4730	7.7907	-101.1243	-205.2054	74.5881	200.2876	75.9800	125.9867	99.9700

	black	und18
black	3871.2136	
und18	569.9413	227.3162

Regular Between-Sample Correlation Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow
unemp	1.0000									
nocar	0.7523	1.0000								
crowd	0.3545	0.4351	1.0000							
rent	0.4509	0.6681	0.4186	1.0000						
profm	-0.2685	-0.3931	-0.0548	0.2458	1.0000					
pov_h	0.7052	0.8060	0.4878	0.6811	-0.2189	1.0000				
fhh	0.6623	0.6758	0.3630	0.2483	-0.5689	0.5849	1.0000			
pbasst	0.5378	0.5953	0.3330	0.3966	-0.3413	0.6861	0.7010	1.0000		
inclow	0.6625	0.8995	0.4124	0.5951	-0.4911	0.8350	0.6218	0.6351	1.0000	
edulow	0.4743	0.6585	0.1947	0.2724	-0.6016	0.6137	0.5535	0.7504	0.7646	1.0000
black	0.7169	0.7087	0.3341	0.3645	-0.4035	0.6069	0.7912	0.6456	0.6262	0.4622
und18	0.3433	0.3424	0.1705	-0.1740	-0.6236	0.2031	0.8293	0.4640	0.3017	0.3794

	black	und18
black	1.0000	
und18	0.6076	1.0000

Estimated Between-Sample Covariance Matrix

	unemp	nocar	crowd	rent	profm	pov_h	fhh	pbasst	inclow	edulow

unemp	17.6908									
nocar	65.7867	211.7378								
crowd	3.0888	9.6960	1.3693							
rent	52.7321	179.5984	10.6193	326.1418						
profm	-14.4266	-63.3978	-0.6907	55.5435	115.7077					
pov_h	48.5067	145.1090	8.4895	150.4417	-28.9535	133.9280				
fhh	29.7254	81.3261	3.8948	35.2708	-50.2514	54.1260	58.4342			
pbasst	15.7418	46.7822	2.3801	38.4419	-20.3701	42.9199	28.4892	26.4845		
inclow	53.6306	177.5075	7.9292	138.4819	-73.0557	131.4008	68.1736	45.3935	169.5693	
edulow	23.2400	86.0116	2.4457	43.1734	-58.1425	67.5306	39.1360	35.7908	92.0923	69.1419
black	129.1481	340.6013	15.5708	219.4653	-141.3650	235.2074	199.6826	109.7769	275.2294	128.1075
und18	14.9785	39.9850	1.2721	-24.1741	-53.2706	16.2743	46.1555	17.0100	32.9196	25.8086

	black	und18
black	987.8146	
und18	143.0123	48.7562

4.4 Composite Index of SEP

```
-----------------------------------------------------------------------------------------------
----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Factor Analysis.log
  log type:  text
 opened on:  22 Jul 2009, 10:23:56

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. *Syntax for Conducting Factor Analysis on Total Correlation
. *Within Correlation
. *And Between Correlation Matrix
.
.
. *Total Correlation Matrix
.
. *use total correlation matrix of SEP
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\totalcorrelation.DAT"
(12 vars, 14 obs)

.
. *TOTAL CORRELATION MATRIX (ignore clustering)
. *delete mean and std from correlation matrix
. drop in 13
(1 observation deleted)

. drop in 13
(1 observation deleted)

.
. *upload correlation matrix
. *check to make sure that everything looks okay
. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(withincor)

. matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list withincor

symmetric withincor[12,12]
             unemp       nocar       crowd        rent       profm       pov_h         fhh      pbasst      inclow      edulow
black        und18
 unemp           1
 nocar   .45568001           1
 crowd     .169406   .30500099           1
  rent     .228443   .64276701     .345599           1
 profm  -.23661999  -.36915201    -.059351     .172427           1
 pov_h   .44385701   .70468003     .356747   .61643797  -.19322801           1
   fhh     .427995     .573753     .300538     .236393    -.487544   .53746003           1
pbasst     .373483     .542418   .28011301   .36837301    -.291345   .62631798   .66049802           1
inclow   .37582001   .83491302   .31293899   .60520202  -.43650401   .77246898     .513807   .56414801           1
edulow     .304481   .56269097     .141159     .247099  -.50928903   .45932901     .443344   .60109597   .61873299           1
 black   .48263499   .63410598   .25150701   .32596901    -.369995   .53036797   .71456897   .58477902   .54148602   .40821701
1
 und18     .195087   .25643501     .192066  -.14624301  -.47418699   .20628899   .77258998   .44936499   .20627099   .27353999
.53400803           1

.
. *conduct factor analysis
. factormat withincor, n(341) ml
(obs=341)
number of factors adjusted to 7
Iteration 0:   log likelihood = -98.317281
Iteration 1:   log likelihood = -26.338898
Iteration 2:   log likelihood = -13.842636
Iteration 3:   log likelihood = -13.069393
Iteration 4:   log likelihood = -3.9193106
Iteration 5:   log likelihood = -2.5296083
```

```
Iteration 6:   log likelihood = -2.5001492
Iteration 7:   log likelihood =  -2.401671
Iteration 8:   log likelihood = -2.3696017
Iteration 9:   log likelihood = -2.3364738
Iteration 10:  log likelihood = -2.2867793
Iteration 11:  log likelihood = -2.2133984
Iteration 12:  log likelihood = -2.1311116
Iteration 13:  log likelihood = -2.0729605
Iteration 14:  log likelihood = -2.0437538
Iteration 15:  log likelihood = -2.0313942
Iteration 16:  log likelihood = -2.0266881
Iteration 17:  log likelihood = -2.0250092
Iteration 18:  log likelihood = -2.0244332
Iteration 19:  log likelihood =   -2.02424
Iteration 20:  log likelihood =  -2.024176
Iteration 21:  log likelihood =  -2.024155
Iteration 22:  log likelihood = -2.0241481
Iteration 23:  log likelihood = -2.0241458
Iteration 24:  log likelihood = -2.0241451
Iteration 25:  log likelihood = -2.0241449

number of factors adjusted to 6
Iteration 0:   log likelihood = -98.369199
Iteration 1:   log likelihood = -11.660295
Iteration 2:   log likelihood = -10.063247
Iteration 3:   log likelihood = -9.9338417
Iteration 4:   log likelihood = -9.6519641
Iteration 5:   log likelihood =  -9.625306
Iteration 6:   log likelihood = -9.6061189
Iteration 7:   log likelihood = -9.6058713
Iteration 8:   log likelihood = -9.6058617
Iteration 9:   log likelihood = -9.6058612
Iteration 10:  log likelihood = -9.6058612

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        6
    Rotation: (unrotated)                          Number of params =       57
                                                   Schwarz's BIC    =  351.629
    Log likelihood = -9.605861                     (Akaike's) AIC   =  133.212

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.91693      2.47140            0.4289       0.4289
        Factor2  |      1.44553     -0.21040            0.1583       0.5872
        Factor3  |      1.65593      0.61789            0.1813       0.7686
        Factor4  |      1.03804      0.33032            0.1137       0.8822
        Factor5  |      0.70772      0.34007            0.0775       0.9597
        Factor6  |      0.36765            .            0.0403       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   6 factors vs. saturated:  chi2(9)  =   18.71 Prob>chi2 = 0.0277
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6 |   Uniqueness
    -------------+------------------------------------------------------------+-------------
           unemp |   0.3843    0.2536    0.1526    0.1161   -0.0382    0.5053 |      0.4944
           nocar |   0.5613    0.4453    0.0977    0.5595   -0.0796    0.0895 |      0.1497
           crowd |   0.2895    0.2208    0.0372    0.1422    0.1987   -0.0918 |      0.7979
            rent |   0.3885    0.4791   -0.4257    0.5048    0.2999   -0.0474 |      0.0914
           profm |  -0.2917   -0.0017   -0.5825   -0.2156    0.4962    0.0189 |      0.2826
           pov_h |   0.6580    0.7530    0.0000   -0.0000   -0.0000   -0.0000 |      0.0000
             fhh |   0.6665    0.1313    0.5707    0.1849    0.2006    0.0592 |      0.1349
          pbasst |   0.9991   -0.0413   -0.0000   -0.0000   -0.0000   -0.0000 |      0.0000
          inclow |   0.5859    0.5139    0.0594    0.4574   -0.2594   -0.0969 |      0.1032
          edulow |   0.6050    0.0813    0.1139    0.2589   -0.3902   -0.0465 |      0.3929
           black |   0.5930    0.1862    0.3644    0.2821    0.1219    0.2570 |      0.3204
           und18 |   0.4450   -0.1149    0.7913    0.0075    0.2228   -0.1102 |      0.1008
    ---------------------------------------------------------------------------------
```

```
. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph saved)

.
. *conduct factor analysis on 1-3 factors
. *One factor
. factormat withincor, n(341) factors(1) ml
(obs=341)
Iteration 0:   log likelihood = -976.93131
Iteration 1:   log likelihood = -565.81845
Iteration 2:   log likelihood = -561.63564
Iteration 3:   log likelihood = -560.41952
Iteration 4:   log likelihood =  -560.0653
Iteration 5:   log likelihood = -559.96903
Iteration 6:   log likelihood = -559.94387
Iteration 7:   log likelihood = -559.93745
Iteration 8:   log likelihood = -559.93583
Iteration 9:   log likelihood = -559.93542
Iteration 10:  log likelihood = -559.93532
Iteration 11:  log likelihood =  -559.9353
Iteration 12:  log likelihood = -559.93529

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        1
    Rotation: (unrotated)                          Number of params =       12
                                                   Schwarz's BIC    =  1189.85
    Log likelihood = -559.9353                     (Akaike's) AIC   =  1143.87

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.26183            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) = 1101.81 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+--------------
           unemp |   0.5073 |      0.7426
           nocar |   0.8863 |      0.2145
           crowd |   0.3704 |      0.8628
            rent |   0.6009 |      0.6388
           profm |  -0.4356 |      0.8102
           pov_h |   0.8173 |      0.3320
             fhh |   0.7044 |      0.5038
          pbasst |   0.7122 |      0.4928
          inclow |   0.8830 |      0.2203
          edulow |   0.6487 |      0.5792
           black |   0.7133 |      0.4912
           und18 |   0.3875 |      0.8499
    ---------------------------------------

.
. *Two factor, with rotation
. factormat withincor, n(341) factors(2) ml
(obs=341)
Iteration 0:   log likelihood = -292.14342
Iteration 1:   log likelihood = -242.16713
Iteration 2:   log likelihood = -238.29029
Iteration 3:   log likelihood =  -238.1988
Iteration 4:   log likelihood = -238.19719
Iteration 5:   log likelihood = -238.19712
Iteration 6:   log likelihood = -238.19712

Factor analysis/correlation                        Number of obs    =      341
```

```
    Method: maximum likelihood                        Retained factors =        2
    Rotation: (unrotated)                             Number of params =       23
                                                      Schwarz's BIC    =  610.528
    Log likelihood = -238.1971                        (Akaike's) AIC   =  522.394

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.38017      3.83919            0.7774       0.7774
        Factor2  |      1.54099            .            0.2226       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  467.78 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.4971    0.0883 |      0.7451
           nocar |   0.8179    0.3748 |      0.1905
           crowd |   0.3687    0.0919 |      0.8556
            rent |   0.4699    0.6261 |      0.3873
           profm |  -0.5054    0.2378 |      0.6881
           pov_h |   0.7492    0.3738 |      0.2989
             fhh |   0.8639   -0.3387 |      0.1391
          pbasst |   0.7422    0.0003 |      0.4492
          inclow |   0.7933    0.4302 |      0.1857
          edulow |   0.6141    0.1370 |      0.6041
           black |   0.7760   -0.0884 |      0.3901
           und18 |   0.6205   -0.6854 |      0.1452
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                           Number of obs    =      341
    Method: maximum likelihood                        Retained factors =        2
    Rotation: oblique oblimin (Horst off)             Number of params =       23
                                                      Schwarz's BIC    =  610.528
    Log likelihood = -238.1971                        (Akaike's) AIC   =  522.394

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      4.80969       0.6949
        Factor2  |      3.38288       0.4888
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  467.78 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.4077    0.1878 |      0.7451
           nocar |   0.8609    0.0980 |      0.1905
           crowd |   0.3243    0.1151 |      0.8556
            rent |   0.8344   -0.3212 |      0.3873
           profm |  -0.1436   -0.4921 |      0.6881
           pov_h |   0.8137    0.0618 |      0.2989
             fhh |   0.3015    0.7788 |      0.1391
          pbasst |   0.5000    0.4014 |      0.4492
          inclow |   0.8901    0.0338 |      0.1857
          edulow |   0.5269    0.2065 |      0.6041
           black |   0.4494    0.5012 |      0.3901
           und18 |  -0.1492    0.9658 |      0.1452
    -------------------------------------------------

Factor rotation matrix
```

```
    --------------------------------
                 | Factor1  Factor2
    -------------+------------------
         Factor1 |  0.8618   0.7756
         Factor2 |  0.5073  -0.6312
    --------------------------------

.
. *Three factor, with rotation
. factormat withincor, n(341) factors(3) ml
(obs=341)
Iteration 0:   log likelihood = -142.16073
Iteration 1:   log likelihood = -101.52402
Iteration 2:   log likelihood = -101.28537
Iteration 3:   log likelihood = -101.27863
Iteration 4:   log likelihood = -101.27772
Iteration 5:   log likelihood = -101.27757
Iteration 6:   log likelihood = -101.27755
Iteration 7:   log likelihood = -101.27754
Iteration 8:   log likelihood = -101.27754

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  395.007
    Log likelihood = -101.2775                     (Akaike's) AIC   =  268.555

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.45063      3.85836            0.6986       0.6986
        Factor2  |      1.59228      0.83268            0.2041       0.9026
        Factor3  |      0.75960            .            0.0974       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  198.50 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.4943    0.0212    0.0369 |      0.7539
           nocar |   0.8340    0.3271   -0.0594 |      0.1938
           crowd |   0.3673    0.1079    0.1880 |      0.8181
            rent |   0.5021    0.6696    0.3245 |      0.1941
           profm |  -0.5280    0.3593    0.6126 |      0.2169
           pov_h |   0.7626    0.3440    0.1007 |      0.2900
             fhh |   0.8566   -0.3933    0.1870 |      0.0765
          pbasst |   0.7328   -0.0314    0.1180 |      0.4480
          inclow |   0.8320    0.3921   -0.2245 |      0.1037
          edulow |   0.6299    0.0677   -0.3271 |      0.4916
           black |   0.7588   -0.1258    0.1191 |      0.3942
           und18 |   0.5725   -0.6689    0.0903 |      0.2166
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  395.007
    Log likelihood = -101.2775                     (Akaike's) AIC   =  268.555

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      4.43233       0.5681
        Factor2  |      3.77988       0.4844
        Factor3  |      1.96954       0.2524
    --------------------------------------------------------------------------
```

```
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  198.50 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.3200    0.2643   -0.0400 |      0.7539
           nocar |   0.8002    0.1289   -0.1593 |      0.1938
           crowd |   0.3119    0.2293    0.1568 |      0.8181
            rent |   0.8807   -0.0634    0.3593 |      0.1941
           profm |  -0.0345   -0.1547    0.8013 |      0.2169
           pov_h |   0.7645    0.1853    0.0285 |      0.2900
             fhh |   0.1729    0.8879    0.0047 |      0.0765
          pbasst |   0.4169    0.4849    0.0005 |      0.4480
          inclow |   0.8627   -0.0352   -0.3286 |      0.1037
          edulow |   0.4591    0.0534   -0.4505 |      0.4916
           black |   0.3501    0.5754   -0.0156 |      0.3942
           und18 |  -0.2386    0.8984   -0.0904 |      0.2166
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3
    -------------+---------------------------
         Factor1 |  0.8191   0.8077  -0.4678
         Factor2 |  0.5711  -0.5562   0.3657
         Factor3 |  0.0543   0.1959   0.8046
    -----------------------------------------

.
. *Results demonstrate that 1 factor solution is the best
.
. *WITHIN NEIGHBORHOOD MATRIX
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\withinneighbg.DAT"
(12 vars, 14 obs)

.
. *Within, neighborhood is clustering variable
. *delete mean and std from correlation matrix
. drop in 13
(1 observation deleted)

. drop in 13
(1 observation deleted)

.
. *upload correlation matrix
. *check to make sure that everything looks okay
. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(withincor)

. matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list withincor

symmetric withincor[12,12]
             unemp       nocar       crowd        rent       profm       pov_h         fhh      pbasst      inclow      edulow
black        und18
 unemp           1
 nocar     .077226           1
 crowd     .026303     .141489           1
  rent    -.032287   .58619797   .27283701           1
 profm  -.24298599    -.284174    -.083035    -.046265           1
 pov_h     .137079     .426256      .20417   .46948299    -.113659           1
   fhh     .152242     .283842     .240601     .209179  -.22103301   .41668999           1
pbasst     .191835   .40137199   .23070601     .305237  -.13773599   .48063099   .55954403           1
inclow     .041647   .67490602     .202749   .62715697    -.285741   .62747598     .256244   .40156499           1
edulow     .105904   .29646799     .078155   .18927699    -.213337     .073507     .160542     .234284     .276209           1
```

```
 black   .15976501   .30455801   .17781401   .23671199  -.16108701   .25677699   .46545601   .42265701     .274813   .21991999
1
 und18     .031267     .052699     .228578    -.090705      -.0681   .21436401   .65288502   .42019299     .011487     .043655
.37644401           1

.
. *Conduct factor analysis
. factormat withincor, n(341) ml
(obs=341)
number of factors adjusted to 7
Iteration 0:   log likelihood = -68.062155
Iteration 1:   log likelihood = -42.737783
Iteration 2:   log likelihood = -5.3952488
Iteration 3:   log likelihood = -4.4945924
Iteration 4:   log likelihood = -3.7089787
Iteration 5:   log likelihood = -1.0478978
Iteration 6:   log likelihood = -1.0232495
Iteration 7:   log likelihood = -.94026387
Iteration 8:   log likelihood = -.93577967
Iteration 9:   log likelihood = -.93497096
Iteration 10:  log likelihood =  -.9349676
Iteration 11:  log likelihood = -.93496756

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        7
    Rotation: (unrotated)                          Number of params =       63
                                                   Schwarz's BIC    =  369.279
    Log likelihood = -.9349676                     (Akaike's) AIC   =   127.87

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.05213      2.11014            0.3852       0.3852
        Factor2  |      0.94199      0.32297            0.1189       0.5041
        Factor3  |      0.61901      0.12765            0.0781       0.5822
        Factor4  |      0.49136     -1.50171            0.0620       0.6442
        Factor5  |      1.99307      1.56104            0.2515       0.8957
        Factor6  |      0.43204      0.03780            0.0545       0.9502
        Factor7  |      0.39424            .            0.0498       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   7 factors vs. saturated:  chi2(3)  =    1.82 Prob>chi2 = 0.6111
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7 |   Uniqueness
    -------------+----------------------------------------------------------------------+-------------
           unemp |   0.0424   -0.2052   -0.1352    0.0329    0.0860    0.2214    0.3075 |      0.7857
           nocar |   0.7419    0.0057   -0.1908    0.6428   -0.0000    0.0000   -0.0000 |      0.0000
           crowd |   0.2340    0.0860   -0.1184   -0.0858    0.2649   -0.0576   -0.0019 |      0.8430
            rent |   0.7598    0.5376   -0.3577   -0.0759    0.0000   -0.0000   -0.0000 |      0.0000
           profm |  -0.3018    0.7443    0.5911    0.0751    0.0000   -0.0000    0.0000 |      0.0000
           pov_h |   0.6291    0.0369    0.0872   -0.0375    0.3503    0.5500   -0.0718 |      0.1635
             fhh |   0.2775   -0.0833   -0.1377    0.0811    0.7339    0.0250    0.1418 |      0.3311
          pbasst |   0.4161   -0.0142   -0.0203    0.1383    0.5143    0.1237    0.3027 |      0.4356
          inclow |   0.9795   -0.1134    0.1634   -0.0311   -0.0000   -0.0000    0.0000 |      0.0000
          edulow |   0.2888   -0.1047   -0.0944    0.1008    0.0304   -0.1492    0.2960 |      0.7758
           black |   0.2967   -0.0292   -0.0973    0.1028    0.4256   -0.0806    0.2905 |      0.6191
           und18 |  -0.0050   -0.1276    0.0304    0.0979    0.8986   -0.1804   -0.1038 |      0.1223
    -------------------------------------------------------------------------------------------------

. estat common

Correlation matrix of the common factors

    ------------------------------------------------------------------------------------
         Factors |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7
    -------------+----------------------------------------------------------------------
         Factor1 |        1
         Factor2 |        0         1
         Factor3 |        0         0         1
```

```
         Factor4 |        0          0          0          1
         Factor5 |        0          0          0          0          1
         Factor6 |        0          0          0          0          0          1
         Factor7 |        0          0          0          0          0          0          1
    ------------------------------------------------------------------------------------

. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph saved)

.
. *Conduct factor analysis on 1-3 factors
. *1 factor
. factormat withincor, n(341) factors(1) ml
(obs=341)
Iteration 0:   log likelihood = -385.59102
Iteration 1:   log likelihood = -296.37159
Iteration 2:   log likelihood = -294.06444
Iteration 3:   log likelihood = -293.18308
Iteration 4:   log likelihood = -292.85168
Iteration 5:   log likelihood = -292.73797
Iteration 6:   log likelihood = -292.70121
Iteration 7:   log likelihood = -292.68979
Iteration 8:   log likelihood = -292.68632
Iteration 9:   log likelihood = -292.68528
Iteration 10:  log likelihood = -292.68496
Iteration 11:  log likelihood = -292.68487
Iteration 12:  log likelihood = -292.68485
Iteration 13:  log likelihood = -292.68484
Iteration 14:  log likelihood = -292.68483

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        1
    Rotation: (unrotated)                          Number of params =       12
                                                   Schwarz's BIC    =  655.352
    Log likelihood = -292.6848                     (Akaike's) AIC   =   609.37

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.32516            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  575.93 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+--------------
           unemp |   0.1346 |      0.9819
           nocar |   0.7464 |      0.4429
           crowd |   0.2995 |      0.9103
            rent |   0.6745 |      0.5450
           profm |  -0.2953 |      0.9128
           pov_h |   0.6950 |      0.5170
             fhh |   0.4969 |      0.7531
          pbasst |   0.6042 |      0.6350
          inclow |   0.8174 |      0.3318
          edulow |   0.3228 |      0.8958
           black |   0.4487 |      0.7987
           und18 |   0.2226 |      0.9504
    ---------------------------------------

. estat common

Correlation matrix of the common factors

    ------------------------
         Factors |  Factor1
```

```
    -------------+----------
         Factor1 |        1
    ------------------------

.
. *2 factors
. factormat withincor, n(341) factors(2) ml
(obs=341)
Iteration 0:   log likelihood = -111.27868
Iteration 1:   log likelihood =  -89.11792
Iteration 2:   log likelihood = -88.914749
Iteration 3:   log likelihood = -88.906156
Iteration 4:   log likelihood = -88.905632
Iteration 5:   log likelihood = -88.905592
Iteration 6:   log likelihood = -88.905589
Iteration 7:   log likelihood = -88.905588

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: (unrotated)                          Number of params =       23
                                                   Schwarz's BIC    =  311.944
    Log likelihood = -88.90559                     (Akaike's) AIC   =  223.811

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.53321      2.12345            0.7148       0.7148
        Factor2  |      1.40976            .            0.2852       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  174.60 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.1410    0.0928 |      0.9715
           nocar |   0.7003   -0.2987 |      0.4203
           crowd |   0.3178    0.0955 |      0.8899
            rent |   0.6176   -0.3878 |      0.4682
           profm |  -0.3010    0.0180 |      0.9091
           pov_h |   0.6970   -0.0763 |      0.5083
             fhh |   0.6445    0.5649 |      0.2656
          pbasst |   0.6626    0.2492 |      0.4989
          inclow |   0.7862   -0.4189 |      0.2064
          edulow |   0.3110   -0.0682 |      0.8986
           black |   0.5027    0.2576 |      0.6809
           und18 |   0.3770    0.7201 |      0.3393
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: oblique oblimin (Horst off)          Number of params =       23
                                                   Schwarz's BIC    =  311.944
    Log likelihood = -88.90559                     (Akaike's) AIC   =  223.811

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      3.04396       0.6158
        Factor2  |      2.44709       0.4951
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  174.60 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
```

```
    Variable |  Factor1   Factor2 |   Uniqueness 
-------------+--------------------+--------------
       unemp |   0.0465    0.1503 |      0.9715  
       nocar |   0.7510    0.0357 |      0.4203  
       crowd |   0.1827    0.2323 |      0.8899  
        rent |   0.7474   -0.0849 |      0.4682  
       profm |  -0.2473   -0.1185 |      0.9091  
       pov_h |   0.5963    0.2422 |      0.5083  
         fhh |   0.1165    0.8183 |      0.2656  
      pbasst |   0.3467    0.5312 |      0.4989  
      inclow |   0.9003   -0.0381 |      0.2064  
      edulow |   0.2895    0.0761 |      0.8986  
       black |   0.2161    0.4672 |      0.6809  
       und18 |  -0.1985    0.8432 |      0.3393  
-------------------------------------------------
```

Factor rotation matrix

```
--------------------------------
             | Factor1  Factor2 
-------------+------------------
     Factor1 |  0.9012   0.6592 
     Factor2 | -0.4334   0.7520 
--------------------------------
```

```
. estat common
```

Correlation matrix of the oblimin(0) rotated common factors

```
----------------------------------
     Factors |  Factor1   Factor2 
-------------+--------------------
     Factor1 |        1 
     Factor2 |    .2681         1 
----------------------------------
```

```
.
. *3 factors
. factormat withincor, n(341) factors(3) ml
(obs=341)
Iteration 0:   log likelihood = -80.543667
Iteration 1:   log likelihood = -59.559453
Iteration 2:   log likelihood = -59.002644
Iteration 3:   log likelihood = -58.730139
Iteration 4:   log likelihood = -58.575617
Iteration 5:   log likelihood = -58.489456
Iteration 6:   log likelihood = -58.436457
Iteration 7:   log likelihood = -58.399909
Iteration 8:   log likelihood = -58.372417
Iteration 9:   log likelihood = -58.350398
Iteration 10:  log likelihood = -58.331902
Iteration 11:  log likelihood = -58.315775
Iteration 12:  log likelihood = -58.301289
Iteration 13:  log likelihood = -58.287965
Iteration 14:  log likelihood = -58.275482
Iteration 15:  log likelihood =  -58.26362
Iteration 16:  log likelihood = -58.252235
Iteration 17:  log likelihood = -58.241237
Iteration 18:  log likelihood = -58.230578
Iteration 19:  log likelihood = -58.226733
Iteration 20:  log likelihood = -58.226589
Iteration 21:  log likelihood = -58.226581
Iteration 22:  log likelihood =  -58.22658

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  308.905
    Log likelihood = -58.22658                     (Akaike's) AIC   =  182.453

    Beware: solution is a Heywood case
```

```
        (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      1.38732     -1.79083            0.2319       0.2319
        Factor2  |      3.17815      1.76229            0.5313       0.7633
        Factor3  |      1.41586            .            0.2367       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  114.12 Prob>chi2 = 0.0000
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |  -0.2430    0.0659    0.0964 |      0.9273
           nocar |  -0.2842    0.6390   -0.3076 |      0.4163
           crowd |  -0.0830    0.3135    0.0879 |      0.8871
            rent |  -0.0463    0.6408   -0.4126 |      0.4171
           profm |   1.0000    0.0000   -0.0000 |      0.0000
           pov_h |  -0.1137    0.6983   -0.0868 |      0.4919
             fhh |  -0.2210    0.6133    0.5533 |      0.2688
          pbasst |  -0.1377    0.6565    0.2390 |      0.4930
          inclow |  -0.2857    0.7223   -0.4212 |      0.2193
          edulow |  -0.2133    0.2513   -0.0688 |      0.8866
           black |  -0.1611    0.4786    0.2498 |      0.6826
           und18 |  -0.0681    0.3846    0.7202 |      0.3287
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  308.905
    Log likelihood = -58.22658                     (Akaike's) AIC   =  182.453

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      3.01918       0.5048
        Factor2  |      2.42364       0.4052
        Factor3  |      1.37597       0.2300
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  114.12 Prob>chi2 = 0.0000
    (tests formally not valid because a Heywood case was encountered)

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |  -0.0132    0.1220   -0.2267 |      0.9273
           nocar |   0.7227    0.0253   -0.1150 |      0.4163
           crowd |   0.1898    0.2322   -0.0029 |      0.8871
            rent |   0.7958   -0.0720    0.1243 |      0.4171
           profm |  -0.0027   -0.0059    0.9985 |      0.0000
           pov_h |   0.6173    0.2564    0.0680 |      0.4919
             fhh |   0.1084    0.8061   -0.0687 |      0.2688
          pbasst |   0.3594    0.5366    0.0293 |      0.4930
          inclow |   0.8674   -0.0394   -0.0937 |      0.2193
          edulow |   0.2485    0.0587   -0.1473 |      0.8866
           black |   0.2100    0.4612   -0.0401 |      0.6826
           und18 |  -0.1896    0.8491    0.0229 |      0.3287
```

```
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3
    -------------+---------------------------
         Factor1 | -0.2286  -0.1582   1.0000
         Factor2 |  0.8626   0.6454   0.0061
         Factor3 | -0.4513   0.7473   0.0032
    -----------------------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    --------------------------------------------
         Factors |  Factor1   Factor2   Factor3
    -------------+------------------------------
         Factor1 |        1
         Factor2 |    .2556         1
         Factor3 |   -.2248    -.1519         1
    --------------------------------------------

.
. *Results demonstrate that 2 factor solution is the best
.
. *BETWEEN NEIGHBORHOOD
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\betweencorrneigh.csv"
(13 vars, 12 obs)

. drop v1

. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(betweencor)

. matrix rownames betweencor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list betweencor

symmetric betweencor[12,12]
            unemp       nocar       crowd        rent       profm       pov_h         fhh      pbasst      inclow      edulow
black       und18
 unemp          1
 nocar  .75230002           1
 crowd      .3545   .43509999           1
  rent  .45089999       .6681   .41859999           1
 profm     -.2685  -.39309999      -.0548       .2458           1
 pov_h  .70520002   .80599999       .4878   .68110001      -.2189           1
   fhh  .66229999   .67580003   .36300001       .2483  -.56889999   .58490002           1
pbasst  .53780001   .59530002        .333   .39660001  -.34130001   .68610001   .70099998           1
inclow  .66250002   .89950001   .41240001   .59509999  -.49110001   .83499998   .62180001   .63510001           1
edulow      .4743   .65850002       .1947   .27239999  -.60159999   .61369997       .5535   .75040001   .76459998           1
 black  .71689999       .7087   .33410001   .36449999  -.40349999   .60689998   .79119998   .64560002   .62620002   .46219999
1
 und18  .34330001   .34240001       .1705  -.17399999  -.62360001       .2031   .82929999   .46399999       .3017   .37940001
.60759997           1

.
. *Conduct factor analysis
. factormat betweencor, n(89) ml
(obs=89)
number of factors adjusted to 7
Iteration 0:   log likelihood = -35.891568
Iteration 1:   log likelihood =  -26.36651
Iteration 2:   log likelihood = -2.2551268
Iteration 3:   log likelihood =  -1.850692
Iteration 4:   log likelihood = -1.5088242
Iteration 5:   log likelihood = -1.4798121
Iteration 6:   log likelihood = -1.4200041
Iteration 7:   log likelihood = -1.4125279
Iteration 8:   log likelihood = -1.4108895
```

```
Iteration 9:   log likelihood =  -1.410478
Iteration 10:  log likelihood = -1.4103738
Iteration 11:  log likelihood = -1.4103472
Iteration 12:  log likelihood = -1.4103404
Iteration 13:  log likelihood = -1.4103387
Iteration 14:  log likelihood = -1.4103383
Iteration 15:  log likelihood = -1.4103382
Iteration 16:  log likelihood = -1.4103381
Iteration 17:  log likelihood = -1.4103381
Iteration 18:  log likelihood = -1.4103381
Iteration 19:  log likelihood = -1.4103381
Iteration 20:  log likelihood = -1.4103381

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        7
    Rotation: (unrotated)                          Number of params =       63
                                                   Schwarz's BIC    =  285.605
    Log likelihood = -1.410338                     (Akaike's) AIC   =  128.821

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	5.37145	3.59545	0.5048	0.5048
Factor2	1.77600	0.65145	0.1669	0.6717
Factor3	1.12455	0.81010	0.1057	0.7774
Factor4	0.31445	-1.00400	0.0296	0.8069
Factor5	1.31845	0.85117	0.1239	0.9308
Factor6	0.46728	0.19830	0.0439	0.9747
Factor7	0.26899	.	0.0253	1.0000

```
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   7 factors vs. saturated:  chi2(3)  =    2.52 Prob>chi2 = 0.4718
    (tests formally not valid because a Heywood case was encountered)
```

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
unemp	0.9792	-0.0298	-0.2006	-0.0022	-0.0000	-0.0000	-0.0000	0.0000
nocar	0.8224	0.2065	0.2326	0.0652	0.2450	0.2740	-0.0766	0.0818
crowd	0.4115	0.1761	0.2157	-0.0331	-0.0641	0.1194	0.2137	0.6880
rent	0.5379	0.8022	0.2589	-0.0021	-0.0000	-0.0000	-0.0000	0.0000
profm	-0.3032	0.5832	-0.2279	-0.0290	-0.4298	-0.3606	0.1356	0.1820
pov_h	0.7668	0.2744	0.1870	-0.0009	0.2423	0.1372	0.3128	0.1263
fhh	0.7706	-0.3738	0.5160	-0.0118	-0.0000	-0.0000	-0.0000	0.0000
pbasst	0.6271	-0.0508	0.3870	0.0820	0.4050	-0.2872	0.2925	0.1156
inclow	0.7311	0.1742	0.2400	0.0319	0.4324	0.3822	0.0794	0.0372
edulow	0.5272	-0.0858	0.2222	-0.0417	0.8122	-0.0220	-0.0082	0.0033
black	0.7828	-0.1546	0.2646	0.5415	0.0000	-0.0000	-0.0000	0.0000
und18	0.4303	-0.6622	0.4865	0.0733	-0.0128	-0.0078	-0.0966	0.1247

```
. estat common
```

Correlation matrix of the common factors

Factors	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
Factor1	1						
Factor2	0	1					
Factor3	0	0	1				
Factor4	0	0	0	1			
Factor5	0	0	0	0	1		
Factor6	0	0	0	0	0	1	
Factor7	0	0	0	0	0	0	1

```
. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph", replace
```

```
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph saved)

.
. *1 Factor
. factormat betweencor, n(89) factors(1) ml
(obs=89)
Iteration 0:   log likelihood = -693.90879
Iteration 1:   log likelihood = -268.67184
Iteration 2:   log likelihood = -264.01906
Iteration 3:   log likelihood = -262.58289
Iteration 4:   log likelihood = -262.22774
Iteration 5:   log likelihood =  -262.1539
Iteration 6:   log likelihood = -262.13989
Iteration 7:   log likelihood = -262.13735
Iteration 8:   log likelihood = -262.13689
Iteration 9:   log likelihood = -262.13681
Iteration 10:  log likelihood =  -262.1368
Iteration 11:  log likelihood =  -262.1368

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        1
    Rotation: (unrotated)                          Number of params =       12
                                                   Schwarz's BIC    =  578.137
    Log likelihood = -262.1368                     (Akaike's) AIC   =  548.274

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      6.28587            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  491.87 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+--------------
           unemp |   0.7756 |      0.3985
           nocar |   0.9384 |      0.1193
           crowd |   0.4613 |      0.7872
            rent |   0.6144 |      0.6225
           profm |  -0.4534 |      0.7944
           pov_h |   0.8698 |      0.2434
             fhh |   0.7502 |      0.4372
          pbasst |   0.7270 |      0.4715
          inclow |   0.9296 |      0.1358
          edulow |   0.7407 |      0.4514
           black |   0.7556 |      0.4291
           und18 |   0.4199 |      0.8237
    ---------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        1
    Rotation: oblique oblimin (Horst off)          Number of params =       12
                                                   Schwarz's BIC    =  578.137
    Log likelihood = -262.1368                     (Akaike's) AIC   =  548.274

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      6.28587       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  491.87 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    ---------------------------------------
```

```
        Variable |  Factor1 |   Uniqueness 
    -------------+----------+--------------
           unemp |   0.7756 |      0.3985  
           nocar |   0.9384 |      0.1193  
           crowd |   0.4613 |      0.7872  
            rent |   0.6144 |      0.6225  
           profm |  -0.4534 |      0.7944  
           pov_h |   0.8698 |      0.2434  
             fhh |   0.7502 |      0.4372  
          pbasst |   0.7270 |      0.4715  
          inclow |   0.9296 |      0.1358  
          edulow |   0.7407 |      0.4514  
           black |   0.7556 |      0.4291  
           und18 |   0.4199 |      0.8237  
    ---------------------------------------

Factor rotation matrix

    ---------------------------
                 | Factor1 
    -------------+---------
         Factor1 |  1.0000 
    ---------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    ------------------------
         Factors |  Factor1 
    -------------+----------
         Factor1 |        1 
    ------------------------

. 
. *2 Factors
. factormat betweencor, n(89) factors(2) ml
(obs=89)
Iteration 0:   log likelihood = -237.03736
Iteration 1:   log likelihood = -141.41436
Iteration 2:   log likelihood = -137.08408
Iteration 3:   log likelihood = -136.82711
Iteration 4:   log likelihood = -136.80855
Iteration 5:   log likelihood = -136.80601
Iteration 6:   log likelihood = -136.80562
Iteration 7:   log likelihood = -136.80556
Iteration 8:   log likelihood = -136.80555
Iteration 9:   log likelihood = -136.80555
Iteration 10:  log likelihood = -136.80555
Iteration 11:  log likelihood = -136.80555

Factor analysis/correlation                     Number of obs    =        89
    Method: maximum likelihood                  Retained factors =         2
    Rotation: (unrotated)                       Number of params =        23
                                                Schwarz's BIC    =    376.85
    Log likelihood = -136.8055                  (Akaike's) AIC   =   319.611

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.16518      2.17315            0.6332       0.6332
        Factor2  |      2.99202            .            0.3668       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  254.65 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness 
    -------------+--------------------+--------------
```

```
         unemp |   0.6048    0.5017 |      0.3825
         nocar |   0.6590    0.6681 |      0.1193
         crowd |   0.3296    0.3493 |      0.7694
          rent |   0.1503    0.8045 |      0.3302
         profm |  -0.6460    0.1014 |      0.5724
         pov_h |   0.5356    0.7292 |      0.1814
           fhh |   0.9506    0.0887 |      0.0885
        pbasst |   0.6694    0.3547 |      0.4261
        inclow |   0.6211    0.6802 |      0.1515
        edulow |   0.5929    0.4058 |      0.4839
         black |   0.7861    0.2691 |      0.3097
         und18 |   0.9071   -0.3864 |      0.0280
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        2
    Rotation: oblique oblimin (Horst off)          Number of params =       23
                                                   Schwarz's BIC    =   376.85
    Log likelihood = -136.8055                     (Akaike's) AIC   =  319.611

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      5.94130       0.7284
        Factor2  |      3.64666       0.4470
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  254.65 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.7117    0.1684 |      0.3825
           nocar |   0.8981    0.1026 |      0.1193
           crowd |   0.4645    0.0412 |      0.7694
            rent |   0.8633   -0.4110 |      0.3302
           profm |  -0.1167   -0.6045 |      0.5724
           pov_h |   0.9179   -0.0406 |      0.1814
             fhh |   0.4120    0.7309 |      0.0885
          pbasst |   0.5852    0.3200 |      0.4261
          inclow |   0.8975    0.0631 |      0.1515
          edulow |   0.6108    0.2224 |      0.4839
           black |   0.5383    0.4741 |      0.3097
           und18 |  -0.0825    1.0113 |      0.0280
    -------------------------------------------------

Factor rotation matrix

    --------------------------------
                 | Factor1  Factor2
    -------------+------------------
         Factor1 |  0.6254   0.9480
         Factor2 |  0.7803  -0.3184
    --------------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    ----------------------------------
         Factors |  Factor1   Factor2
    -------------+--------------------
         Factor1 |        1
         Factor2 |    .3445         1
    ----------------------------------

.
```

```
. *3 Factor
. factormat betweencor, n(89) factors(3) ml
(obs=89)
Iteration 0:   log likelihood = -103.80108
Iteration 1:   log likelihood = -73.340157
Iteration 2:   log likelihood = -69.206845
Iteration 3:   log likelihood = -68.947903
Iteration 4:   log likelihood = -68.939724
Iteration 5:   log likelihood = -68.939343
Iteration 6:   log likelihood =  -68.93932
Iteration 7:   log likelihood = -68.939318
Iteration 8:   log likelihood = -68.939318
Iteration 9:   log likelihood = -68.939318

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  286.004
    Log likelihood = -68.93932                     (Akaike's) AIC   =  203.879

    ------------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+----------------------------------------------------------------
        Factor1  |      6.35594      4.55999            0.6999       0.6999
        Factor2  |      1.79595      0.86611            0.1978       0.8976
        Factor3  |      0.92984            .            0.1024       1.0000
    ------------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  127.29 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.7401    0.1842    0.1719 |      0.3889
           nocar |   0.8502    0.4015    0.0107 |      0.1158
           crowd |   0.4232    0.2058    0.2187 |      0.7307
            rent |   0.4234    0.7020    0.4310 |      0.1422
           profm |  -0.5989    0.3068    0.6478 |      0.1275
           pov_h |   0.7567    0.4731    0.1180 |      0.1897
             fhh |   0.9350   -0.2950    0.1300 |      0.0219
          pbasst |   0.7531    0.0651    0.0842 |      0.4215
          inclow |   0.8397    0.4634   -0.2019 |      0.0395
          edulow |   0.7100    0.2013   -0.3755 |      0.3144
           black |   0.8160   -0.0503    0.1598 |      0.3061
           und18 |   0.6924   -0.6315   -0.0406 |      0.1201
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  286.004
    Log likelihood = -68.93932                     (Akaike's) AIC   =  203.879

    ------------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+----------------------------------------------------------------
        Factor1  |      5.47460       0.6028
        Factor2  |      4.42968       0.4878
        Factor3  |      2.07941       0.2290
    ------------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  127.29 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
```

```
    -------------+------------------------------+--------------
           unemp |   0.5677    0.3800    0.0795 |      0.3889
           nocar |   0.8387    0.1636   -0.1138 |      0.1158
           crowd |   0.4168    0.2008    0.1771 |      0.7307
            rent |   0.8835   -0.1040    0.4082 |      0.1422
           profm |  -0.0484   -0.2424    0.7964 |      0.1275
           pov_h |   0.8536    0.1088    0.0172 |      0.1897
             fhh |   0.2170    0.8853    0.0066 |      0.0219
          pbasst |   0.4638    0.4396   -0.0181 |      0.4215
          inclow |   0.8983   -0.0202   -0.3454 |      0.0395
          edulow |   0.5841    0.0281   -0.5159 |      0.3144
           black |   0.3853    0.6207    0.0559 |      0.3061
           und18 |  -0.2289    0.9327   -0.1438 |      0.1201
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3
    -------------+---------------------------
         Factor1 |  0.7848   0.8671  -0.4405
         Factor2 |  0.6106  -0.4849   0.2747
         Factor3 |  0.1065   0.1144   0.8547
    -----------------------------------------

.
. estat common

Correlation matrix of the oblimin(0) rotated common factors

    --------------------------------------------
         Factors |  Factor1   Factor2   Factor3
    -------------+------------------------------
         Factor1 |        1
         Factor2 |    .3966         1
         Factor3 |  -.08696    -.4173         1
    --------------------------------------------

.
. *Results demonstrate that 1 factor solution is the best
.
.
end of do-file

.
. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Factor Analysis.log
  log type:  text
 closed on:  22 Jul 2009, 10:24:31
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
--
```

4.3 Correlations for 4 neighborhoods

```
------------------------------------------------------------------------------------------------
-----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Correlation 4 Neighborhoods.log
  log type:  text
 opened on:  22 Jul 2009, 10:12:06

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"

. *Strong Correlation Within, Strong Correlation Between
. graph twoway (scatter nocar inclow if neigh==69, msymbol(Oh)) ///
>   (scatter nocar inclow if neigh==28, msymbol(S)) ///
>   (scatter nocar inclow if neigh==34, msymbol(Dh)) ///
>   (scatter nocar inclow if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xtitle(% with Income < $30K) ytitle (% of Households with No Car) ///
>   ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)

. graph save "C:\MSTHESIS\Final\Graphs\Correlations\car_inc.gph", replace
(file C:\MSTHESIS\Final\Graphs\Correlations\car_inc.gph saved)

.
. *Weak Correlation Within, Weak Correlation Between
. graph twoway (scatter rent edulow if neigh==69, msymbol(Oh)) ///
>   (scatter rent edulow if neigh==28, msymbol(S)) ///
>   (scatter rent edulow if neigh==34, msymbol(Dh)) ///
>   (scatter rent edulow if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xtitle (% < High School Education) ytitle(% Renters )  ///
>   ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)

.
. graph twoway (scatter unemp inclow if neigh==69, msymbol(Oh)) ///
>   (scatter unemp inclow if neigh==28, msymbol(S)) ///
>   (scatter unemp inclow if neigh==34, msymbol(Dh)) ///
>   (scatter unemp inclow if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xtitle (% < Income $30K) ytitle(% Unemployed )  ///
>   ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100)

. graph save "C:\MSTHESIS\Final\Graphs\Correlations\unemp_inc.gph"
file C:\MSTHESIS\Final\Graphs\Correlations\unemp_inc.gph already exists
r(602);

end of do-file
r(602);

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. graph save "C:\MSTHESIS\Final\Graphs\Correlations\unemp_inc.gph", replace
(file C:\MSTHESIS\Final\Graphs\Correlations\unemp_inc.gph saved)

.
.
. use "C:\MSTHESIS\Final\Dataset\Test of homogeneity\sep_var_md.dta"

.
. list neigh_name neigh nocarmd varnocar inclowmd varinclow rentmd varrent edulowmd varedulow
unempmd varunemp  ///
> if neigh==69 | neigh ==28 | neigh==34 | neigh==77

    +------------------------------------------------------------------------------------------------------------------------------+
    |         neigh_name   neigh    nocarmd   varnocar   inclowmd   varinc~w     rentmd    varrent   edulowmd   varedu~w    unempmd   varunemp |
```

```
     |-----------------------------------------------------------------------------------------------------------------------------------|
 27. |        East Liberty      28   49.70587   181.4032   65.83157   81.08256   77.76382   119.3283   20.92855   103.6699   10.92743   86.45458 |
 33. |            Garfield      34   35.92965   104.5128   61.43187   146.3553   53.26633   344.2783   22.06655   148.5022   10.75581   23.70106 |
 68. |           Shadyside      69   17.81019   81.88496   41.74005   128.1398   73.39394   134.5143   4.010143    16.0011   3.819959   36.05885 |
 76. | Squirrel Hill North      77   6.233062   34.98369   24.75442   122.3662   38.38384   339.4703    3.26087   7.533834   2.190923   386.5553 |
     +-----------------------------------------------------------------------------------------------------------------------------------+

.
end of do-file

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Correlation 4 Neighborhoods.log
  log type:  text
 closed on:  22 Jul 2009, 10:12:35
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

4.4 Composite Index of SEP

```
----------------------------------------------------------------------------------------------------
------------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Factor Analysis.log
  log type:  text
 opened on:  22 Jul 2009, 10:23:56

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. *Syntax for Conducting Factor Analysis on Total Correlation
. *Within Correlation
. *And Between Correlation Matrix
.
.
. *Total Correlation Matrix
.
. *use total correlation matrix of SEP
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\totalcorrelation.DAT"
(12 vars, 14 obs)

.
. *TOTAL CORRELATION MATRIX (ignore clustering)
. *delete mean and std from correlation matrix
. drop in 13
(1 observation deleted)

. drop in 13
(1 observation deleted)

.
. *upload correlation matrix
. *check to make sure that everything looks okay
. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(withincor)

. matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list withincor

symmetric withincor[12,12]
             unemp       nocar       crowd        rent       profm       pov_h         fhh
pbasst      inclow      edulow       black       und18
 unemp           1
 nocar   .45568001           1
 crowd     .169406   .30500099           1
  rent     .228443   .64276701     .345599           1
 profm  -.23661999  -.36915201    -.059351     .172427           1
 pov_h   .44385701   .70468003     .356747   .61643797  -.19322801           1
   fhh     .427995     .573753     .300538     .236393    -.487544   .53746003           1
pbasst     .373483     .542418   .28011301   .36837301    -.291345   .62631798   .66049802
1
inclow   .37582001   .83491302   .31293899   .60520202  -.43650401   .77246898     .513807
.56414801           1
edulow     .304481   .56269097     .141159     .247099  -.50928903   .45932901     .443344
.60109597   .61873299           1
 black   .48263499   .63410598   .25150701   .32596901    -.369995   .53036797   .71456897
.58477902   .54148602   .40821701           1
 und18     .195087   .25643501     .192066  -.14624301  -.47418699   .20628899   .77258998
.44936499   .20627099   .27353999   .53400803           1

.
. *conduct factor analysis
. factormat withincor, n(341) ml
```

```
(obs=341)
number of factors adjusted to 7
Iteration 0:   log likelihood = -98.317281
Iteration 1:   log likelihood = -26.338898
Iteration 2:   log likelihood = -13.842636
Iteration 3:   log likelihood = -13.069393
Iteration 4:   log likelihood = -3.9193106
Iteration 5:   log likelihood = -2.5296083
Iteration 6:   log likelihood = -2.5001492
Iteration 7:   log likelihood =  -2.401671
Iteration 8:   log likelihood = -2.3696017
Iteration 9:   log likelihood = -2.3364738
Iteration 10:  log likelihood = -2.2867793
Iteration 11:  log likelihood = -2.2133984
Iteration 12:  log likelihood = -2.1311116
Iteration 13:  log likelihood = -2.0729605
Iteration 14:  log likelihood = -2.0437538
Iteration 15:  log likelihood = -2.0313942
Iteration 16:  log likelihood = -2.0266881
Iteration 17:  log likelihood = -2.0250092
Iteration 18:  log likelihood = -2.0244332
Iteration 19:  log likelihood =   -2.02424
Iteration 20:  log likelihood =  -2.024176
Iteration 21:  log likelihood =  -2.024155
Iteration 22:  log likelihood = -2.0241481
Iteration 23:  log likelihood = -2.0241458
Iteration 24:  log likelihood = -2.0241451
Iteration 25:  log likelihood = -2.0241449

number of factors adjusted to 6
Iteration 0:   log likelihood = -98.369199
Iteration 1:   log likelihood = -11.660295
Iteration 2:   log likelihood = -10.063247
Iteration 3:   log likelihood = -9.9338417
Iteration 4:   log likelihood = -9.6519641
Iteration 5:   log likelihood =  -9.625306
Iteration 6:   log likelihood = -9.6061189
Iteration 7:   log likelihood = -9.6058713
Iteration 8:   log likelihood = -9.6058617
Iteration 9:   log likelihood = -9.6058612
Iteration 10:  log likelihood = -9.6058612

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        6
    Rotation: (unrotated)                          Number of params =       57
                                                   Schwarz's BIC    =  351.629
    Log likelihood = -9.605861                     (Akaike's) AIC   =  133.212

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.91693      2.47140            0.4289       0.4289
        Factor2  |      1.44553     -0.21040            0.1583       0.5872
        Factor3  |      1.65593      0.61789            0.1813       0.7686
        Factor4  |      1.03804      0.33032            0.1137       0.8822
        Factor5  |      0.70772      0.34007            0.0775       0.9597
        Factor6  |      0.36765            .            0.0403       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   6 factors vs. saturated:  chi2(9)  =   18.71 Prob>chi2 = 0.0277
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6 |   Uniqueness
    -------------+------------------------------------------------------------+-------------
           unemp |   0.3843    0.2536    0.1526    0.1161   -0.0382    0.5053 |      0.4944
           nocar |   0.5613    0.4453    0.0977    0.5595   -0.0796    0.0895 |      0.1497
           crowd |   0.2895    0.2208    0.0372    0.1422    0.1987   -0.0918 |      0.7979
```

```
         rent |   0.3885    0.4791   -0.4257    0.5048    0.2999   -0.0474 |      0.0914
        profm |  -0.2917   -0.0017   -0.5825   -0.2156    0.4962    0.0189 |      0.2826
        pov_h |   0.6580    0.7530    0.0000   -0.0000   -0.0000   -0.0000 |      0.0000
          fhh |   0.6665    0.1313    0.5707    0.1849    0.2006    0.0592 |      0.1349
       pbasst |   0.9991   -0.0413   -0.0000   -0.0000   -0.0000   -0.0000 |      0.0000
       inclow |   0.5859    0.5139    0.0594    0.4574   -0.2594   -0.0969 |      0.1032
       edulow |   0.6050    0.0813    0.1139    0.2589   -0.3902   -0.0465 |      0.3929
        black |   0.5930    0.1862    0.3644    0.2821    0.1219    0.2570 |      0.3204
        und18 |   0.4450   -0.1149    0.7913    0.0075    0.2228   -0.1102 |      0.1008
    ---------------------------------------------------------------------------------------

. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screetot.gph saved)

.
. *conduct factor analysis on 1-3 factors
. *One factor
. factormat withincor, n(341) factors(1) ml
(obs=341)
Iteration 0:   log likelihood = -976.93131
Iteration 1:   log likelihood = -565.81845
Iteration 2:   log likelihood = -561.63564
Iteration 3:   log likelihood = -560.41952
Iteration 4:   log likelihood =  -560.0653
Iteration 5:   log likelihood = -559.96903
Iteration 6:   log likelihood = -559.94387
Iteration 7:   log likelihood = -559.93745
Iteration 8:   log likelihood = -559.93583
Iteration 9:   log likelihood = -559.93542
Iteration 10:  log likelihood = -559.93532
Iteration 11:  log likelihood =  -559.9353
Iteration 12:  log likelihood = -559.93529

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        1
    Rotation: (unrotated)                          Number of params =       12
                                                   Schwarz's BIC    =  1189.85
    Log likelihood = -559.9353                     (Akaike's) AIC   =  1143.87

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.26183            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) = 1101.81 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+-------------
           unemp |   0.5073 |      0.7426
           nocar |   0.8863 |      0.2145
           crowd |   0.3704 |      0.8628
            rent |   0.6009 |      0.6388
           profm |  -0.4356 |      0.8102
           pov_h |   0.8173 |      0.3320
             fhh |   0.7044 |      0.5038
          pbasst |   0.7122 |      0.4928
          inclow |   0.8830 |      0.2203
          edulow |   0.6487 |      0.5792
           black |   0.7133 |      0.4912
           und18 |   0.3875 |      0.8499
    -------------------------------------

.
. *Two factor, with rotation
. factormat withincor, n(341) factors(2) ml
(obs=341)
Iteration 0:   log likelihood = -292.14342
Iteration 1:   log likelihood = -242.16713
```

```
Iteration 2:   log likelihood = -238.29029
Iteration 3:   log likelihood =  -238.1988
Iteration 4:   log likelihood = -238.19719
Iteration 5:   log likelihood = -238.19712
Iteration 6:   log likelihood = -238.19712

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: (unrotated)                          Number of params =       23
                                                   Schwarz's BIC    =  610.528
    Log likelihood = -238.1971                     (Akaike's) AIC   =  522.394

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.38017      3.83919            0.7774       0.7774
        Factor2  |      1.54099            .            0.2226       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  467.78 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.4971    0.0883 |      0.7451
           nocar |   0.8179    0.3748 |      0.1905
           crowd |   0.3687    0.0919 |      0.8556
            rent |   0.4699    0.6261 |      0.3873
           profm |  -0.5054    0.2378 |      0.6881
           pov_h |   0.7492    0.3738 |      0.2989
             fhh |   0.8639   -0.3387 |      0.1391
          pbasst |   0.7422    0.0003 |      0.4492
          inclow |   0.7933    0.4302 |      0.1857
          edulow |   0.6141    0.1370 |      0.6041
           black |   0.7760   -0.0884 |      0.3901
           und18 |   0.6205   -0.6854 |      0.1452
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: oblique oblimin (Horst off)          Number of params =       23
                                                   Schwarz's BIC    =  610.528
    Log likelihood = -238.1971                     (Akaike's) AIC   =  522.394

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      4.80969       0.6949
        Factor2  |      3.38288       0.4888
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  467.78 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.4077    0.1878 |      0.7451
           nocar |   0.8609    0.0980 |      0.1905
           crowd |   0.3243    0.1151 |      0.8556
            rent |   0.8344   -0.3212 |      0.3873
           profm |  -0.1436   -0.4921 |      0.6881
           pov_h |   0.8137    0.0618 |      0.2989
             fhh |   0.3015    0.7788 |      0.1391
          pbasst |   0.5000    0.4014 |      0.4492
          inclow |   0.8901    0.0338 |      0.1857
```

```
         edulow |   0.5269    0.2065 |      0.6041
          black |   0.4494    0.5012 |      0.3901
          und18 |  -0.1492    0.9658 |      0.1452
    -------------------------------------------------

Factor rotation matrix

    --------------------------------
                 | Factor1  Factor2
    -------------+------------------
         Factor1 |  0.8618   0.7756
         Factor2 |  0.5073  -0.6312
    --------------------------------

.
. *Three factor, with rotation
. factormat withincor, n(341) factors(3) ml
(obs=341)
Iteration 0:   log likelihood = -142.16073
Iteration 1:   log likelihood = -101.52402
Iteration 2:   log likelihood = -101.28537
Iteration 3:   log likelihood = -101.27863
Iteration 4:   log likelihood = -101.27772
Iteration 5:   log likelihood = -101.27757
Iteration 6:   log likelihood = -101.27755
Iteration 7:   log likelihood = -101.27754
Iteration 8:   log likelihood = -101.27754

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  395.007
    Log likelihood = -101.2775                     (Akaike's) AIC   =  268.555

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.45063      3.85836            0.6986       0.6986
        Factor2  |      1.59228      0.83268            0.2041       0.9026
        Factor3  |      0.75960            .            0.0974       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  198.50 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.4943    0.0212    0.0369 |      0.7539
           nocar |   0.8340    0.3271   -0.0594 |      0.1938
           crowd |   0.3673    0.1079    0.1880 |      0.8181
            rent |   0.5021    0.6696    0.3245 |      0.1941
           profm |  -0.5280    0.3593    0.6126 |      0.2169
           pov_h |   0.7626    0.3440    0.1007 |      0.2900
             fhh |   0.8566   -0.3933    0.1870 |      0.0765
          pbasst |   0.7328   -0.0314    0.1180 |      0.4480
          inclow |   0.8320    0.3921   -0.2245 |      0.1037
          edulow |   0.6299    0.0677   -0.3271 |      0.4916
           black |   0.7588   -0.1258    0.1191 |      0.3942
           und18 |   0.5725   -0.6689    0.0903 |      0.2166
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  395.007
    Log likelihood = -101.2775                     (Akaike's) AIC   =  268.555
```

```
    ---------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+-------------------------------------------------------
        Factor1  |      4.43233       0.5681
        Factor2  |      3.77988       0.4844
        Factor3  |      1.96954       0.2524
    ---------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 2896.64 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  198.50 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.3200    0.2643   -0.0400 |      0.7539
           nocar |   0.8002    0.1289   -0.1593 |      0.1938
           crowd |   0.3119    0.2293    0.1568 |      0.8181
            rent |   0.8807   -0.0634    0.3593 |      0.1941
           profm |  -0.0345   -0.1547    0.8013 |      0.2169
           pov_h |   0.7645    0.1853    0.0285 |      0.2900
             fhh |   0.1729    0.8879    0.0047 |      0.0765
          pbasst |   0.4169    0.4849    0.0005 |      0.4480
          inclow |   0.8627   -0.0352   -0.3286 |      0.1037
          edulow |   0.4591    0.0534   -0.4505 |      0.4916
           black |   0.3501    0.5754   -0.0156 |      0.3942
           und18 |  -0.2386    0.8984   -0.0904 |      0.2166
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3
    -------------+---------------------------
         Factor1 |  0.8191   0.8077  -0.4678
         Factor2 |  0.5711  -0.5562   0.3657
         Factor3 |  0.0543   0.1959   0.8046
    -----------------------------------------

.
. *Results demonstrate that 1 factor solution is the best
.
. *WITHIN NEIGHBORHOOD MATRIX
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\withinneighbg.DAT"
(12 vars, 14 obs)

.
. *Within, neighborhood is clustering variable
. *delete mean and std from correlation matrix
. drop in 13
(1 observation deleted)

. drop in 13
(1 observation deleted)

.
. *upload correlation matrix
. *check to make sure that everything looks okay
. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(withincor)

. matrix rownames withincor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list withincor

symmetric withincor[12,12]
           unemp       nocar       crowd        rent       profm       pov_h         fhh       pbasst      inclow      edulow
black       und18
 unemp           1
```

```
 nocar     .077226           1
 crowd     .026303     .141489           1
  rent    -.032287   .58619797   .27283701           1
 profm  -.24298599    -.284174    -.083035    -.046265           1
 pov_h     .137079     .426256      .20417   .46948299    -.113659           1
   fhh     .152242     .283842     .240601     .209179  -.22103301   .41668999           1
pbasst     .191835   .40137199   .23070601     .305237  -.13773599   .48063099   .55954403           1
inclow     .041647   .67490602     .202749   .62715697    -.285741   .62747598     .256244   .40156499           1
edulow     .105904   .29646799     .078155   .18927699    -.213337     .073507     .160542     .234284     .276209           1
 black   .15976501   .30455801   .17781401   .23671199  -.16108701   .25677699   .46545601   .42265701     .274813   .21991999
1
 und18     .031267     .052699     .228578    -.090705      -.0681   .21436401   .65288502   .42019299     .011487     .043655
.37644401           1

.
. *Conduct factor analysis
. factormat withincor, n(341) ml
(obs=341)
number of factors adjusted to 7
Iteration 0:   log likelihood = -68.062155
Iteration 1:   log likelihood = -42.737783
Iteration 2:   log likelihood = -5.3952488
Iteration 3:   log likelihood = -4.4945924
Iteration 4:   log likelihood = -3.7089787
Iteration 5:   log likelihood = -1.0478978
Iteration 6:   log likelihood = -1.0232495
Iteration 7:   log likelihood = -.94026387
Iteration 8:   log likelihood = -.93577967
Iteration 9:   log likelihood = -.93497096
Iteration 10:  log likelihood =  -.9349676
Iteration 11:  log likelihood = -.93496756

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        7
    Rotation: (unrotated)                          Number of params =       63
                                                   Schwarz's BIC    =  369.279
    Log likelihood = -.9349676                     (Akaike's) AIC   =   127.87

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.05213      2.11014            0.3852       0.3852
        Factor2  |      0.94199      0.32297            0.1189       0.5041
        Factor3  |      0.61901      0.12765            0.0781       0.5822
        Factor4  |      0.49136     -1.50171            0.0620       0.6442
        Factor5  |      1.99307      1.56104            0.2515       0.8957
        Factor6  |      0.43204      0.03780            0.0545       0.9502
        Factor7  |      0.39424            .            0.0498       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   7 factors vs. saturated:  chi2(3)  =    1.82 Prob>chi2 = 0.6111
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7 |   Uniqueness
    -------------+-----------------------------------------------------------------------+-------------
           unemp |   0.0424   -0.2052   -0.1352    0.0329    0.0860    0.2214    0.3075 |      0.7857
           nocar |   0.7419    0.0057   -0.1908    0.6428   -0.0000    0.0000   -0.0000 |      0.0000
           crowd |   0.2340    0.0860   -0.1184   -0.0858    0.2649   -0.0576   -0.0019 |      0.8430
            rent |   0.7598    0.5376   -0.3577   -0.0759    0.0000   -0.0000   -0.0000 |      0.0000
           profm |  -0.3018    0.7443    0.5911    0.0751    0.0000   -0.0000    0.0000 |      0.0000
           pov_h |   0.6291    0.0369    0.0872   -0.0375    0.3503    0.5500   -0.0718 |      0.1635
             fhh |   0.2775   -0.0833   -0.1377    0.0811    0.7339    0.0250    0.1418 |      0.3311
          pbasst |   0.4161   -0.0142   -0.0203    0.1383    0.5143    0.1237    0.3027 |      0.4356
          inclow |   0.9795   -0.1134    0.1634   -0.0311   -0.0000   -0.0000    0.0000 |      0.0000
          edulow |   0.2888   -0.1047   -0.0944    0.1008    0.0304   -0.1492    0.2960 |      0.7758
           black |   0.2967   -0.0292   -0.0973    0.1028    0.4256   -0.0806    0.2905 |      0.6191
           und18 |  -0.0050   -0.1276    0.0304    0.0979    0.8986   -0.1804   -0.1038 |      0.1223
    -------------------------------------------------------------------------------------------

. estat common

Correlation matrix of the common factors
```

```
    --------------------------------------------------------------------------------
         Factors |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7
    -------------+------------------------------------------------------------------
         Factor1 |        1
         Factor2 |        0         1
         Factor3 |        0         0         1
         Factor4 |        0         0         0         1
         Factor5 |        0         0         0         0         1
         Factor6 |        0         0         0         0         0         1
         Factor7 |        0         0         0         0         0         0         1
    --------------------------------------------------------------------------------

. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screewithin.gph saved)

.
. *Conduct factor analysis on 1-3 factors
. *1 factor
. factormat withincor, n(341) factors(1) ml
(obs=341)
Iteration 0:   log likelihood = -385.59102
Iteration 1:   log likelihood = -296.37159
Iteration 2:   log likelihood = -294.06444
Iteration 3:   log likelihood = -293.18308
Iteration 4:   log likelihood = -292.85168
Iteration 5:   log likelihood = -292.73797
Iteration 6:   log likelihood = -292.70121
Iteration 7:   log likelihood = -292.68979
Iteration 8:   log likelihood = -292.68632
Iteration 9:   log likelihood = -292.68528
Iteration 10:  log likelihood = -292.68496
Iteration 11:  log likelihood = -292.68487
Iteration 12:  log likelihood = -292.68485
Iteration 13:  log likelihood = -292.68484
Iteration 14:  log likelihood = -292.68483

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        1
    Rotation: (unrotated)                          Number of params =       12
                                                   Schwarz's BIC    =  655.352
    Log likelihood = -292.6848                     (Akaike's) AIC   =   609.37

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.32516            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  575.93 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    --------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+-------------
           unemp |   0.1346 |      0.9819
           nocar |   0.7464 |      0.4429
           crowd |   0.2995 |      0.9103
            rent |   0.6745 |      0.5450
           profm |  -0.2953 |      0.9128
           pov_h |   0.6950 |      0.5170
             fhh |   0.4969 |      0.7531
          pbasst |   0.6042 |      0.6350
          inclow |   0.8174 |      0.3318
          edulow |   0.3228 |      0.8958
           black |   0.4487 |      0.7987
           und18 |   0.2226 |      0.9504
    --------------------------------------
```

```
. estat common

Correlation matrix of the common factors

    ------------------------
         Factors |  Factor1
    -------------+----------
         Factor1 |        1
    ------------------------

.
. *2 factors
. factormat withincor, n(341) factors(2) ml
(obs=341)
Iteration 0:   log likelihood = -111.27868
Iteration 1:   log likelihood =  -89.11792
Iteration 2:   log likelihood = -88.914749
Iteration 3:   log likelihood = -88.906156
Iteration 4:   log likelihood = -88.905632
Iteration 5:   log likelihood = -88.905592
Iteration 6:   log likelihood = -88.905589
Iteration 7:   log likelihood = -88.905588

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: (unrotated)                          Number of params =       23
                                                   Schwarz's BIC    =  311.944
    Log likelihood = -88.90559                     (Akaike's) AIC   =  223.811

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      3.53321      2.12345            0.7148       0.7148
        Factor2  |      1.40976            .            0.2852       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  174.60 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.1410    0.0928 |      0.9715
           nocar |   0.7003   -0.2987 |      0.4203
           crowd |   0.3178    0.0955 |      0.8899
            rent |   0.6176   -0.3878 |      0.4682
           profm |  -0.3010    0.0180 |      0.9091
           pov_h |   0.6970   -0.0763 |      0.5083
             fhh |   0.6445    0.5649 |      0.2656
          pbasst |   0.6626    0.2492 |      0.4989
          inclow |   0.7862   -0.4189 |      0.2064
          edulow |   0.3110   -0.0682 |      0.8986
           black |   0.5027    0.2576 |      0.6809
           und18 |   0.3770    0.7201 |      0.3393
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        2
    Rotation: oblique oblimin (Horst off)          Number of params =       23
                                                   Schwarz's BIC    =  311.944
    Log likelihood = -88.90559                     (Akaike's) AIC   =  223.811

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      3.04396       0.6158
        Factor2  |      2.44709       0.4951
```

```
    ------------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  174.60 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness 
    -------------+--------------------+--------------
           unemp |   0.0465    0.1503 |      0.9715  
           nocar |   0.7510    0.0357 |      0.4203  
           crowd |   0.1827    0.2323 |      0.8899  
            rent |   0.7474   -0.0849 |      0.4682  
           profm |  -0.2473   -0.1185 |      0.9091  
           pov_h |   0.5963    0.2422 |      0.5083  
             fhh |   0.1165    0.8183 |      0.2656  
          pbasst |   0.3467    0.5312 |      0.4989  
          inclow |   0.9003   -0.0381 |      0.2064  
          edulow |   0.2895    0.0761 |      0.8986  
           black |   0.2161    0.4672 |      0.6809  
           und18 |  -0.1985    0.8432 |      0.3393  
    -------------------------------------------------

Factor rotation matrix

    --------------------------------
                 | Factor1  Factor2 
    -------------+------------------
         Factor1 |  0.9012   0.6592 
         Factor2 | -0.4334   0.7520 
    --------------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    ----------------------------------
         Factors |  Factor1   Factor2 
    -------------+--------------------
         Factor1 |        1           
         Factor2 |    .2681         1 
    ----------------------------------

. 
. *3 factors
. factormat withincor, n(341) factors(3) ml
(obs=341)
Iteration 0:   log likelihood = -80.543667
Iteration 1:   log likelihood = -59.559453
Iteration 2:   log likelihood = -59.002644
Iteration 3:   log likelihood = -58.730139
Iteration 4:   log likelihood = -58.575617
Iteration 5:   log likelihood = -58.489456
Iteration 6:   log likelihood = -58.436457
Iteration 7:   log likelihood = -58.399909
Iteration 8:   log likelihood = -58.372417
Iteration 9:   log likelihood = -58.350398
Iteration 10:  log likelihood = -58.331902
Iteration 11:  log likelihood = -58.315775
Iteration 12:  log likelihood = -58.301289
Iteration 13:  log likelihood = -58.287965
Iteration 14:  log likelihood = -58.275482
Iteration 15:  log likelihood =  -58.26362
Iteration 16:  log likelihood = -58.252235
Iteration 17:  log likelihood = -58.241237
Iteration 18:  log likelihood = -58.230578
Iteration 19:  log likelihood = -58.226733
Iteration 20:  log likelihood = -58.226589
Iteration 21:  log likelihood = -58.226581
Iteration 22:  log likelihood =  -58.22658
```

```
Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  308.905
    Log likelihood = -58.22658                     (Akaike's) AIC   =  182.453

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      1.38732     -1.79083            0.2319       0.2319
        Factor2  |      3.17815      1.76229            0.5313       0.7633
        Factor3  |      1.41586            .            0.2367       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  114.12 Prob>chi2 = 0.0000
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |  -0.2430    0.0659    0.0964 |      0.9273
           nocar |  -0.2842    0.6390   -0.3076 |      0.4163
           crowd |  -0.0830    0.3135    0.0879 |      0.8871
            rent |  -0.0463    0.6408   -0.4126 |      0.4171
           profm |   1.0000    0.0000   -0.0000 |      0.0000
           pov_h |  -0.1137    0.6983   -0.0868 |      0.4919
             fhh |  -0.2210    0.6133    0.5533 |      0.2688
          pbasst |  -0.1377    0.6565    0.2390 |      0.4930
          inclow |  -0.2857    0.7223   -0.4212 |      0.2193
          edulow |  -0.2133    0.2513   -0.0688 |      0.8866
           black |  -0.1611    0.4786    0.2498 |      0.6826
           und18 |  -0.0681    0.3846    0.7202 |      0.3287
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =      341
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  308.905
    Log likelihood = -58.22658                     (Akaike's) AIC   =  182.453

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      3.01918       0.5048
        Factor2  |      2.42364       0.4052
        Factor3  |      1.37597       0.2300
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1412.79 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  114.12 Prob>chi2 = 0.0000
    (tests formally not valid because a Heywood case was encountered)

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |  -0.0132    0.1220   -0.2267 |      0.9273
           nocar |   0.7227    0.0253   -0.1150 |      0.4163
           crowd |   0.1898    0.2322   -0.0029 |      0.8871
            rent |   0.7958   -0.0720    0.1243 |      0.4171
           profm |  -0.0027   -0.0059    0.9985 |      0.0000
```

```
           pov_h |   0.6173    0.2564    0.0680 |      0.4919
             fhh |   0.1084    0.8061   -0.0687 |      0.2688
          pbasst |   0.3594    0.5366    0.0293 |      0.4930
          inclow |   0.8674   -0.0394   -0.0937 |      0.2193
          edulow |   0.2485    0.0587   -0.1473 |      0.8866
           black |   0.2100    0.4612   -0.0401 |      0.6826
           und18 |  -0.1896    0.8491    0.0229 |      0.3287
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3
    -------------+---------------------------
         Factor1 | -0.2286  -0.1582   1.0000
         Factor2 |  0.8626   0.6454   0.0061
         Factor3 | -0.4513   0.7473   0.0032
    -----------------------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    --------------------------------------------
         Factors |  Factor1   Factor2   Factor3
    -------------+------------------------------
         Factor1 |        1
         Factor2 |    .2556         1
         Factor3 |   -.2248    -.1519         1
    --------------------------------------------

.
. *Results demonstrate that 2 factor solution is the best
.
. *BETWEEN NEIGHBORHOOD
. clear

. insheet using "C:\MSTHESIS\Final\Dataset\betweencorrneigh.csv"
(13 vars, 12 obs)

. drop v1

. mkmat unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black und18, matrix
(betweencor)

. matrix rownames betweencor = unemp nocar crowd rent profm pov_h fhh pbasst inclow edulow black
und18

. matrix list betweencor

symmetric betweencor[12,12]
             unemp       nocar       crowd        rent       profm       pov_h         fhh
pbasst      inclow      edulow       black       und18
 unemp           1
 nocar   .75230002           1
 crowd       .3545   .43509999           1
  rent   .45089999       .6681   .41859999           1
 profm      -.2685  -.39309999      -.0548       .2458           1
 pov_h   .70520002   .80599999       .4878   .68110001      -.2189           1
   fhh   .66229999   .67580003   .36300001       .2483  -.56889999   .58490002           1
pbasst   .53780001   .59530002        .333   .39660001  -.34130001   .68610001   .70099998
1
inclow   .66250002   .89950001   .41240001   .59509999  -.49110001   .83499998   .62180001
.63510001           1
edulow       .4743   .65850002       .1947   .27239999  -.60159999   .61369997       .5535
.75040001   .76459998           1
 black   .71689999       .7087   .33410001   .36449999  -.40349999   .60689998   .79119998
.64560002   .62620002   .46219999           1
 und18   .34330001   .34240001       .1705  -.17399999  -.62360001       .2031   .82929999
.46399999       .3017   .37940001   .60759997           1
```

```
.
. *Conduct factor analysis
. factormat betweencor, n(89) ml
(obs=89)
number of factors adjusted to 7
Iteration 0:   log likelihood = -35.891568
Iteration 1:   log likelihood =  -26.36651
Iteration 2:   log likelihood = -2.2551268
Iteration 3:   log likelihood =  -1.850692
Iteration 4:   log likelihood = -1.5088242
Iteration 5:   log likelihood = -1.4798121
Iteration 6:   log likelihood = -1.4200041
Iteration 7:   log likelihood = -1.4125279
Iteration 8:   log likelihood = -1.4108895
Iteration 9:   log likelihood =  -1.410478
Iteration 10:  log likelihood = -1.4103738
Iteration 11:  log likelihood = -1.4103472
Iteration 12:  log likelihood = -1.4103404
Iteration 13:  log likelihood = -1.4103387
Iteration 14:  log likelihood = -1.4103383
Iteration 15:  log likelihood = -1.4103382
Iteration 16:  log likelihood = -1.4103381
Iteration 17:  log likelihood = -1.4103381
Iteration 18:  log likelihood = -1.4103381
Iteration 19:  log likelihood = -1.4103381
Iteration 20:  log likelihood = -1.4103381

Factor analysis/correlation                        Number of obs    =        89
    Method: maximum likelihood                     Retained factors =         7
    Rotation: (unrotated)                          Number of params =        63
                                                   Schwarz's BIC    =   285.605
    Log likelihood = -1.410338                     (Akaike's) AIC   =   128.821

    Beware: solution is a Heywood case
            (i.e., invalid or boundary values of uniqueness)

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      5.37145      3.59545            0.5048       0.5048
        Factor2  |      1.77600      0.65145            0.1669       0.6717
        Factor3  |      1.12455      0.81010            0.1057       0.7774
        Factor4  |      0.31445     -1.00400            0.0296       0.8069
        Factor5  |      1.31845      0.85117            0.1239       0.9308
        Factor6  |      0.46728      0.19830            0.0439       0.9747
        Factor7  |      0.26899            .            0.0253       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   7 factors vs. saturated:  chi2(3)  =    2.52 Prob>chi2 = 0.4718
    (tests formally not valid because a Heywood case was encountered)

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7 |   Uniqueness
    -------------+--------------------------------------------------------------------+--------------
           unemp |   0.9792   -0.0298   -0.2006   -0.0022   -0.0000   -0.0000   -0.0000 |       0.0000
           nocar |   0.8224    0.2065    0.2326    0.0652    0.2450    0.2740   -0.0766 |       0.0818
           crowd |   0.4115    0.1761    0.2157   -0.0331   -0.0641    0.1194    0.2137 |       0.6880
            rent |   0.5379    0.8022    0.2589   -0.0021   -0.0000   -0.0000   -0.0000 |       0.0000
           profm |  -0.3032    0.5832   -0.2279   -0.0290   -0.4298   -0.3606    0.1356 |       0.1820
           pov_h |   0.7668    0.2744    0.1870   -0.0009    0.2423    0.1372    0.3128 |       0.1263
             fhh |   0.7706   -0.3738    0.5160   -0.0118   -0.0000   -0.0000   -0.0000 |       0.0000
          pbasst |   0.6271   -0.0508    0.3870    0.0820    0.4050   -0.2872    0.2925 |       0.1156
          inclow |   0.7311    0.1742    0.2400    0.0319    0.4324    0.3822    0.0794 |       0.0372
          edulow |   0.5272   -0.0858    0.2222   -0.0417    0.8122   -0.0220   -0.0082 |       0.0033
           black |   0.7828   -0.1546    0.2646    0.5415    0.0000   -0.0000   -0.0000 |       0.0000
           und18 |   0.4303   -0.6622    0.4865    0.0733   -0.0128   -0.0078   -0.0966 |       0.1247
    -------------------------------------------------------------------------------------------------

. estat common

Correlation matrix of the common factors

    ------------------------------------------------------------------------------------
```

```
        Factors |  Factor1   Factor2   Factor3   Factor4   Factor5   Factor6   Factor7
    -------------+----------------------------------------------------------------------
        Factor1 |        1
        Factor2 |        0         1
        Factor3 |        0         0         1
        Factor4 |        0         0         0         1
        Factor5 |        0         0         0         0         1
        Factor6 |        0         0         0         0         0         1
        Factor7 |        0         0         0         0         0         0         1
    ------------------------------------------------------------------------------------

. screeplot

. graph save "C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Analysis\Screeplots\screebetween.gph saved)

.
. *1 Factor
. factormat betweencor, n(89) factors(1) ml
(obs=89)
Iteration 0:   log likelihood = -693.90879
Iteration 1:   log likelihood = -268.67184
Iteration 2:   log likelihood = -264.01906
Iteration 3:   log likelihood = -262.58289
Iteration 4:   log likelihood = -262.22774
Iteration 5:   log likelihood =  -262.1539
Iteration 6:   log likelihood = -262.13989
Iteration 7:   log likelihood = -262.13735
Iteration 8:   log likelihood = -262.13689
Iteration 9:   log likelihood = -262.13681
Iteration 10:  log likelihood =  -262.1368
Iteration 11:  log likelihood =  -262.1368

Factor analysis/correlation                        Number of obs    =        89
    Method: maximum likelihood                     Retained factors =         1
    Rotation: (unrotated)                          Number of params =        12
                                                   Schwarz's BIC    =   578.137
    Log likelihood = -262.1368                     (Akaike's) AIC   =   548.274

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      6.28587            .            1.0000       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  491.87 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    ---------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+--------------
           unemp |   0.7756 |      0.3985
           nocar |   0.9384 |      0.1193
           crowd |   0.4613 |      0.7872
            rent |   0.6144 |      0.6225
           profm |  -0.4534 |      0.7944
           pov_h |   0.8698 |      0.2434
             fhh |   0.7502 |      0.4372
          pbasst |   0.7270 |      0.4715
          inclow |   0.9296 |      0.1358
          edulow |   0.7407 |      0.4514
           black |   0.7556 |      0.4291
           und18 |   0.4199 |      0.8237
    ---------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =        89
    Method: maximum likelihood                     Retained factors =         1
    Rotation: oblique oblimin (Horst off)          Number of params =        12
```

```
                                                   Schwarz's BIC    =  578.137
    Log likelihood = -262.1368                     (Akaike's) AIC   =  548.274

    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      6.28587       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:    1 factor vs. saturated:  chi2(54) =  491.87 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    ---------------------------------------
        Variable |  Factor1 |   Uniqueness
    -------------+----------+--------------
           unemp |   0.7756 |      0.3985
           nocar |   0.9384 |      0.1193
           crowd |   0.4613 |      0.7872
            rent |   0.6144 |      0.6225
           profm |  -0.4534 |      0.7944
           pov_h |   0.8698 |      0.2434
             fhh |   0.7502 |      0.4372
          pbasst |   0.7270 |      0.4715
          inclow |   0.9296 |      0.1358
          edulow |   0.7407 |      0.4514
           black |   0.7556 |      0.4291
           und18 |   0.4199 |      0.8237
    ---------------------------------------

Factor rotation matrix

    -----------------------
                 | Factor1
    -------------+---------
         Factor1 |  1.0000
    -----------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    ------------------------
         Factors |  Factor1
    -------------+----------
         Factor1 |        1
    ------------------------

.
. *2 Factors
. factormat betweencor, n(89) factors(2) ml
(obs=89)
Iteration 0:   log likelihood = -237.03736
Iteration 1:   log likelihood = -141.41436
Iteration 2:   log likelihood = -137.08408
Iteration 3:   log likelihood = -136.82711
Iteration 4:   log likelihood = -136.80855
Iteration 5:   log likelihood = -136.80601
Iteration 6:   log likelihood = -136.80562
Iteration 7:   log likelihood = -136.80556
Iteration 8:   log likelihood = -136.80555
Iteration 9:   log likelihood = -136.80555
Iteration 10:  log likelihood = -136.80555
Iteration 11:  log likelihood = -136.80555

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        2
    Rotation: (unrotated)                          Number of params =       23
                                                   Schwarz's BIC    =   376.85
    Log likelihood = -136.8055                     (Akaike's) AIC   =  319.611
```

```
    ------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+----------------------------------------------------------
        Factor1  |      5.16518      2.17315            0.6332       0.6332
        Factor2  |      2.99202            .            0.3668       1.0000
    ------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  254.65 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.6048    0.5017 |      0.3825
           nocar |   0.6590    0.6681 |      0.1193
           crowd |   0.3296    0.3493 |      0.7694
            rent |   0.1503    0.8045 |      0.3302
           profm |  -0.6460    0.1014 |      0.5724
           pov_h |   0.5356    0.7292 |      0.1814
             fhh |   0.9506    0.0887 |      0.0885
          pbasst |   0.6694    0.3547 |      0.4261
          inclow |   0.6211    0.6802 |      0.1515
          edulow |   0.5929    0.4058 |      0.4839
           black |   0.7861    0.2691 |      0.3097
           und18 |   0.9071   -0.3864 |      0.0280
    -------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                          Number of obs    =        89
    Method: maximum likelihood                       Retained factors =         2
    Rotation: oblique oblimin (Horst off)            Number of params =        23
                                                     Schwarz's BIC    =    376.85
    Log likelihood = -136.8055                       (Akaike's) AIC   =   319.611

    ------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+----------------------------------------------------------
        Factor1  |      5.94130       0.7284
        Factor2  |      3.64666       0.4470
    ------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   2 factors vs. saturated:  chi2(43) =  254.65 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -------------------------------------------------
        Variable |  Factor1   Factor2 |   Uniqueness
    -------------+--------------------+--------------
           unemp |   0.7117    0.1684 |      0.3825
           nocar |   0.8981    0.1026 |      0.1193
           crowd |   0.4645    0.0412 |      0.7694
            rent |   0.8633   -0.4110 |      0.3302
           profm |  -0.1167   -0.6045 |      0.5724
           pov_h |   0.9179   -0.0406 |      0.1814
             fhh |   0.4120    0.7309 |      0.0885
          pbasst |   0.5852    0.3200 |      0.4261
          inclow |   0.8975    0.0631 |      0.1515
          edulow |   0.6108    0.2224 |      0.4839
           black |   0.5383    0.4741 |      0.3097
           und18 |  -0.0825    1.0113 |      0.0280
    -------------------------------------------------

Factor rotation matrix

    --------------------------------
                 | Factor1  Factor2
    -------------+------------------
         Factor1 |  0.6254   0.9480
         Factor2 |  0.7803  -0.3184
```

```
    --------------------------------

. estat common

Correlation matrix of the oblimin(0) rotated common factors

    ----------------------------------
         Factors |  Factor1   Factor2
    -------------+--------------------
         Factor1 |        1
         Factor2 |    .3445         1
    ----------------------------------

.
. *3 Factor
. factormat betweencor, n(89) factors(3) ml
(obs=89)
Iteration 0:   log likelihood = -103.80108
Iteration 1:   log likelihood = -73.340157
Iteration 2:   log likelihood = -69.206845
Iteration 3:   log likelihood = -68.947903
Iteration 4:   log likelihood = -68.939724
Iteration 5:   log likelihood = -68.939343
Iteration 6:   log likelihood =  -68.93932
Iteration 7:   log likelihood = -68.939318
Iteration 8:   log likelihood = -68.939318
Iteration 9:   log likelihood = -68.939318

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        3
    Rotation: (unrotated)                          Number of params =       33
                                                   Schwarz's BIC    =  286.004
    Log likelihood = -68.93932                     (Akaike's) AIC   =  203.879

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      6.35594      4.55999            0.6999       0.6999
        Factor2  |      1.79595      0.86611            0.1978       0.8976
        Factor3  |      0.92984            .            0.1024       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  127.29 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
           unemp |   0.7401    0.1842    0.1719 |      0.3889
           nocar |   0.8502    0.4015    0.0107 |      0.1158
           crowd |   0.4232    0.2058    0.2187 |      0.7307
            rent |   0.4234    0.7020    0.4310 |      0.1422
           profm |  -0.5989    0.3068    0.6478 |      0.1275
           pov_h |   0.7567    0.4731    0.1180 |      0.1897
             fhh |   0.9350   -0.2950    0.1300 |      0.0219
          pbasst |   0.7531    0.0651    0.0842 |      0.4215
          inclow |   0.8397    0.4634   -0.2019 |      0.0395
          edulow |   0.7100    0.2013   -0.3755 |      0.3144
           black |   0.8160   -0.0503    0.1598 |      0.3061
           und18 |   0.6924   -0.6315   -0.0406 |      0.1201
    -----------------------------------------------------------

. rotate, oblimin oblique

Factor analysis/correlation                        Number of obs    =       89
    Method: maximum likelihood                     Retained factors =        3
    Rotation: oblique oblimin (Horst off)          Number of params =       33
                                                   Schwarz's BIC    =  286.004
    Log likelihood = -68.93932                     (Akaike's) AIC   =  203.879
```

```
    --------------------------------------------------------------------------
         Factor  |     Variance   Proportion    Rotated factors are correlated
    -------------+------------------------------------------------------------
        Factor1  |      5.47460       0.6028
        Factor2  |      4.42968       0.4878
        Factor3  |      2.07941       0.2290
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(66) = 1132.82 Prob>chi2 = 0.0000
    LR test:   3 factors vs. saturated:  chi2(33) =  127.29 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances

    -----------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness 
    -------------+------------------------------+--------------
           unemp |   0.5677    0.3800    0.0795 |      0.3889  
           nocar |   0.8387    0.1636   -0.1138 |      0.1158  
           crowd |   0.4168    0.2008    0.1771 |      0.7307  
            rent |   0.8835   -0.1040    0.4082 |      0.1422  
           profm |  -0.0484   -0.2424    0.7964 |      0.1275  
           pov_h |   0.8536    0.1088    0.0172 |      0.1897  
             fhh |   0.2170    0.8853    0.0066 |      0.0219  
          pbasst |   0.4638    0.4396   -0.0181 |      0.4215  
          inclow |   0.8983   -0.0202   -0.3454 |      0.0395  
          edulow |   0.5841    0.0281   -0.5159 |      0.3144  
           black |   0.3853    0.6207    0.0559 |      0.3061  
           und18 |  -0.2289    0.9327   -0.1438 |      0.1201  
    -----------------------------------------------------------

Factor rotation matrix

    -----------------------------------------
                 | Factor1  Factor2  Factor3 
    -------------+---------------------------
         Factor1 |  0.7848   0.8671  -0.4405 
         Factor2 |  0.6106  -0.4849   0.2747 
         Factor3 |  0.1065   0.1144   0.8547 
    -----------------------------------------

. 
. estat common

Correlation matrix of the oblimin(0) rotated common factors

    --------------------------------------------
         Factors |  Factor1   Factor2   Factor3 
    -------------+------------------------------
         Factor1 |        1                     
         Factor2 |    .3966         1           
         Factor3 |  -.08696    -.4173         1 
    --------------------------------------------

. 
. *Results demonstrate that 1 factor solution is the best
. 
. 
end of do-file

. 
. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Factor Analysis.log
  log type:  text
 closed on:  22 Jul 2009, 10:24:31
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

4.4.4 Creating Factor Scores

```
------------------------------------------------------------------------------------------------
-----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Creating Factor Scores.log
  log type:  text
 opened on:  22 Jul 2009, 11:16:06

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09.dta"

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. drop  f1nw f2nw meanfbwn fbwn meanf1nw meanf2nw cf1nw cf2nw cfbwn

.
. *Factor 1: Within Neighborhoods
. *Variables with high loadings: nocar, rent, pov_h, pbasst, inclow
. gen f1nw = (nocar + rent + pov_h + pbasst + inclow)/5

. describe f1nw

              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
f1nw            float  %9.0g

. summarize f1nw

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        f1nw |       341     29.8456    13.59283          0   75.44032

. codebook f1nw

------------------------------------------------------------------------------------------------
-----------------------------------------------------------
f1nw
(unlabeled)
------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,75.440323]                units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   29.8456
              std. dev:   13.5928

           percentiles:        10%       25%       50%       75%       90%
                           14.2903   19.8229   27.8348   37.1479   48.8285

.
. *Factor 2: Within Neighborhoods
. *Variables with high loadsing: fhh, pbasst, black, und18
. gen f2nw = (fhh + pbasst + black + und18)/4

. describe f2nw

              storage  display     value
```

```
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
f2nw            float  %9.0g

. summarize f2nw

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        f2nw |       341    15.76843    12.82209   1.075993   63.70679

. codebook f2nw

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
f2nw
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (float)

                 range:  [1.0759932,63.706791]        units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   15.7684
              std. dev:   12.8221

           percentiles:        10%       25%       50%       75%       90%
                           4.68791   6.46522   10.3548   21.4829   37.3242

.
. *Now create between factor scores for neighborhoods
. *From FinalCreating Factor Scores 6_27_09
. *Factor: Between Neighborhoods
. *One factor extracted
. *All factors loaded
. gen meanfbwn = (unemp + nocar + crowd + rent + profmrev + pov_h + fhh + pbasst + inclow +
edulow + black + und18)/12

. *describe meanfbwn
. *summarize meanfbwn
. *codebook meanfbwn
. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. collapse (mean)fbwn  = meanfbwn , by(neigh)

. *The following describes the neighborhood factor
. describe fbwn

              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
fbwn            float  %9.0g                  (mean) meanfbwn

. summarize fbwn

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        fbwn |        89    29.34108    10.76975   13.20997    63.0678

. codebook fbwn

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
```

```
fbwn
(mean) meanfbwn
---------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [13.209972,63.067802]        units:  1.000e-06
         unique values:  89                       missing .:  0/89

                  mean:   29.3411
              std. dev:   10.7698

           percentiles:        10%       25%       50%       75%       90%
                           17.3818   21.0944   28.1573   36.1022   43.5494

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta saved

.
. *Now create merge these scores with entire dataset
. *First, merge between factor scores from census tracts
. *Sort neigh in each dataset
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. sort neigh

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta"

. sort neigh

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta saved

.
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. *drop _merge
. merge neigh using "C:\MSTHESIS\Final\Dataset\Final6_27_09tempbw.dta"
variable neigh does not uniquely identify observations in the master data

. list neigh blkgrp f1nw f2nw fbwn in 1/20

     +---------------------------------------------------+
     | neigh   blkgrp       f1nw       f2nw        fbwn |
     |---------------------------------------------------|
  1. |     1        1   55.69299   9.855605    37.23996 |
  2. |     2        1   31.92208   4.766697    22.64123 |
  3. |     3        1   35.39141   9.914721    31.16913 |
  4. |     3        3   38.03324   24.21375    31.16913 |
  5. |     3        2   44.19748   25.18054    31.16913 |
     |---------------------------------------------------|
  6. |     3        4   23.61492   11.56456    31.16913 |
  7. |     4        3   31.52401   14.30459     25.0034 |
  8. |     4        2   28.70193   14.38364     25.0034 |
  9. |     4        1    17.4782   8.209464     25.0034 |
 10. |     5        1   50.14189   36.58075    44.67694 |
     |---------------------------------------------------|
 11. |     6        2   10.58274   8.316279    17.14701 |
 12. |     6        1   25.19449   6.207402    17.14701 |
 13. |     6        3   12.53693   3.248848    17.14701 |
 14. |     7        1   69.88033   51.14944     58.8264 |
 15. |     8        3   22.70531    7.70952    21.26229 |
     |---------------------------------------------------|
```

```
 16. |     8        1   18.38859   5.284203   21.26229 |
 17. |     8        4   24.02517    7.26091   21.26229 |
 18. |     8        5   26.81016   5.376109   21.26229 |
 19. |     8        4   23.82751   10.09721   21.26229 |
 20. |     8        2   11.34782   6.756063   21.26229 |
     +---------------------------------------------------+

.
. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
. describe f1nw f2nw

              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
f1nw            float  %9.0g
f2nw            float  %9.0g

. summarize f1nw f2nw

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        f1nw |       341     29.8456    13.59283          0   75.44032
        f2nw |       341    15.76843    12.82209   1.075993   63.70679

. codebook f1nw f2nw

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
f1nw
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,75.440323]                units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   29.8456
              std. dev:   13.5928

           percentiles:        10%       25%       50%       75%       90%
                           14.2903   19.8229   27.8348   37.1479   48.8285

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
f2nw
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [1.0759932,63.706791]        units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   15.7684
              std. dev:   12.8221

           percentiles:        10%       25%       50%       75%       90%
                           4.68791   6.46522   10.3548   21.4829   37.3242

.
. ****NOW CENTER THE FACTOR SCORES
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
```

```
.
. *Neighborhoods
. *Create the mean factor scores for each neighborhood
. collapse (mean) meanf1nw=f1nw meanf2nw=f2nw meanfbwn=fbwn, by (neigh)

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09tempmean.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09tempmean.dta saved

.
. *Find the meanfbwn for all neighborhoods
. summarize meanfbwn

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    meanfbwn |        89    29.34108    10.76975   13.20997    63.0678

. *the mean of fbwn is 29.34108
.
. *Now create within factor scores
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. sort neigh

. drop _merge

. merge neigh using "C:\MSTHESIS\Final\Dataset\Final6_27_09tempmean.dta"
variable neigh does not uniquely identify observations in the master data

. drop _merge

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

.
. *Now center within factor
. generate cf1nw = f1nw - meanf1nw

. generate cf2nw = f2nw - meanf2nw

.
. *Now center between factor
. generate cfbwn = fbwn - 29.34108

.
. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
.
. *Summary of Factor Scores
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. summarize  f1nw f2nw, detail

                            f1nw
-------------------------------------------------------------
      Percentiles      Smallest
 1%     7.523272              0
 5%     11.42521       4.927536
10%     14.29026       7.286844       Obs                 341
25%     19.82287       7.523272       Sum of Wgt.         341
```

```
50%     27.83481                      Mean           29.8456
                        Largest       Std. Dev.      13.59283
75%     37.14793       69.88033
90%     48.82852       70.16402       Variance        184.765
95%     55.16427       73.94585       Skewness       .7556728
99%     69.88033       75.44032       Kurtosis       3.446444

                            f2nw
-------------------------------------------------------------
      Percentiles      Smallest
 1%     1.516272       1.075993
 5%     3.523313       1.191581
10%     4.687915       1.506288       Obs                 341
25%     6.465221       1.516272       Sum of Wgt.         341

50%     10.35479                      Mean           15.76843
                        Largest       Std. Dev.      12.82209
75%     21.48288       49.90309
90%     37.32417       51.14944       Variance        164.406
95%     41.02642       51.87084       Skewness       1.182808
99%     49.90309       63.70679       Kurtosis       3.346164

. list neigh f1nw f2nw fbwn if neigh==69 | neigh ==28 | neigh ==34 | neigh==77

     +-----------------------------------------+
     | neigh       f1nw       f2nw        fbwn |
     |-----------------------------------------|
106. |    28   37.99669   21.48288   39.62757 |
107. |    28   40.13419   30.35669   39.62757 |
108. |    28   37.04466   18.50215   39.62757 |
109. |    28   62.55502    43.4033   39.62757 |
110. |    28    46.8095   34.41298   39.62757 |
     |-----------------------------------------|
111. |    28   49.96933   19.16884   39.62757 |
112. |    28   52.73336   46.55172   39.62757 |
113. |    28   47.41875   35.05957   39.62757 |
123. |    34   43.42123   33.69773    39.8526 |
124. |    34    33.8281   39.35994    39.8526 |
     |-----------------------------------------|
125. |    34   28.21354   31.49629    39.8526 |
126. |    34   60.52499   49.90309    39.8526 |
127. |    34    39.6973   34.71199    39.8526 |
256. |    69   40.35477   2.850565   20.38206 |
257. |    69   31.69611   4.783919   20.38206 |
     |-----------------------------------------|
258. |    69   25.25451   4.892443   20.38206 |
259. |    69   39.21545   4.857312   20.38206 |
260. |    69   34.61671   5.846191   20.38206 |
261. |    69   37.79825   9.879511   20.38206 |
262. |    69   32.68169   1.516272   20.38206 |
     |-----------------------------------------|
263. |    69   27.87943   2.940318   20.38206 |
264. |    69   27.16369   3.915975   20.38206 |
265. |    69   31.06884   2.787946   20.38206 |
266. |    69   27.63222   4.266765   20.38206 |
267. |    69   18.93339   5.927807   20.38206 |
     |-----------------------------------------|
296. |    77   24.50913   5.076081   15.03123 |
297. |    77   9.261839   5.305548   15.03123 |
298. |    77   29.56621   5.805963   15.03123 |
299. |    77   23.10911   5.440475   15.03123 |
300. |    77   13.94859   7.188161   15.03123 |
     |-----------------------------------------|
301. |    77   10.67426   7.834249   15.03123 |
302. |    77   14.91629   4.723129   15.03123 |
303. |    77   19.10871   7.772051   15.03123 |
304. |    77   11.42521   1.191581   15.03123 |
     +-----------------------------------------+

.
. collapse (mean) meanfbwn=fbwn, by (neigh)
```

```
. summarize meanfbwn, detail

                         (mean) fbwn
-------------------------------------------------------------
      Percentiles      Smallest
 1%     13.20997       13.20997
 5%     16.49473       14.23174
10%     17.38185       14.53187       Obs                  89
25%     21.09437       15.03123       Sum of Wgt.          89

50%     28.15728                      Mean           29.34108
                        Largest       Std. Dev.      10.76975
75%     36.10224       53.13168
90%     43.54941       55.03351       Variance       115.9876
95%     52.51833        58.8264       Skewness       .9040846
99%      63.0678        63.0678       Kurtosis       3.503534

.
. *GRAPHING MEDij CDij vs ONDj
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

.
. *OND vs MED
. graph twoway (scatter fbwn f1nw), ///
> ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100) ///
> xtitle (Material and Economic Block Group Deprivation) ytitle(Overall Neighborhood Deprivation)

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f1wn.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f1wn.gph saved)

.
. *OND vs CD
. graph twoway (scatter fbwn f2nw), ///
> ysc (r(0 100)) ylabel (0(20)100) xsc (r(0 100)) xlabel (0 (20) 100) ///
>   xtitle (Concentrated Block Group Disadvantage) ytitle(Overall Neighborhood Disadvantage)

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f2wn.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f2wn.gph saved)

.
. *Boxplot of OND
. graph box fbwn , fxsize(15) ysc (r(0 100)) caption(" " " ") ytitle(" ") ylabel (none)

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnbox.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnbox.gph saved)

.
. *Boxplot of MED
. graph hbox f1nw , ysc (r(0 100)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\f1nwbox.gph"
file C:\MSTHESIS\Final\Graphs\Factor Scores\f1nwbox.gph already exists
r(602);

end of do-file
r(602);

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\f1nwbox.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\f1nwbox.gph saved)

.
. *Boxplot of CD
. graph hbox f2nw , ysc (r(0 100)) fysize(15) l1title(" ") l2title(" ") ylabel(none) ytitle(" ")

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\f2nwbox.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\f2nwbox.gph saved)
```

```
.
. *Combined graph of OND vs MED
. gr combine "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnbox.gph" ///
> "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f1wn.gph" ///
> "C:\MSTHESIS\Final\Graphs\Factor Scores\f1nwbox.gph", cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnf1nwbox.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnf1nwbox.gph saved)

.
. *Combined graph of OND vs CD
. gr combine "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnbox.gph" ///
> "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwn_f2wn.gph" ///
> "C:\MSTHESIS\Final\Graphs\Factor Scores\f2nwbox.gph", cols(2) holes(3)

. graph save "C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnf2nwbox.gph", replace
(file C:\MSTHESIS\Final\Graphs\Factor Scores\fbwnf2nwbox.gph saved)

.
. *GRAPHING FACTOR SCORES FOR 4 NEIGHBORHOODS
. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. dotplot f1nw if neigh_name=="East Liberty" | neigh_name=="Garfield" | neigh_name=="Shadyside" |
///
> neigh_name=="Squirrel Hill North", center over (neigh_name) ///
> msymbol(0) nx(80) ny(125) ysize(2.5) scale(1.0) ysc (r(0 100)) ylabel (0(20)100) ///
> ytitle(Material and Economic Deprivation) xtitle (Neighborhood)
(note:  named style 0 not found in class symbol, default attributes used

.
. dotplot f2nw if neigh_name=="East Liberty" | neigh_name=="Garfield" | neigh_name=="Shadyside" |
///
> neigh_name=="Squirrel Hill North", center over (neigh_name) ///
> msymbol(0) nx(80) ny(1000) ysize(2.5) scale(1.0) ysc (r(0 100)) ylabel (0(20)100) ///
> ytitle(Concentrated Disadvantage) xtitle (Neighborhood)
(note:  named style 0 not found in class symbol, default attributes used

.
. collapse (mean) fbw, by (neigh_name)

. dotplot fbw if neigh_name=="East Liberty" | neigh_name=="Garfield" | neigh_name=="Shadyside" |
///
> neigh_name=="Squirrel Hill North", center over (neigh_name) ///
> msymbol(0) nx(80) ny(125) ysize(2.5) scale(1.0) ysc (r(0 100)) ylabel (0(20)100) ///
> ytitle(Overall Neighborhood Deprivation) xtitle (Neighborhood)
(note:  named style 0 not found in class symbol, default attributes used

.
.
.
end of do-file

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Creating Factor Scores.log
  log type:  text
 closed on:  22 Jul 2009, 11:17:24
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Creating Factor Scores.log
  log type:  text
 opened on:  22 Jul 2009, 11:19:54

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"
```

```
. sort neigh_name ctblock

. list neigh_name ctblock f1nw f2nw fbwn if neigh==28 | neigh==69 | neigh==34 | neigh==77

     +-----------------------------------------------------------------+
     |          neigh_name   ctblock       f1nw       f2nw       fbwn |
     |-----------------------------------------------------------------|
106. |        East Liberty   1113001   40.13419   30.35669   39.62757 |
107. |        East Liberty   1113002   37.04466   18.50215   39.62757 |
108. |        East Liberty   1113003   47.41875   35.05957   39.62757 |
109. |        East Liberty   1113004   37.99669   21.48288   39.62757 |
110. |        East Liberty   1115001    46.8095   34.41298   39.62757 |
     |-----------------------------------------------------------------|
111. |        East Liberty   1115002   52.73336   46.55172   39.62757 |
112. |        East Liberty   1115003   49.96933   19.16884   39.62757 |
113. |        East Liberty   1115004   62.55502    43.4033   39.62757 |
123. |            Garfield   1016001   60.52499   49.90309    39.8526 |
124. |            Garfield   1017001   28.21354   31.49629    39.8526 |
     |-----------------------------------------------------------------|
125. |            Garfield   1017002    39.6973   34.71199    39.8526 |
126. |            Garfield   1114001   43.42123   33.69773    39.8526 |
127. |            Garfield   1114002    33.8281   39.35994    39.8526 |
257. |           Shadyside   0703001   32.68169   1.516272   20.38206 |
258. |           Shadyside   0703002   34.61671   5.846191   20.38206 |
     |-----------------------------------------------------------------|
259. |           Shadyside   0703003   18.93339   5.927807   20.38206 |
260. |           Shadyside   0705001   31.06884   2.787946   20.38206 |
261. |           Shadyside   0705002   40.35477   2.850565   20.38206 |
262. |           Shadyside   0705003   37.79825   9.879511   20.38206 |
263. |           Shadyside   0706001   25.25451   4.892443   20.38206 |
     |-----------------------------------------------------------------|
264. |           Shadyside   0706002   27.87943   2.940318   20.38206 |
265. |           Shadyside   0708001   27.63222   4.266765   20.38206 |
266. |           Shadyside   0708002   27.16369   3.915975   20.38206 |
267. |           Shadyside   0709001   31.69611   4.783919   20.38206 |
268. |           Shadyside   0709002   39.21545   4.857312   20.38206 |
     |-----------------------------------------------------------------|
297. | Squirrel Hill North   1401001   14.91629   4.723129   15.03123 |
298. | Squirrel Hill North   1401002   9.261839   5.305548   15.03123 |
299. | Squirrel Hill North   1401004   11.42521   1.191581   15.03123 |
300. | Squirrel Hill North   1402001   24.50913   5.076081   15.03123 |
301. | Squirrel Hill North   1402002   29.56621   5.805963   15.03123 |
     |-----------------------------------------------------------------|
302. | Squirrel Hill North   1403001   19.10871   7.772051   15.03123 |
303. | Squirrel Hill North   1403002   23.10911   5.440475   15.03123 |
304. | Squirrel Hill North   1403003   10.67426   7.834249   15.03123 |
305. | Squirrel Hill North   1403004   13.94859   7.188161   15.03123 |
     +-----------------------------------------------------------------+

.
end of do-file

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Creating Factor Scores.log
  log type:  text
 closed on:  22 Jul 2009, 11:20:04
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

4.5.1 Model Selection

```
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Multilevel Model Building.log
  log type:  text
 opened on:  22 Jul 2009, 11:34:00

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. *Now conduct multilevel model
. clear

.
. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

.
. summarize lbwper, detail

                           lbwper
-------------------------------------------------------------
      Percentiles      Smallest
 1%            0              0
 5%            0              0
10%            0              0       Obs                 341
25%     .0434783              0       Sum of Wgt.         341

50%     .0857143                      Mean           .0904031
                        Largest       Std. Dev.      .0650725
75%         .125            .32
90%     .1666667       .3333333       Variance       .0042344
95%     .2093023       .3333333       Skewness       .9370538
99%          .32       .3333333       Kurtosis        4.40874

. *Model Fitting Neigborhood Data
. **Model 1
. xtmixed lbwper || neigh:, variance covar(ind) mle
Note: single-variable random-effects specification; covariance structure set to identity

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  459.87089
Iteration 1:   log likelihood =   459.8719
Iteration 2:   log likelihood =   459.8719

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(0)       =         .
Log likelihood =   459.8719                     Prob > chi2        =         .

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0944598   .0046886    20.15   0.000     .0852703    .1036493
------------------------------------------------------------------------------

------------------------------------------------------------------------------
```

```
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Identity              |
                  var(_cons) |    .000805   .0002634      .0004239    .0015285
-----------------------------+------------------------------------------------
               var(Residual) |   .0033884   .0002901      .0028649    .0040074
------------------------------------------------------------------------------
LR test vs. linear regression: chibar2(01) =    23.06 Prob >= chibar2 = 0.0000

. estat ic

-----------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+---------------------------------------------------------------
           . |    341           .    459.8719      3    -913.7438   -902.2482
-----------------------------------------------------------------------------

. estimates store m1

. display "deviance = " -2*e(ll)
deviance = -919.7438

.
. **Model 2 Main Effects Model, Within
. xtmixed lbwper cf1nw cf2nw || neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  467.63843
Iteration 1:   log likelihood =  468.72077
Iteration 2:   log likelihood =  468.75363
Iteration 3:   log likelihood =  468.75398
Iteration 4:   log likelihood =  468.75398

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(2)       =      5.89
Log likelihood =  468.75398                     Prob > chi2        =    0.0525

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0016518   .0006849     2.41   0.016     .0003095    .0029941
       cf2nw |  -.0004634   .0008735    -0.53   0.596    -.0021755    .0012486
       _cons |   .0948126   .0046561    20.36   0.000     .0856868    .1039384
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   7.25e-06   3.53e-06      2.79e-06    .0000188
                  var(cf2nw) |   4.95e-06   5.55e-06      5.50e-07    .0000445
                  var(_cons) |    .000935   .0002711      .0005297    .0016506
-----------------------------+------------------------------------------------
               var(Residual) |   .0027963   .0002742      .0023073     .003389
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    38.31   Prob > chi2 = 0.0000

Note: LR test is conservative and provided only for reference
```

```
. estat ic

-----------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+---------------------------------------------------------------
           . |    341           .     468.754      7     -923.508   -896.6848
-----------------------------------------------------------------------------

. estimates store m2

. display "deviance = " -2*e(ll)
deviance = -937.50797

.
. **Model 3 Main Effects Model, Between
. xtmixed lbwper cfbw || neigh:, variance covar(ind) mle
Note: single-variable random-effects specification; covariance structure set to identity

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  478.42156
Iteration 1:   log likelihood =  478.67362
Iteration 2:   log likelihood =  478.67452
Iteration 3:   log likelihood =  478.67452

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(1)       =     51.45
Log likelihood =  478.67452                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cfbwn |   .0027737   .0003867     7.17   0.000     .0020158    .0035316
       _cons |    .098104    .003673    26.71   0.000     .0909052    .1053029
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Identity              |
                  var(_cons) |   .0001689   .0001497      .0000297    .0009592
-----------------------------+------------------------------------------------
               var(Residual) |    .003383   .0002855      .0028673    .0039915
------------------------------------------------------------------------------
LR test vs. linear regression: chibar2(01) =     1.74 Prob >= chibar2 = 0.0938

. estat ic

-----------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+---------------------------------------------------------------
           . |    341           .    478.6745      4     -949.349   -934.0215
-----------------------------------------------------------------------------

. estimates store m3

. display "deviance = " -2*e(ll)
deviance = -957.34904

.
```

```
. **Model 4 Main Effects Model, Full
. xtmixed lbwper cf1nw cf2nw cfbw || neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  486.18725
Iteration 1:   log likelihood =  487.49861
Iteration 2:   log likelihood =  487.53156
Iteration 3:   log likelihood =  487.53198
Iteration 4:   log likelihood =  487.53198

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(3)       =     56.79
Log likelihood =  487.53198                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0016507   .0006851     2.41   0.016     .0003079    .0029935
       cf2nw |  -.0004651   .0008736    -0.53   0.594    -.0021774    .0012472
       cfbwn |   .0027126   .0003802     7.14   0.000     .0019675    .0034578
       _cons |   .0980671   .0036409    26.93   0.000      .090931    .1052031
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   7.23e-06   3.53e-06      2.77e-06    .0000188
                  var(cf2nw) |   4.89e-06   5.52e-06      5.33e-07    .0000448
                  var(_cons) |   .0002794   .0001593      .0000914    .0008541
-----------------------------+------------------------------------------------
               var(Residual) |   .0028087   .0002714      .0023242    .0033943
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    16.45   Prob > chi2 = 0.0009

Note: LR test is conservative and provided only for reference

. estat ic

------------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+----------------------------------------------------------------
           . |    341           .     487.532      8     -959.064   -928.4089
------------------------------------------------------------------------------

. estimates store m4

. display "deviance = " -2*e(ll)
deviance = -975.06396

.
. **Model 5 Interaction Model F1w*Fbw F2w*Fbw
. g f1int = cf1nw*cfbwn

. g f2int = cf2nw*cfbwn

. xtmixed lbwper cf1nw cf2nw cfbw f1int f2int || neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:
```

```
Performing gradient-based optimization:

Iteration 0:   log likelihood =  488.12587
Iteration 1:   log likelihood =  490.42483
Iteration 2:   log likelihood =  490.64744
Iteration 3:   log likelihood =  490.70572
Iteration 4:   log likelihood =  490.71995
Iteration 5:   log likelihood =   490.7239
Iteration 6:   log likelihood =   490.7249
Iteration 7:   log likelihood =  490.72514
Iteration 8:   log likelihood =  490.72519
Iteration 9:   log likelihood =   490.7252

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(5)       =     65.88
Log likelihood =   490.7252                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0019815   .0006553     3.02   0.002      .000697    .0032659
       cf2nw |  -.0004663   .0007879    -0.59   0.554    -.0020105    .0010779
       cfbwn |    .002722   .0003811     7.14   0.000     .0019751    .0034689
       f1int |   .0001096   .0000718     1.53   0.127    -.0000311    .0002503
       f2int |  -.0002896   .0001018    -2.84   0.004    -.0004892    -.00009
       _cons |   .0980783   .0036444    26.91   0.000     .0909353    .1052212
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   5.11e-06   3.00e-06      1.61e-06    .0000162
                  var(cf2nw) |   4.83e-11   2.03e-08             0           .
                  var(_cons) |   .0002623   .0001571      .0000811    .0008486
-----------------------------+------------------------------------------------
               var(Residual) |   .0028918   .0002647      .0024169      .00346
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =     9.38   Prob > chi2 = 0.0246

Note: LR test is conservative and provided only for reference

. estat ic

------------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+----------------------------------------------------------------
           . |    341           .    490.7252     10    -961.4504   -923.1316
------------------------------------------------------------------------------

. estimates store m5

. display "deviance = " -2*e(ll)
deviance = -981.4504

. predict yhat
(option xb assumed)

.
. **Model 6 f2int only
```

```
. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24773
Iteration 2:   log likelihood =  489.57755
Iteration 3:   log likelihood =   489.6392
Iteration 4:   log likelihood =  489.65324
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65757
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0003208   .0007869    -0.41   0.684    -.0018632    .0012216
       cfbwn |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036437    26.92   0.000     .0909348    .1052177
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.23e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. estat ic

------------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+----------------------------------------------------------------
           . |    341           .    489.6579      9    -961.3158   -926.8289
------------------------------------------------------------------------------

. estimates store m6

. display "deviance =" -2*e(ll)
deviance =-979.31581

.
. **Model 7 f1int only
. xtmixed lbwper cf1nw cf2nw cfbw f1int || neigh: cf1nw cf2nw, variance covar(ind) mle
```

```
Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  486.46856
Iteration 1:   log likelihood =  487.72087
Iteration 2:   log likelihood =  487.74625
Iteration 3:   log likelihood =  487.74643
Iteration 4:   log likelihood =  487.74643

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     57.25
Log likelihood =  487.74643                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0017208   .0006903     2.49   0.013     .0003679    .0030737
       cf2nw |  -.0005525   .0008958    -0.62   0.537    -.0023082    .0012031
       cfbwn |   .0027121   .0003801     7.13   0.000     .0019671    .0034572
       f1int |   .0000487    .000072     0.68   0.499    -.0000925    .0001898
       _cons |   .0980664   .0036407    26.94   0.000     .0909307    .1052021
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.81e-06   3.51e-06      2.48e-06    .0000187
                  var(cf2nw) |   5.56e-06   5.86e-06      7.04e-07    .0000439
                  var(_cons) |   .0002804   .0001594       .000092    .0008543
-----------------------------+------------------------------------------------
               var(Residual) |   .0028043   .0002713      .0023199    .0033897
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.95   Prob > chi2 = 0.0019

Note: LR test is conservative and provided only for reference

. estat ic

------------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+----------------------------------------------------------------
           . |    341           .    487.7464      9    -957.4929   -923.0059
------------------------------------------------------------------------------

. estimates store m7

. display "deviance =" -2*e(ll)
deviance =-975.49285

.
. *Now examine fit
. lrtest m2 m1

Likelihood-ratio test                                 LR chi2(4)  =     17.76
(Assumption: m1 nested in m2)                         Prob > chi2 =    0.0014

Note: LR test is conservative

. lrtest m3 m1
```

```
Likelihood-ratio test                                 LR chi2(1)  =     37.61
(Assumption: m1 nested in m3)                         Prob > chi2 =    0.0000

. lrtest m4 m1

Likelihood-ratio test                                 LR chi2(5)  =     55.32
(Assumption: m1 nested in m4)                         Prob > chi2 =    0.0000

Note: LR test is conservative

. lrtest m4 m2

Likelihood-ratio test                                 LR chi2(1)  =     37.56
(Assumption: m2 nested in m4)                         Prob > chi2 =    0.0000

. lrtest m4 m3

Likelihood-ratio test                                 LR chi2(4)  =     17.71
(Assumption: m3 nested in m4)                         Prob > chi2 =    0.0014

Note: LR test is conservative

. lrtest m5 m4

Likelihood-ratio test                                 LR chi2(2)  =      6.39
(Assumption: m4 nested in m5)                         Prob > chi2 =    0.0410

. lrtest m6 m5

Likelihood-ratio test                                 LR chi2(1)  =      2.13
(Assumption: m6 nested in m5)                         Prob > chi2 =    0.1440

. lrtest m7 m4

Likelihood-ratio test                                 LR chi2(1)  =      0.43
(Assumption: m4 nested in m7)                         Prob > chi2 =    0.5125

. lrtest m7 m5

Likelihood-ratio test                                 LR chi2(1)  =      5.96
(Assumption: m7 nested in m5)                         Prob > chi2 =    0.0147

. lrtest m6 m4

Likelihood-ratio test                                 LR chi2(1)  =      4.25
(Assumption: m4 nested in m6)                         Prob > chi2 =    0.0392

.
. *Model 6 is the final model
. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24773
Iteration 2:   log likelihood =  489.57755
Iteration 3:   log likelihood =   489.6392
Iteration 4:   log likelihood =  489.65324
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65757
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                    Number of obs      =       341
```

```
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0003208   .0007869    -0.41   0.684    -.0018632    .0012216
       cfbwn |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036437    26.92   0.000     .0909348    .1052177
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.23e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

.
. *Original model had trouble converging
. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =   487.2922
Iteration 1:   log likelihood =  489.36611
Iteration 2:   log likelihood =  489.59968
Iteration 3:   log likelihood =  489.64483
Iteration 4:   log likelihood =  489.65443
Iteration 5:   log likelihood =  489.65693
Iteration 6:   log likelihood =  489.65767
Iteration 7:   log likelihood =  489.65785
Iteration 8:   log likelihood =   489.6579
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 9:   log likelihood =  489.65791
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 10:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 11:  log likelihood =  489.65791  (backed up)
Iteration 12:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
nearby values are missing
Iteration 13:  log likelihood =  489.65791
numerical derivatives are approximate
nearby values are missing
Iteration 14:  log likelihood =  489.65791  (backed up)
Iteration 15:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 16:  log likelihood =  489.65791
```

```
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 17:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 18:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 19:  log likelihood =  489.65791  (backed up)
numerical derivatives are approximate
flat or discontinuous region encountered
Iteration 20:  log likelihood =  489.65791  (backed up)
--Break--
r(1);

end of do-file
--Break--
r(1);

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Multilevel Model Building.log
  log type:  text
 closed on:  22 Jul 2009, 11:35:11
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

4.5.2 Diagnostics

```
---------------------------------------------------------------------------------------------------
------------------------------------------------------------
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Diagnostics.log
  log type:  text
 opened on:  22 Jul 2009, 12:26:40

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. *Diagnostic
. *Why is Model 6 not converging?
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. drop fitted yhat6 f1int f2int eres rstandard

.
. **Model 6 f2int only
. g f1int = cf1nw*cfbwn

. g f2int = cf2nw*cfbwn

. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24773
Iteration 2:   log likelihood =  489.57755
Iteration 3:   log likelihood =   489.6392
Iteration 4:   log likelihood =  489.65324
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65757
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0003208   .0007869    -0.41   0.684    -.0018632    .0012216
       cfbwn |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036437    26.92   0.000     .0909348    .1052177
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
```

```
----------------------------+------------------------------------------------
neigh: Independent          |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.23e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. estat ic

------------------------------------------------------------------------------
       Model |    Obs    ll(null)   ll(model)     df          AIC         BIC
-------------+----------------------------------------------------------------
           . |    341           .    489.6579      9    -961.3158   -926.8289
------------------------------------------------------------------------------

. estimates store m6

. display "deviance =" -2*e(ll)
deviance =-979.31581

. *Predicted y only fixed effects
. predict yhat6
(option xb assumed)

. *Predicted y given fixed and random effects
. predict fitted, fitted

. *Predict residuals
. predict eres, resid

. label variable eres "Residual"

. *Predict standardized residuals
. predict rstandard, rstandard

.
end of do-file

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
. *How many neighborhoods are comprised of only 1 block group?
. collapse (count) n_bg=lbwper, by(neigh)

. list neigh if n_bg==1

     +-------+
     | neigh |
     |-------|
  1. |     1 |
  2. |     2 |
  5. |     5 |
  7. |     7 |
 12. |    12 |
     |-------|
 15. |    15 |
 20. |    20 |
 25. |    26 |
 29. |    30 |
 30. |    31 |
     |-------|
 34. |    35 |
 37. |    38 |
```

```
 52. |    53 |
 54. |    55 |
 56. |    57 |
     |-------|
 57. |    58 |
 58. |    59 |
 65. |    66 |
 66. |    67 |
 67. |    68 |
     |-------|
 71. |    72 |
 79. |    80 |
 80. |    81 |
 81. |    82 |
 86. |    87 |
     +-------+

. summarize neigh if n_bg==1

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       neigh |        25       44.28    28.04092          1         87

. codebook neigh if n_bg==1

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
neigh
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [1,87]                       units:  1
         unique values:  25                       missing .:  0/25

                  mean:     44.28
              std. dev:   28.0409

           percentiles:        10%       25%       50%       75%       90%
                                 5        20        53        67        81

. **There are 25 neighborhoods comprised of 1 block group
. sort neigh

. save "C:\MSTHESIS\Final\Dataset\n_bg.dta", replace
file C:\MSTHESIS\Final\Dataset\n_bg.dta saved

.
. *Now merge number of bg with existing dataset
. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. sort neigh

. merge neigh using "C:\MSTHESIS\Final\Dataset\n_bg.dta"
variable neigh does not uniquely identify observations in the master data

. drop _merge

. save "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta", replace
file C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta saved

.
. *List neighborhoods comprised of 1 block group along with centered values
. list neigh neigh_name cf1nw cf2nw cfbwn f1int f2int if n_bg==1

     +--------------------------------------------------------------------------+
     | neigh                neigh_name   cf1nw   cf2nw       cfbwn   f1int   f2int |
     |--------------------------------------------------------------------------|
  1. |     1          Allegheny Center       0       0    7.898876       0       0 |
```

```
  2. |     2            Allegheny West       0       0   -6.699852       0       0 |
 10. |     5         Arlington Heights       0       0    15.33586       0       0 |
 14. |     7          Bedford Dwellings      0       0    29.48532       0       0 |
 41. |    12                     Bonair      0       0   -10.49502       0       0 |
     |---------------------------------------------------------------------------|
 64. |    15      California Kirkbride       0       0    13.72025       0       0 |
 90. |    20            Chartiers City       0       0   -.7686122       0       0 |
102. |    26            East Carnegie        0       0   -4.733464       0       0 |
117. |    30                    Esplen       0       0   -.5697692       0       0 |
118. |    31                 Fairywood       0       0    20.38713       0       0 |
     |---------------------------------------------------------------------------|
128. |    35                Glen Hazel       0       0    23.17725       0       0 |
142. |    38                      Hays       0       0   -5.700158       0       0 |
205. |    53   Mt. Oliver Neighborhood       0       0   -1.175474       0       0 |
217. |    55             New Homestead       0       0   -12.66936       0       0 |
223. |    57               North Shore       0       0   -11.48519       0       0 |
     |---------------------------------------------------------------------------|
224. |    58         Northview Heights       0       0    33.72672       0       0 |
225. |    59                   Oakwood       0       0   -5.988911       0       0 |
253. |    66             Regent Square       0       0   -16.13111       0       0 |
254. |    67                 Ridgemont       0       0   -12.84635       0       0 |
255. |    68                 St. Clair       0       0     23.7906       0       0 |
     |---------------------------------------------------------------------------|
278. |    72               South Shore       0       0    3.568874       0       0 |
321. |    80            Strip District       0       0    4.530365       0       0 |
322. |    81               Summer Hill       0       0   -11.35344       0       0 |
323. |    82            Swisshelm Park       0       0   -14.80921       0       0 |
335. |    87                  West End       0       0    .9851777       0       0 |
     +---------------------------------------------------------------------------+

.
. *Generate uncentered interaction terms
. generate f1intr=f1nw*fbwn

. generate f2intr=f2nw*fbwn

.
. *List neighborhoods comrpised of 1 block group along with raw values
. list neigh neigh_name f1nw f2nw fbwn f1intr f2intr if n_bg==1

     +--------------------------------------------------------------------------------+
     | neigh                neigh_name       f1nw       f2nw       fbwn     f1intr     f2intr |
     |--------------------------------------------------------------------------------|
  1. |     1          Allegheny Center   55.69299   9.855605   37.23996   2074.004   367.0223 |
  2. |     2            Allegheny West   31.92208   4.766697   22.64123   722.7551   107.9239 |
 10. |     5         Arlington Heights   50.14189   36.58075   44.67694   2240.186   1634.316 |
 14. |     7         Bedford Dwellings   69.88033   51.14944    58.8264   4110.809   3008.938 |
 41. |    12                    Bonair   17.68627   9.428794   18.84606   333.3165   177.6956 |
     |--------------------------------------------------------------------------------|
 64. |    15      California Kirkbride   44.26424   39.93887   43.06133   1906.077   1719.821 |
 90. |    20            Chartiers City   19.69537   31.71043   28.57247   562.7453   906.0452 |
102. |    26             East Carnegie   23.91746   13.22265   24.60762   588.5517   325.3778 |
117. |    30                    Esplen   29.05951   17.00037   28.77131   836.0802   489.1229 |
118. |    31                 Fairywood   55.16427   43.16129   49.72821    2743.22   2146.333 |
     |--------------------------------------------------------------------------------|
128. |    35                Glen Hazel   65.49001   37.05721   52.51833   3439.426   1946.183 |
142. |    38                      Hays   25.11425   6.770075   23.64092    593.724   160.0508 |
205. |    53   Mt. Oliver Neighborhood   30.47497   16.17451   28.16561    858.346   455.5649 |
217. |    55             New Homestead   11.14797   7.445294   16.67171   185.8557   124.1258 |
223. |    57               North Shore   26.48225   4.588015   17.85589   472.8642   81.92311 |
     |--------------------------------------------------------------------------------|
224. |    58         Northview Heights   73.94585   63.70679    63.0678   4663.602   4017.847 |
225. |    59                   Oakwood   28.01634   8.952958   23.35217   654.2423    209.071 |
253. |    66             Regent Square   13.18385   7.085756   13.20997   174.1583   93.60264 |
254. |    67                 Ridgemont   14.69935   5.645743   16.49473   242.4619   93.12502 |
255. |    68                 St. Clair   58.86625   51.87084   53.13168   3127.663   2755.985 |
     |--------------------------------------------------------------------------------|
278. |    72               South Shore   54.91194   15.99804   32.90995   1807.149   526.4949 |
321. |    80            Strip District   34.55768   32.28305   33.87144   1170.518   1093.473 |
322. |    81               Summer Hill   14.94859   8.833696   17.98764   268.8899   158.8974 |
323. |    82            Swisshelm Park   11.10383   6.747871   14.53187   161.3594   98.05917 |
335. |    87                  West End   37.50316   17.53547   30.32626    1137.33   531.7851 |
     +--------------------------------------------------------------------------------+

. *interactions became 0!!!!
.
. *are 0 values just for these neighborhoods with 1 bg??
. list neigh cf1nw cf2nw cfbwn f1int f2int if (cf1nw==0 | cf2nw==0)
```

```
     +--------------------------------------------------+
     | neigh   cf1nw   cf2nw       cfbwn   f1int   f2int |
     |--------------------------------------------------|
  1. |     1       0       0    7.898876       0       0 |
  2. |     2       0       0   -6.699852       0       0 |
 10. |     5       0       0    15.33586       0       0 |
 14. |     7       0       0    29.48532       0       0 |
 41. |    12       0       0   -10.49502       0       0 |
     |--------------------------------------------------|
 64. |    15       0       0    13.72025       0       0 |
 90. |    20       0       0   -.7686122       0       0 |
102. |    26       0       0   -4.733464       0       0 |
117. |    30       0       0   -.5697692       0       0 |
118. |    31       0       0    20.38713       0       0 |
     |--------------------------------------------------|
128. |    35       0       0    23.17725       0       0 |
142. |    38       0       0   -5.700158       0       0 |
205. |    53       0       0   -1.175474       0       0 |
217. |    55       0       0   -12.66936       0       0 |
223. |    57       0       0   -11.48519       0       0 |
     |--------------------------------------------------|
224. |    58       0       0    33.72672       0       0 |
225. |    59       0       0   -5.988911       0       0 |
253. |    66       0       0   -16.13111       0       0 |
254. |    67       0       0   -12.84635       0       0 |
255. |    68       0       0     23.7906       0       0 |
     |--------------------------------------------------|
278. |    72       0       0    3.568874       0       0 |
321. |    80       0       0    4.530365       0       0 |
322. |    81       0       0   -11.35344       0       0 |
323. |    82       0       0   -14.80921       0       0 |
335. |    87       0       0    .9851777       0       0 |
     +--------------------------------------------------+

. *they are the same
. *Structural issue??
.
. *EXAMINING RESIDUALS
. *Model 6 xtmixed lbwper cf1nw cf2nw cfbw f2int|| neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)
.
. *Diagnostic Plots
. *Graphs examining departure from normality
. histogram eres
(bin=18, start=-.10949236, width=.01803153)

. graph box eres

. kdensity eres, normal

. qnorm eres


.
. *Fitted Standardized Residuals vs predictors
. graph twoway (scatter rstandard fitted), yline(0) xtitle (Predicted LBW Proportion)

. graph twoway (scatter rstandard cf1nw), yline(0) xtitle (Centered MED)

. graph twoway (scatter rstandard cf2nw), yline(0) xtitle (Centered CD)

. graph twoway (scatter rstandard cfbw), yline(0)  xtitle (Centered OND)

. graph twoway (scatter rstandard f2int), yline(0)   xtitle (CD*OND)

.

. *Describe outlier
. list neigh neigh_name ctblock n_bg lbwper fitted yhat6 cf1nw cf2nw cfbw f2int rstandard if
rstandard>4.0

    +-------------------------------------------------------------------------------------------------------------------
----------+
```

```
     | neigh         neigh_name   ctblock   n_bg     lbwper     fitted      yhat6      cf1nw       cf2nw       cfbwn      f2int
rstand~d |
     |--------------------------------------------------------------------------------------------------------------------------
----------|
280. |    73   South Side Flats   1609001      5   .3333333   .1182581   .0986456   6.446583   -.5003312   -3.965183   1.983905
4.010965 |
     +--------------------------------------------------------------------------------------------------------------------------
----------+

. list neigh neigh_name ctblock n_bg lbwper fitted f1nw f2nw fbw f2intr rstandard if
rstandard>4.0

     +-------------------------------------------------------------------------------------------------------------------------+
     | neigh         neigh_name   ctblock   n_bg     lbwper     fitted       f1nw       f2nw      fbwn     f2intr   rstand~d |
     |-------------------------------------------------------------------------------------------------------------------------|
280. |    73   South Side Flats   1609001      5   .3333333   .1182581   42.23056   3.810627   25.3759   96.69807   4.010965 |
     +-------------------------------------------------------------------------------------------------------------------------+

. list neigh_name lbwper fitted und18 unemp inclow f1nw f2nw fbw f2intr if neigh_name=="South
Side Flats"

     +----------------------------------------------------------------------------------------------------------------------+
     |       neigh_name     lbwper     fitted      und18      unemp     inclow       f1nw       f2nw      fbwn     f2intr |
     |----------------------------------------------------------------------------------------------------------------------|
279. | South Side Flats          0   .0826501   10.19108   1.791045   54.98576   34.25714   5.111873   25.3759   129.7184 |
280. | South Side Flats   .3333333   .1182581   10.60359          0   67.91045   42.23056   3.810627   25.3759   96.69807 |
281. | South Side Flats       .025   .1024489   6.809079    6.54102   58.77193   38.68632   4.421063   25.3759   112.1884 |
282. | South Side Flats   .0217391   .0812071   6.318681   5.681818   55.67797   34.14563   3.523313   25.3759   89.40722 |
283. | South Side Flats   .0857143   .0611567    10.3022   10.05155   48.79227   29.60022   4.687915   25.3759     118.96 |
     +----------------------------------------------------------------------------------------------------------------------+
.
.
. *SENSITIVITY ANALYSIS
. *Original Model 6
. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24773
Iteration 2:   log likelihood =  489.57755
Iteration 3:   log likelihood =   489.6392
Iteration 4:   log likelihood =  489.65324
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65757
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0003208   .0007869    -0.41   0.684    -.0018632    .0012216
       cfbwn |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036437    26.92   0.000     .0909348    .1052177
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
```

```
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.23e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. predict fitted_6, fitted

.
. *Model 6 Excluding neighborhoods = 1 Block group
. xtmixed lbwper cf1nw cf2nw cfbw f2int if n_bg~=1 || neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  452.51175
Iteration 1:   log likelihood =  453.61726
Iteration 2:   log likelihood =  453.74609
Iteration 3:   log likelihood =  453.77471
Iteration 4:   log likelihood =  453.78162
Iteration 5:   log likelihood =  453.78349
Iteration 6:   log likelihood =  453.78392
Iteration 7:   log likelihood =  453.78403
Iteration 8:   log likelihood =  453.78406
Iteration 9:   log likelihood =  453.78406

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       316
Group variable: neigh                           Number of groups   =        64

                                                Obs per group: min =         2
                                                               avg =       4.9
                                                               max =        15


                                                Wald chi2(4)       =     65.05
Log likelihood =  453.78406                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018074   .0006651     2.72   0.007     .0005039    .0031109
       cf2nw |   -.000321   .0007868    -0.41   0.683     -.001863    .0012211
       cfbwn |   .0031953   .0004392     7.27   0.000     .0023344    .0040561
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004171   -.0000413
       _cons |   .1018746   .0038694    26.33   0.000     .0942908    .1094585
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.43e-06   3.20e-06      2.42e-06    .0000171
                  var(cf2nw) |   2.05e-10   1.25e-07             0           .
                  var(_cons) |   .0002482    .000153      .0000741    .0008311
-----------------------------+------------------------------------------------
               var(Residual) |   .0028736   .0002696       .002391    .0034538
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.00   Prob > chi2 = 0.0029

Note: LR test is conservative and provided only for reference

. predict fitted_nbg, fitted
```

```
(25 missing values generated)

.
. *Model 6 Excluding Outlier
. xtmixed lbwper cf1nw cf2nw cfbw f2int if ctblock~="1609001" || neigh: cf1nw cf2nw, variance
covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =   495.7884
Iteration 1:   log likelihood =  497.46176
Iteration 2:   log likelihood =  497.62044
Iteration 3:   log likelihood =  497.63385
Iteration 4:   log likelihood =  497.63389

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       340
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     59.54
Log likelihood =  497.63389                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0015563   .0006427     2.42   0.015     .0002965     .002816
       cf2nw |  -.0001672   .0007875    -0.21   0.832    -.0017107    .0013762
       cfbwn |   .0027007   .0003843     7.03   0.000     .0019475     .003454
       f2int |  -.0002159    .000096    -2.25   0.025    -.0004041   -.0000277
       _cons |   .0972666   .0037024    26.27   0.000     .0900099    .1045232
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   5.91e-06   2.85e-06      2.30e-06    .0000152
                  var(cf2nw) |   1.47e-06   4.77e-06      2.59e-09    .0008401
                  var(_cons) |   .0003521   .0001711      .0001358    .0009127
-----------------------------+------------------------------------------------
               var(Residual) |   .0026276   .0002601      .0021642    .0031902
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    16.91   Prob > chi2 = 0.0007

Note: LR test is conservative and provided only for reference

. predict fitted_out, fitted

.
. *Model 6 where cf2nw is not a random effect
. xtmixed lbwper cf1nw cf2nw cfbw f2int || neigh: cf1nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  489.38332
Iteration 1:   log likelihood =  489.65681
Iteration 2:   log likelihood =  489.65791
Iteration 3:   log likelihood =  489.65791

Computing standard errors:
```

```
Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018072   .0006651     2.72   0.007     .0005036    .0031108
       cf2nw |  -.0003209   .0007869    -0.41   0.683    -.0018632    .0012215
       cfbwn |   .0027201   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036438    26.92   0.000     .0909346    .1052178
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(_cons) |   .0002657   .0001573      .0000833    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028752   .0002624      .0024042    .0034384
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(2) =    14.37   Prob > chi2 = 0.0008

Note: LR test is conservative and provided only for reference

. predict fitted_re, fitted

.
. *Model 4 Main Effects Only
. xtmixed lbwper cf1nw cf2nw cfbw|| neigh: cf1nw cf2nw, variance covar(ind) mle

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  486.18725
Iteration 1:   log likelihood =  487.49861
Iteration 2:   log likelihood =  487.53156
Iteration 3:   log likelihood =  487.53198
Iteration 4:   log likelihood =  487.53198

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(3)       =     56.79
Log likelihood =  487.53198                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0016507   .0006851     2.41   0.016     .0003079    .0029935
       cf2nw |  -.0004651   .0008736    -0.53   0.594    -.0021774    .0012472
       cfbwn |   .0027126   .0003802     7.14   0.000     .0019675    .0034578
       _cons |   .0980671   .0036409    26.93   0.000      .090931    .1052031
------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   7.23e-06   3.53e-06      2.77e-06    .0000188
                  var(cf2nw) |   4.89e-06   5.52e-06      5.33e-07    .0000448
                  var(_cons) |   .0002794   .0001593      .0000914    .0008541
-----------------------------+------------------------------------------------
               var(Residual) |   .0028087   .0002714      .0023242    .0033943
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    16.45   Prob > chi2 = 0.0009

Note: LR test is conservative and provided only for reference

. predict fitted_4, fitted

sort neigh ctblock

. list neigh_name ctblock fitted_4 fitted_6 lbwper cf1nw cf2nw cfbwn f2int if neigh==28 |
neigh==34 | neigh==69 | neigh==77

     +---------------------------------------------------------------------------------------------------------+
     |          neigh_name   ctblock   fitted_4   fitted_6     lbwper       cf1nw       cf2nw       cfbwn       f2int |
     |---------------------------------------------------------------------------------------------------------|
106. |        East Liberty   1113001   .1108535   .1105255   .0465116   -6.698502   -.7605743    10.28649   -7.823641 |
107. |        East Liberty   1113002    .141123   .1402769   .2692308   -9.788025   -12.61511    10.28649   -129.7653 |
108. |        East Liberty   1113003   .1019304    .102655   .1136364    .5860634    3.942299    10.28649    40.55243 |
109. |        East Liberty   1113004   .1336012   .1329099   .0882353   -8.835999    -9.63439    10.28649   -99.10406 |
110. |        East Liberty   1115001    .103357   .1039917     .03125   -.0231895    3.295708    10.28649    33.90127 |
     |---------------------------------------------------------------------------------------------------------|
111. |        East Liberty   1115002   .0737673   .0753184          0    5.900677    15.43446    10.28649    158.7664 |
112. |        East Liberty   1115003   .1459135   .1468794   .0857143    3.136639   -11.94843    10.28649   -122.9074 |
113. |        East Liberty   1115004   .0872257   .0901272       .125    15.72233    12.28603    10.28649    126.3802 |
123. |            Garfield   1016001   .1073304   .1018802   .1101695    19.38796    12.06928    10.51152    126.8665 |
124. |            Garfield   1017001   .1390039   .1403586   .2222222   -12.92349   -6.337517    10.51152   -66.61696 |
     |---------------------------------------------------------------------------------------------------------|
125. |            Garfield   1017002   .1323824   .1357649   .1886792   -1.439735   -3.121815    10.51152   -32.81503 |
126. |            Garfield   1114001   .1331019   .1398917   .0740741    2.284199   -4.136074    10.51152   -43.47644 |
127. |            Garfield   1114002   .1269987   .1209347   .0555556   -7.308933    1.526127    10.51152    16.04192 |
256. |           Shadyside   0703001   .0565832   .0505379          0    1.490433    -3.02248   -8.959021    27.07846 |
257. |           Shadyside   0703002    .056766   .0606426          0    3.425453    1.307439   -8.959021   -11.71338 |
     |---------------------------------------------------------------------------------------------------------|
258. |           Shadyside   0703003   .0367891   .0396981          0   -12.25786    1.389055   -8.959021   -12.44457 |
259. |           Shadyside   0705001   .0538645   .0505731          0   -.1224117   -1.750806   -8.959021     15.6855 |
260. |           Shadyside   0705002   .0656343   .0631663   .0588235    9.163517   -1.688187   -8.959021     15.1245 |
261. |           Shadyside   0705003   .0586891   .0719092    .037037    6.606995    5.340759   -8.959021   -47.84797 |
262. |           Shadyside   0706001   .0453678   .0464026    .047619   -5.936739    .3536911   -8.959021   -3.168726 |
     |---------------------------------------------------------------------------------------------------------|
263. |           Shadyside   0706002   .0497306    .046549   .0769231   -3.311823   -1.598434   -8.959021     14.3204 |
264. |           Shadyside   0708001   .0487189   .0485152          0   -3.559036    -.271987   -8.959021    2.436737 |
265. |           Shadyside   0708002   .0483079   .0472774   .1090909   -4.027567    -.622777   -8.959021    5.579472 |
266. |           Shadyside   0709001   .0536123   .0548751   .0285714    .5048542    .2451673   -8.959021   -2.196459 |
267. |           Shadyside   0709002    .063131   .0651119   .0714286    8.024193    .3185596   -8.959021   -2.853982 |
     |---------------------------------------------------------------------------------------------------------|
296. | Squirrel Hill North   1401001    .049496   .0456215    .030303   -2.474749   -.8698978   -14.30985    12.44811 |
297. | Squirrel Hill North   1401002   .0528476   .0505015          0     -8.1292   -.2874789   -14.30985     4.11378 |
298. | Squirrel Hill North   1401004   .0573191   .0371191   .1666667    -5.96583   -4.401445   -14.30985    62.98402 |
299. | Squirrel Hill North   1402001   .0418271   .0413111          0    7.118092   -.5169454   -14.30985     7.39741 |
300. | Squirrel Hill North   1402002   .0369802   .0406481          0    12.17517    .2129364   -14.30985   -3.047088 |
     |---------------------------------------------------------------------------------------------------------|
301. | Squirrel Hill North   1403001   .0418641   .0523041          0    1.717674    2.179024   -14.30985   -31.18151 |
302. | Squirrel Hill North   1403002   .0423314    .043171   .0263158    5.718069   -.1525521   -14.30985    2.182998 |
303. | Squirrel Hill North   1403003   .0480561   .0571964   .0322581   -6.716778    2.241222   -14.30985   -32.07155 |
304. | Squirrel Hill North   1403004    .046572   .0534566   .0322581   -3.442447    1.595135   -14.30985   -22.82614 |
     +---------------------------------------------------------------------------------------------------------+


. *GRAPHING
. graph twoway (scatter fitted_6 fitted_nbg), ytitle (Predicted LBW Model 6) xtitle (Predicted
LBW with Neighborhoods Comprised of >1 Block Group)

. graph twoway (scatter fitted_6 fitted_out), ytitle (Predicted LBW Model 6) xtitle (Predicted
LBW with No Outlier)

. graph twoway (scatter fitted_6 fitted_re), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with CD Not a Random Effect)

. graph twoway (scatter fitted_6 fitted_4), ytitle (Predicted LBW Model 6) xtitle (Predicted LBW
with Model 4)

.
```

```
. *Observed vs predicted for Model 6
. graph twoway (scatter fitted_6 lbwper), ytitle (Predicted LBW Model 6) xtitle (Observed LBW)

.
. *Effect of Centering
. graph twoway (scatter cf1nw cf2nw), ytitle (Centered MED) xtitle (Centered CD) ///
>   xsc (r(-40 80)) xlabel(-40(20)80)  ysc (r(-40 80)) ylabel(-40(20)80) ///
>   yline (0) xline(0)

. graph twoway (scatter f1nw f2nw), ytitle (MED) xtitle (CD) ///
>   xsc (r(-40 80)) xlabel(-40(20)80)  ysc (r(-40 80)) ylabel(-40(20)80) ///
>   yline (0) xline(0)

.
. *UNDERSTANDING MODEL 6
. *Graph predicted fitted_6 from model 6 vs main effects
. graph twoway (scatter fitted_6 f1nw), ///
> ytitle(Predicted Low Birth Weight Proportion Model 6 ) xtitle (Material and Economic
Deprivation at the Block Group Level) ///
> xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)

.
. graph twoway (scatter fitted_6 f2nw), ///
> ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Concentrated Disadvantage at
the Block Group Level) ///
> xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)

.
. graph twoway (scatter fitted_6 fbwn), ///
> ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Overall Neighborhood
Deprivation) ///
> xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25)

.
. *Graphs for 4 neighborhoods
. graph twoway (scatter fitted_6 f1nw if neigh==69, msymbol(Oh)) ///
>   (scatter fitted_6  f1nw if neigh==28, msymbol(S)) ///
>   (scatter fitted_6  f1nw if neigh==34, msymbol(Dh)) ///
>   (scatter fitted_6 f1nw if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
>   ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Material and Economic
Deprivation at the Block Group Level)

.
. graph twoway (scatter fitted_6  f2nw if neigh==69, msymbol(Oh)) ///
>   (scatter fitted_6  f2nw if neigh==28, msymbol(S)) ///
>   (scatter fitted_6  f2nw if neigh==34, msymbol(Dh)) ///
>   (scatter fitted_6  f2nw if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
>   ytitle(Predicted Low Birth Weight Proportion  Model 6 ) xtitle (Concentrated Disadvantage at
the Block Group Level)

.
. graph twoway (scatter fitted_6  fbwn if neigh==69, msymbol(Oh)) ///
>   (scatter fitted_6  fbwn if neigh==28, msymbol(S)) ///
>   (scatter fitted_6 fbwn if neigh==34, msymbol(Dh)) ///
>   (scatter fitted_6  fbwn if neigh==77, msymbol(T)), ///
>   legend(label(1 Shadyside) label(2 East Liberty) label(3 Garfield) label(4 Sq Hill North)) ///
>   xsc (r(0 80)) xlabel(0(20)80) ysc (r(.05 .25)) ylabel (.05(.05).25) ///
>   ytitle(Predicted Low Birth Weight Proportion  Model 6) xtitle (Overall Neighborhood
Deprivation)

.
end of do-file

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Diagnostics.log
  log type:  text
 closed on:  22 Jul 2009, 12:28:11
```

4.5.2.5 Interaction

```
------------------------------------------------------------------------------------------------
-----------------------------------------------------------
      log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Interaction.log
 log type:  text
opened on:  22 Jul 2009, 12:30:04

. do "C:\DOCUME~1\DONNAA~1\LOCALS~1\Temp\STD0c000000.tmp"

. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. collapse (mean) cfbwn=cfbwn, by(neigh)

. summarize cfbwn

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       cfbwn |        89   -4.47e-06    10.76975  -16.13111   33.72672

. *SD = 10.76975
.
. clear

. use "C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta"

. sum cfbwn

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       cfbwn |       341   -2.654284    9.039153  -16.13111   33.72672

.
. *Summarize interaction terms for mean model
. summarize f1int

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       f1int |       341   -6.95e-07    62.78842  -301.1177   250.1033

. summarize f2int

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       f2int |       341    2.98e-07    35.23124  -129.7653   158.7664

.
. *Create interaction for 1+SD model
. generate cfbwp  =  cfbwn + 10.76975

. generate f2intp = cf2nw*cfbwp

. generate f1intp = cf1nw*cfbwp

.
. *Create interaction for 1-SD model
. generate cfbwm  =  cfbwn - 10.76975

. generate f2intm = cf2nw*cfbwm

. generate f1intm = cf1nw*cfbwm
```

```
.
. *Mean model
. xtmixed lbwper cf1nw cf2nw cfbwn f2int || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24773
Iteration 2:   log likelihood =  489.57755
Iteration 3:   log likelihood =   489.6392
Iteration 4:   log likelihood =  489.65324
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65757
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0003208   .0007869    -0.41   0.684    -.0018632    .0012216
       cfbwn |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
       f2int |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0980762   .0036437    26.92   0.000     .0909348    .1052177
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.23e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. predict fitted_mean, fitted

.
. *1+SD model
. xtmixed lbwper cf1nw cf2nw cfbwp f2intp || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24716
Iteration 2:   log likelihood =  489.57739
```

```
Iteration 3:   log likelihood =  489.63915
Iteration 4:   log likelihood =  489.65323
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65756
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89

                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15


                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |   .0021479   .0014078     1.53   0.127    -.0006113    .0049072
       cfbwp |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
      f2intp |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .0687808   .0049446    13.91   0.000     .0590896    .0784719
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.17e-10   1.22e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008478
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034387
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. predict fitted_pSD, fitted

.
. *1-SD model
. xtmixed lbwper cf1nw cf2nw cfbwm f2intm || neigh: cf1nw cf2nw, variance covar(ind) mle
emiterate(500) emtolerance(1e-3)

Performing EM optimization:

Performing gradient-based optimization:

Iteration 0:   log likelihood =  485.96764
Iteration 1:   log likelihood =  489.24759
Iteration 2:   log likelihood =  489.57745
Iteration 3:   log likelihood =  489.63918
Iteration 4:   log likelihood =  489.65323
Iteration 5:   log likelihood =  489.65668
Iteration 6:   log likelihood =  489.65756
Iteration 7:   log likelihood =  489.65783
Iteration 8:   log likelihood =  489.65789
Iteration 9:   log likelihood =  489.65791

Computing standard errors:

Mixed-effects ML regression                     Number of obs      =       341
Group variable: neigh                           Number of groups   =        89
```

```
                                                Obs per group: min =         1
                                                               avg =       3.8
                                                               max =        15

                                                Wald chi2(4)       =     63.12
Log likelihood =  489.65791                     Prob > chi2        =    0.0000

------------------------------------------------------------------------------
      lbwper |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cf1nw |   .0018071   .0006651     2.72   0.007     .0005036    .0031106
       cf2nw |  -.0027895   .0011789    -2.37   0.018    -.0051002   -.0004789
       cfbwm |   .0027202   .0003809     7.14   0.000     .0019736    .0034667
      f2intm |  -.0002292   .0000959    -2.39   0.017    -.0004172   -.0000413
       _cons |   .1273717   .0059798    21.30   0.000     .1156516    .1390918
------------------------------------------------------------------------------

------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
neigh: Independent           |
                  var(cf1nw) |   6.42e-06   3.20e-06      2.42e-06     .000017
                  var(cf2nw) |   2.16e-10   1.02e-07             0           .
                  var(_cons) |   .0002657   .0001573      .0000832    .0008479
-----------------------------+------------------------------------------------
               var(Residual) |   .0028753   .0002625      .0024042    .0034388
------------------------------------------------------------------------------
LR test vs. linear regression:       chi2(3) =    14.37   Prob > chi2 = 0.0024

Note: LR test is conservative and provided only for reference

. predict fitted_mSD, fitted

.
. *see example syntax on http://www.ats.ucla.edu/stat/stata/faq/conconb.htm
.
. sort neigh ctblock

. list neigh_name ctblock fitted_mean lbwper cf1nw cf2nw cfbwn f1int f2int if neigh==28 |
neigh==69|neigh==34|neigh==77

     +-------------------------------------------------------------------------------------------------------+
     |          neigh_name   ctblock   fitted~n     lbwper       cf1nw       cf2nw       cfbwn       f1int       f2int |
     |-------------------------------------------------------------------------------------------------------|
106. |        East Liberty   1113001   .1105255   .0465116   -6.698502   -.7605743    10.28649   -68.90408   -7.823641 |
107. |        East Liberty   1113002   .1402769   .2692308   -9.788025   -12.61511    10.28649   -100.6844   -129.7653 |
108. |        East Liberty   1113003    .102655   .1136364    .5860634    3.942299    10.28649    6.028536    40.55243 |
109. |        East Liberty   1113004   .1329099   .0882353   -8.835999    -9.63439    10.28649   -90.89143   -99.10406 |
110. |        East Liberty   1115001   .1039917     .03125   -.0231895    3.295708    10.28649   -.2385391    33.90127 |
     |-------------------------------------------------------------------------------------------------------|
111. |        East Liberty   1115002   .0753184          0    5.900677    15.43446    10.28649    60.69726    158.7664 |
112. |        East Liberty   1115003   .1468794   .0857143    3.136639   -11.94843    10.28649    32.26501   -122.9074 |
113. |        East Liberty   1115004   .0901272       .125    15.72233    12.28603    10.28649    161.7276    126.3802 |
123. |            Garfield   1016001   .1018802   .1101695    19.38796    12.06928    10.51152     203.797    126.8665 |
124. |            Garfield   1017001   .1403586   .2222222   -12.92349   -6.337517    10.51152   -135.8456   -66.61696 |
     |-------------------------------------------------------------------------------------------------------|
125. |            Garfield   1017002   .1357649   .1886792   -1.439735   -3.121815    10.51152   -15.13381   -32.81503 |
126. |            Garfield   1114001   .1398917   .0740741    2.284199   -4.136074    10.51152    24.01041   -43.47644 |
127. |            Garfield   1114002   .1209347   .0555556   -7.308933    1.526127    10.51152   -76.82803    16.04192 |
256. |           Shadyside   0703001   .0505379          0    1.490433    -3.02248   -8.959021   -13.35282    27.07846 |
257. |           Shadyside   0703002   .0606426          0    3.425453    1.307439   -8.959021   -30.68871   -11.71338 |
     |-------------------------------------------------------------------------------------------------------|
258. |           Shadyside   0703003   .0396981          0   -12.25786    1.389055   -8.959021    109.8185   -12.44457 |
259. |           Shadyside   0705001   .0505731          0   -.1224117   -1.750806   -8.959021    1.096689     15.6855 |
260. |           Shadyside   0705002   .0631663   .0588235    9.163517   -1.688187   -8.959021   -82.09614     15.1245 |
261. |           Shadyside   0705003   .0719092    .037037    6.606995    5.340759   -8.959021    -59.1922   -47.84797 |
262. |           Shadyside   0706001   .0464026    .047619   -5.936739    .3536911   -8.959021    53.18737   -3.168726 |
     |-------------------------------------------------------------------------------------------------------|
263. |           Shadyside   0706002    .046549   .0769231   -3.311823   -1.598434   -8.959021    29.67069     14.3204 |
264. |           Shadyside   0708001   .0485152          0   -3.559036    -.271987   -8.959021    31.88548    2.436737 |
265. |           Shadyside   0708002   .0472774   .1090909   -4.027567    -.622777   -8.959021    36.08305    5.579472 |
266. |           Shadyside   0709001   .0548751   .0285714    .5048542    .2451673   -8.959021   -4.522999   -2.196459 |
267. |           Shadyside   0709002   .0651119   .0714286    8.024193    .3185596   -8.959021   -71.88891   -2.853982 |
     |-------------------------------------------------------------------------------------------------------|
296. | Squirrel Hill North   1401001   .0456215    .030303   -2.474749   -.8698978   -14.30985    35.41328    12.44811 |
297. | Squirrel Hill North   1401002   .0505015          0     -8.1292   -.2874789   -14.30985    116.3276     4.11378 |
298. | Squirrel Hill North   1401004   .0371191   .1666667    -5.96583   -4.401445   -14.30985    85.37012    62.98402 |
299. | Squirrel Hill North   1402001   .0413111          0    7.118092   -.5169454   -14.30985   -101.8588     7.39741 |
300. | Squirrel Hill North   1402002   .0406481          0    12.17517    .2129364   -14.30985   -174.2249   -3.047088 |
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     |---------------------------------------------------------------------------------------------------------------|
301. | Squirrel Hill North   1403001   .0523041          0    1.717674    2.179024   -14.30985   -24.57966   -31.18151 |
302. | Squirrel Hill North   1403002    .043171   .0263158    5.718069   -.1525521   -14.30985   -81.82471    2.182998 |
303. | Squirrel Hill North   1403003   .0571964   .0322581   -6.716778    2.241222   -14.30985    96.11607   -32.07155 |
304. | Squirrel Hill North   1403004   .0534566   .0322581   -3.442447    1.595135   -14.30985    49.26089   -22.82614 |
     +---------------------------------------------------------------------------------------------------------------+

.
.
.
.
end of do-file

. log close
       log:  C:\MSTHESIS\Final\Log\Final Thesis Logs\Interaction.log
  log type:  text
 closed on:  22 Jul 2009, 12:30:30
-------------------------------------------------------------------------------------------------
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Model 6 Estimates

	neigh_name	ctblock	cf1nw	cf2nw	cfbwn	f2int	cf1nw	cf2nw	cfbwn	f2int	cf2bw*int	f2int
107	East Liberty	1113001	-6.698502	-0.7605743	10.28649	-7.823641	=$D$38*D2	=$E$38*E2	=$F$38*F2	=$G$38*G2	=($E$38+($G$38*F2))	=N2*$E2
108	East Liberty	1113002	-9.788025	-12.61511	10.28649	-129.7653	=$D$38*D3	=$E$38*E3	=$F$38*F3	=$G$38*G3	=($E$38+($G$38*F3))	=N3*$E3
113	East Liberty	1113003	0.5860634	3.942299	10.28649	40.55243	=$D$38*D4	=$E$38*E4	=$F$38*F4	=$G$38*G4	=($E$38+($G$38*F4))	=N4*$E4
106	East Liberty	1113004	-8.835999	-9.63439	10.28649	-99.10406	=$D$38*D5	=$E$38*E5	=$F$38*F5	=$G$38*G5	=($E$38+($G$38*F5))	=N5*$E5
110	East Liberty	1115001	-0.0231895	3.295708	10.28649	33.90127	=$D$38*D6	=$E$38*E6	=$F$38*F6	=$G$38*G6	=($E$38+($G$38*F6))	=N6*$E6
112	East Liberty	1115002	5.900677	15.43446	10.28649	158.7664	=$D$38*D7	=$E$38*E7	=$F$38*F7	=$G$38*G7	=($E$38+($G$38*F7))	=N7*$E7
111	East Liberty	1115003	3.136639	-11.94843	10.28649	-122.9074	=$D$38*D8	=$E$38*E8	=$F$38*F8	=$G$38*G8	=($E$38+($G$38*F8))	=N8*$E8
109	East Liberty	1115004	15.72233	12.28603	10.28649	126.3802	=$D$38*D9	=$E$38*E9	=$F$38*F9	=$G$38*G9	=($E$38+($G$38*F9))	=N9*$E9
126	Garfield	1016001	19.38796	12.06928	10.51152	126.8665	=$D$38*D10	=$E$38*E10	=$F$38*F10	=$G$38*G10	=($E$38+($G$38*F10))	=N10*$E10
125	Garfield	1017001	-12.92349	-6.337517	10.51152	-66.61696	=$D$38*D11	=$E$38*E11	=$F$38*F11	=$G$38*G11	=($E$38+($G$38*F11))	=N11*$E11
127	Garfield	1017002	-1.439735	-3.121815	10.51152	-32.81503	=$D$38*D12	=$E$38*E12	=$F$38*F12	=$G$38*G12	=($E$38+($G$38*F12))	=N12*$E12
123	Garfield	1114001	2.284199	-4.136074	10.51152	-43.47644	=$D$38*D13	=$E$38*E13	=$F$38*F13	=$G$38*G13	=($E$38+($G$38*F13))	=N13*$E13
124	Garfield	1114002	-7.308933	1.526127	10.51152	16.04192	=$D$38*D14	=$E$38*E14	=$F$38*F14	=$G$38*G14	=($E$38+($G$38*F14))	=N14*$E14
262	Shadyside	703001	1.490433	-3.02248	-8.959021	27.07846	=$D$38*D15	=$E$38*E15	=$F$38*F15	=$G$38*G15	=($E$38+($G$38*F15))	=N15*$E15
260	Shadyside	703002	3.425453	1.307439	-8.959021	-11.71338	=$D$38*D16	=$E$38*E16	=$F$38*F16	=$G$38*G16	=($E$38+($G$38*F16))	=N16*$E16
267	Shadyside	703003	-12.25786	1.389055	-8.959021	-12.44457	=$D$38*D17	=$E$38*E17	=$F$38*F17	=$G$38*G17	=($E$38+($G$38*F17))	=N17*$E17
265	Shadyside	705001	-0.1224117	-1.750806	-8.959021	15.6855	=$D$38*D18	=$E$38*E18	=$F$38*F18	=$G$38*G18	=($E$38+($G$38*F18))	=N18*$E18
256	Shadyside	705002	9.163517	-1.688187	-8.959021	15.1245	=$D$38*D19	=$E$38*E19	=$F$38*F19	=$G$38*G19	=($E$38+($G$38*F19))	=N19*$E19
261	Shadyside	705003	6.606995	5.340759	-8.959021	-47.84797	=$D$38*D20	=$E$38*E20	=$F$38*F20	=$G$38*G20	=($E$38+($G$38*F20))	=N20*$E20
258	Shadyside	706001	-5.936739	0.3536911	-8.959021	-3.168726	=$D$38*D21	=$E$38*E21	=$F$38*F21	=$G$38*G21	=($E$38+($G$38*F21))	=N21*$E21
263	Shadyside	706002	-3.311823	-1.598434	-8.959021	14.3204	=$D$38*D22	=$E$38*E22	=$F$38*F22	=$G$38*G22	=($E$38+($G$38*F22))	=N22*$E22
266	Shadyside	708001	-3.559036	-0.271987	-8.959021	2.436737	=$D$38*D23	=$E$38*E23	=$F$38*F23	=$G$38*G23	=($E$38+($G$38*F23))	=N23*$E23
264	Shadyside	708002	-4.027567	-0.622777	-8.959021	5.579472	=$D$38*D24	=$E$38*E24	=$F$38*F24	=$G$38*G24	=($E$38+($G$38*F24))	=N24*$E24
257	Shadyside	709001	0.5048542	0.2451673	-8.959021	-2.196459	=$D$38*D25	=$E$38*E25	=$F$38*F25	=$G$38*G25	=($E$38+($G$38*F25))	=N25*$E25
259	Shadyside	709002	8.024193	0.3185596	-8.959021	-2.853982	=$D$38*D26	=$E$38*E26	=$F$38*F26	=$G$38*G26	=($E$38+($G$38*F26))	=N26*$E26
302	Squirrel Hill North	1401001	-2.474749	-0.8698978	-14.30985	12.44811	=$D$38*D27	=$E$38*E27	=$F$38*F27	=$G$38*G27	=($E$38+($G$38*F27))	=N27*$E27
297	Squirrel Hill North	1401002	-8.1292	-0.2874789	-14.30985	4.11378	=$D$38*D28	=$E$38*E28	=$F$38*F28	=$G$38*G28	=($E$38+($G$38*F28))	=N28*$E28
304	Squirrel Hill North	1401004	-5.96583	-4.401445	-14.30985	62.98402	=$D$38*D29	=$E$38*E29	=$F$38*F29	=$G$38*G29	=($E$38+($G$38*F29))	=N29*$E29
296	Squirrel Hill North	1402001	7.118092	-0.5169454	-14.30985	7.39741	=$D$38*D30	=$E$38*E30	=$F$38*F30	=$G$38*G30	=($E$38+($G$38*F30))	=N30*$E30
298	Squirrel Hill North	1402002	12.17517	0.2129364	-14.30985	-3.047088	=$D$38*D31	=$E$38*E31	=$F$38*F31	=$G$38*G31	=($E$38+($G$38*F31))	=N31*$E31
303	Squirrel Hill North	1403001	1.717674	2.179024	-14.30985	-31.18151	=$D$38*D32	=$E$38*E32	=$F$38*F32	=$G$38*G32	=($E$38+($G$38*F32))	=N32*$E32
299	Squirrel Hill North	1403002	5.718069	-0.1525521	-14.30985	2.182998	=$D$38*D33	=$E$38*E33	=$F$38*F33	=$G$38*G33	=($E$38+($G$38*F33))	=N33*$E33
301	Squirrel Hill North	1403003	-6.716778	2.241222	-14.30985	-32.07155	=$D$38*D34	=$E$38*E34	=$F$38*F34	=$G$38*G34	=($E$38+($G$38*F34))	=N34*$E34
300	Squirrel Hill North	1403004	-3.442447	1.595135	-14.30985	-22.82614	=$D$38*D35	=$E$38*E35	=$F$38*F35	=$G$38*G35	=($E$38+($G$38*F35))	=N35*$E35
			cf1nw	cf2nw	cfbwn	f2int						
			0.0018071	-0.0003208	0.0027202	-0.0002292				=(0.00023*-14		

	neigh_name	ctblock	cf1nw	cf2nw	cfbwn	f2int	cf1nw	cf2nw	cfbwn	f2int	cf2bw*int	f2int
107	East Liberty	1113001	-6.698502	-0.7605743	10.28649	-7.823641	-0.0121049	0.00024399	0.02798131	0.00179318	-0.0026785	0.00203717
108	East Liberty	1113002	-9.788025	-12.61511	10.28649	-129.7653	-0.0176879	0.00404693	0.02798131	0.02974221	-0.0026785	0.03378911
113	East Liberty	1113003	0.5860634	3.942299	10.28649	40.55243	0.00105908	-0.0012647	0.02798131	-0.0092946	-0.0026785	-0.0105593
106	East Liberty	1113004	-8.835999	-9.63439	10.28649	-99.10406	-0.0159675	0.00309071	0.02798131	0.02271465	-0.0026785	0.02580536
110	East Liberty	1115001	-0.0231895	3.295708	10.28649	33.90127	-4.191E-05	-0.0010573	0.02798131	-0.0077702	-0.0026785	-0.0088274
112	East Liberty	1115002	5.900677	15.43446	10.28649	158.7664	0.01066311	-0.0049514	0.02798131	-0.0363893	-0.0026785	-0.0413406
111	East Liberty	1115003	3.136639	-11.94843	10.28649	-122.9074	0.00566822	0.00383306	0.02798131	0.02817038	-0.0026785	0.03200343
109	East Liberty	1115004	15.72233	12.28603	10.28649	126.3802	0.02841182	-0.0039414	0.02798131	-0.0289663	-0.0026785	-0.0329077
126	Garfield	1016001	19.38796	12.06928	10.51152	126.8665	0.03503598	-0.0038718	0.02859344	-0.0290778	-0.00273	-0.0329496
125	Garfield	1017001	-12.92349	-6.337517	10.51152	-66.61696	-0.023354	0.00203308	0.02859344	0.01526861	-0.00273	0.01730168
127	Garfield	1017002	-1.439735	-3.121815	10.51152	-32.81503	-0.0026017	0.00100148	0.02859344	0.0075212	-0.00273	0.00852268
123	Garfield	1114001	2.284199	-4.136074	10.51152	-43.47644	0.00412778	0.00132685	0.02859344	0.0099648	-0.00273	0.01129165
124	Garfield	1114002	-7.308933	1.526127	10.51152	16.04192	-0.013208	-0.0004896	0.02859344	-0.0036768	-0.00273	-0.0041664
262	Shadyside	703001	1.490433	-3.02248	-8.959021	27.07846	0.00269336	0.00096961	-0.0243703	-0.0062064	0.00173261	-0.0052368
260	Shadyside	703002	3.425453	1.307439	-8.959021	-11.71338	0.00619014	-0.0004194	-0.0243703	0.00268471	0.00173261	0.00226528
267	Shadyside	703003	-12.25786	1.389055	-8.959021	-12.44457	-0.0221512	-0.0004456	-0.0243703	0.0028523	0.00173261	0.00240669
265	Shadyside	705001	-0.1224117	-1.750806	-8.959021	15.6855	-0.0002212	0.00056166	-0.0243703	-0.0035951	0.00173261	-0.0030335
256	Shadyside	705002	9.163517	-1.688187	-8.959021	15.1245	0.01655939	0.00054157	-0.0243703	-0.0034665	0.00173261	-0.002925
261	Shadyside	705003	6.606995	5.340759	-8.959021	-47.84797	0.0119395	-0.0017133	-0.0243703	0.01096675	0.00173261	0.00925344
258	Shadyside	706001	-5.936739	0.3536911	-8.959021	-3.168726	-0.0107283	-0.0001135	-0.0243703	0.00072627	0.00173261	0.00061281
263	Shadyside	706002	-3.311823	-1.598434	-8.959021	14.3204	-0.0059848	0.00051278	-0.0243703	-0.0032822	0.00173261	-0.0027695
266	Shadyside	708001	-3.559036	-0.271987	-8.959021	2.436737	-0.0064315	8.7253E-05	-0.0243703	-0.0005585	0.00173261	-0.0004712
264	Shadyside	708002	-4.027567	-0.622777	-8.959021	5.579472	-0.0072782	0.00019979	-0.0243703	-0.0012788	0.00173261	-0.001079
257	Shadyside	709001	0.5048542	0.2451673	-8.959021	-2.196459	0.00091232	-7.865E-05	-0.0243703	0.00050343	0.00173261	0.00042478
259	Shadyside	709002	8.024193	0.3185596	-8.959021	-2.853982	0.01450052	-0.0001022	-0.0243703	0.00065413	0.00173261	0.00055194
302	Squirrel Hill No	1401001	-2.474749	-0.8698978	-14.30985	12.44811	-0.0044721	0.00027906	-0.0389257	-0.0028531	0.00295902	-0.002574
297	Squirrel Hill No	1401002	-8.1292	-0.2874789	-14.30985	4.11378	-0.0146903	9.2223E-05	-0.0389257	-0.0009429	0.00295902	-0.0008507
304	Squirrel Hill No	1401004	-5.96583	-4.401445	-14.30985	62.98402	-0.0107809	0.00141198	-0.0389257	-0.0144359	0.00295902	-0.013024
296	Squirrel Hill No	1402001	7.118092	-0.5169454	-14.30985	7.39741	0.0128631	0.00016584	-0.0389257	-0.0016955	0.00295902	-0.0015297
298	Squirrel Hill No	1402002	12.17517	0.2129364	-14.30985	-3.047088	0.02200175	-6.831E-05	-0.0389257	0.00069839	0.00295902	0.00063008
303	Squirrel Hill No	1403001	1.717674	2.179024	-14.30985	-31.18151	0.00310401	-0.000699	-0.0389257	0.0071468	0.00295902	0.00644777
299	Squirrel Hill No	1403002	5.718069	-0.1525521	-14.30985	2.182998	0.01033312	4.8939E-05	-0.0389257	-0.0005003	0.00295902	-0.0004514
301	Squirrel Hill No	1403003	-6.716778	2.241222	-14.30985	-32.07155	-0.0121379	-0.000719	-0.0389257	0.0073508	0.00295902	0.00663182
300	Squirrel Hill No	1403004	-3.442447	1.595135	-14.30985	-22.82614	-0.0062208	-0.0005117	-0.0389257	0.00523175	0.00295902	0.00472003
			cf1nw	cf2nw	cfbwn	f2int						
			0.0018071	-0.0003208	0.0027202	-0.0002292				-0.0035913		

Model 4 Estimates

	neigh_name	ctblock	cf1nw	cf2nw	cfbwn	cf1nw	cf2nw	cfbwn
107	East Liberty	1113001	-6.698502	-0.7605743	10.28649	=$D$38*D2	=$E$38*E2	=$F$38*F2
108	East Liberty	1113002	-9.788025	-12.61511	10.28649	=$D$38*D3	=$E$38*E3	=$F$38*F3
113	East Liberty	1113003	0.5860634	3.942299	10.28649	=$D$38*D4	=$E$38*E4	=$F$38*F4
106	East Liberty	1113004	-8.835999	-9.63439	10.28649	=$D$38*D5	=$E$38*E5	=$F$38*F5
110	East Liberty	1115001	-0.0231895	3.295708	10.28649	=$D$38*D6	=$E$38*E6	=$F$38*F6
112	East Liberty	1115002	5.900677	15.43446	10.28649	=$D$38*D7	=$E$38*E7	=$F$38*F7
111	East Liberty	1115003	3.136639	-11.94843	10.28649	=$D$38*D8	=$E$38*E8	=$F$38*F8
109	East Liberty	1115004	15.72233	12.28603	10.28649	=$D$38*D9	=$E$38*E9	=$F$38*F9
126	Garfield	1016001	19.38796	12.06928	10.51152	=$D$38*D10	=$E$38*E10	=$F$38*F10
125	Garfield	1017001	-12.92349	-6.337517	10.51152	=$D$38*D11	=$E$38*E11	=$F$38*F11
127	Garfield	1017002	-1.439735	-3.121815	10.51152	=$D$38*D12	=$E$38*E12	=$F$38*F12
123	Garfield	1114001	2.284199	-4.136074	10.51152	=$D$38*D13	=$E$38*E13	=$F$38*F13
124	Garfield	1114002	-7.308933	1.526127	10.51152	=$D$38*D14	=$E$38*E14	=$F$38*F14
262	Shadyside	703001	1.490433	-3.02248	-8.959021	=$D$38*D15	=$E$38*E15	=$F$38*F15
260	Shadyside	703002	3.425453	1.307439	-8.959021	=$D$38*D16	=$E$38*E16	=$F$38*F16
267	Shadyside	703003	-12.25786	1.389055	-8.959021	=$D$38*D17	=$E$38*E17	=$F$38*F17
265	Shadyside	705001	-0.1224117	-1.750806	-8.959021	=$D$38*D18	=$E$38*E18	=$F$38*F18
256	Shadyside	705002	9.163517	-1.688187	-8.959021	=$D$38*D19	=$E$38*E19	=$F$38*F19
261	Shadyside	705003	6.606995	5.340759	-8.959021	=$D$38*D20	=$E$38*E20	=$F$38*F20
258	Shadyside	706001	-5.936739	0.3536911	-8.959021	=$D$38*D21	=$E$38*E21	=$F$38*F21
263	Shadyside	706002	-3.311823	-1.598434	-8.959021	=$D$38*D22	=$E$38*E22	=$F$38*F22
266	Shadyside	708001	-3.559036	-0.271987	-8.959021	=$D$38*D23	=$E$38*E23	=$F$38*F23
264	Shadyside	708002	-4.027567	-0.622777	-8.959021	=$D$38*D24	=$E$38*E24	=$F$38*F24
257	Shadyside	709001	0.5048542	0.2451673	-8.959021	=$D$38*D25	=$E$38*E25	=$F$38*F25
259	Shadyside	709002	8.024193	0.3185596	-8.959021	=$D$38*D26	=$E$38*E26	=$F$38*F26
302	Squirrel Hill North	1401001	-2.474749	-0.8698978	-14.30985	=$D$38*D27	=$E$38*E27	=$F$38*F27
297	Squirrel Hill North	1401002	-8.1292	-0.2874789	-14.30985	=$D$38*D28	=$E$38*E28	=$F$38*F28
304	Squirrel Hill North	1401004	-5.96583	-4.401445	-14.30985	=$D$38*D29	=$E$38*E29	=$F$38*F29
296	Squirrel Hill North	1402001	7.118092	-0.5169454	-14.30985	=$D$38*D30	=$E$38*E30	=$F$38*F30
298	Squirrel Hill North	1402002	12.17517	0.2129364	-14.30985	=$D$38*D31	=$E$38*E31	=$F$38*F31
303	Squirrel Hill North	1403001	1.717674	2.179024	-14.30985	=$D$38*D32	=$E$38*E32	=$F$38*F32
299	Squirrel Hill North	1403002	5.718069	-0.1525521	-14.30985	=$D$38*D33	=$E$38*E33	=$F$38*F33
301	Squirrel Hill North	1403003	-6.716778	2.241222	-14.30985	=$D$38*D34	=$E$38*E34	=$F$38*F34
300	Squirrel Hill North	1403004	-3.442447	1.595135	-14.30985	=$D$38*D35	=$E$38*E35	=$F$38*F35

	neigh_name	ctblock	cf1nw	cf2nw	cfbwn	cf1nw	cf2nw	cfbwn
107	East Liberty	1113001	-6.698502	-0.7605743	10.28649	-0.0110572	0.00035374	0.02790313
108	East Liberty	1113002	-9.788025	-12.61511	10.28649	-0.0161571	0.00586729	0.02790313
113	East Liberty	1113003	0.5860634	3.942299	10.28649	0.00096741	-0.0018336	0.02790313
106	East Liberty	1113004	-8.835999	-9.63439	10.28649	-0.0145856	0.00448095	0.02790313
110	East Liberty	1115001	-0.0231895	3.295708	10.28649	-3.828E-05	-0.0015328	0.02790313
112	East Liberty	1115002	5.900677	15.43446	10.28649	0.00974025	-0.0071786	0.02790313
111	East Liberty	1115003	3.136639	-11.94843	10.28649	0.00517765	0.00555721	0.02790313
109	East Liberty	1115004	15.72233	12.28603	10.28649	0.02595285	-0.0057142	0.02790313
126	Garfield	1016001	19.38796	12.06928	10.51152	0.03200371	-0.0056134	0.02851355
125	Garfield	1017001	-12.92349	-6.337517	10.51152	-0.0213328	0.00294758	0.02851355
127	Garfield	1017002	-1.439735	-3.121815	10.51152	-0.0023766	0.00145196	0.02851355
123	Garfield	1114001	2.284199	-4.136074	10.51152	0.00377053	0.00192369	0.02851355
124	Garfield	1114002	-7.308933	1.526127	10.51152	-0.0120649	-0.0007098	0.02851355
262	Shadyside	703001	1.490433	-3.02248	-8.959021	0.00246026	0.00140576	-0.0243022
260	Shadyside	703002	3.425453	1.307439	-8.959021	0.0056544	-0.0006081	-0.0243022
267	Shadyside	703003	-12.25786	1.389055	-8.959021	-0.020234	-0.000646	-0.0243022
265	Shadyside	705001	-0.1224117	-1.750806	-8.959021	-0.0002021	0.0008143	-0.0243022
256	Shadyside	705002	9.163517	-1.688187	-8.959021	0.01512622	0.00078518	-0.0243022
261	Shadyside	705003	6.606995	5.340759	-8.959021	0.01090617	-0.002484	-0.0243022
258	Shadyside	706001	-5.936739	0.3536911	-8.959021	-0.0097998	-0.0001645	-0.0243022
263	Shadyside	706002	-3.311823	-1.598434	-8.959021	-0.0054668	0.00074343	-0.0243022
266	Shadyside	708001	-3.559036	-0.271987	-8.959021	-0.0058749	0.0001265	-0.0243022
264	Shadyside	708002	-4.027567	-0.622777	-8.959021	-0.0066483	0.00028965	-0.0243022
257	Shadyside	709001	0.5048542	0.2451673	-8.959021	0.00083336	-0.000114	-0.0243022
259	Shadyside	709002	8.024193	0.3185596	-8.959021	0.01324554	-0.0001482	-0.0243022
302	Squirrel Hill No	1401001	-2.474749	-0.8698978	-14.30985	-0.0040851	0.00040459	-0.0388169
297	Squirrel Hill No	1401002	-8.1292	-0.2874789	-14.30985	-0.0134189	0.00013371	-0.0388169
304	Squirrel Hill No	1401004	-5.96583	-4.401445	-14.30985	-0.0098478	0.00204711	-0.0388169
296	Squirrel Hill No	1402001	7.118092	-0.5169454	-14.30985	0.01174983	0.00024043	-0.0388169
298	Squirrel Hill No	1402002	12.17517	0.2129364	-14.30985	0.02009755	-9.904E-05	-0.0388169
303	Squirrel Hill No	1403001	1.717674	2.179024	-14.30985	0.00283536	-0.0010135	-0.0388169
299	Squirrel Hill No	1403002	5.718069	-0.1525521	-14.30985	0.00943882	7.0952E-05	-0.0388169
301	Squirrel Hill No	1403003	-6.716778	2.241222	-14.30985	-0.0110874	-0.0010424	-0.0388169
300	Squirrel Hill No	1403004	-3.442447	1.595135	-14.30985	-0.0056824	-0.0007419	-0.0388169

Interaction Graph

cf2nw	mean OND	High OND (SD+1)	Low OND (SD-1)
0	=0.0980762+(-0.0003208*A2)	=0.0687808+(0.0021479*A2)	=0.1273717+(-0.0027895*A2)
0	=0.0980762+(-0.0003208*A3)	=0.0687808+(0.0021479*A3)	=0.1273717+(-0.0027895*A3)
-7.803672	=0.0980762+(-0.0003208*A4)	=0.0687808+(0.0021479*A4)	=0.1273717+(-0.0027895*A4)
6.495358	=0.0980762+(-0.0003208*A5)	=0.0687808+(0.0021479*A5)	=0.1273717+(-0.0027895*A5)
7.462149	=0.0980762+(-0.0003208*A6)	=0.0687808+(0.0021479*A6)	=0.1273717+(-0.0027895*A6)
-6.153832	=0.0980762+(-0.0003208*A7)	=0.0687808+(0.0021479*A7)	=0.1273717+(-0.0027895*A7)
2.005355	=0.0980762+(-0.0003208*A8)	=0.0687808+(0.0021479*A8)	=0.1273717+(-0.0027895*A8)
2.084413	=0.0980762+(-0.0003208*A9)	=0.0687808+(0.0021479*A9)	=0.1273717+(-0.0027895*A9)
-4.089767	=0.0980762+(-0.0003208*A10)	=0.0687808+(0.0021479*A10)	=0.1273717+(-0.0027895*A10)
0	=0.0980762+(-0.0003208*A11)	=0.0687808+(0.0021479*A11)	=0.1273717+(-0.0027895*A11)
2.392103	=0.0980762+(-0.0003208*A12)	=0.0687808+(0.0021479*A12)	=0.1273717+(-0.0027895*A12)
0.2832255	=0.0980762+(-0.0003208*A13)	=0.0687808+(0.0021479*A13)	=0.1273717+(-0.0027895*A13)
-2.675328	=0.0980762+(-0.0003208*A14)	=0.0687808+(0.0021479*A14)	=0.1273717+(-0.0027895*A14)
0	=0.0980762+(-0.0003208*A15)	=0.0687808+(0.0021479*A15)	=0.1273717+(-0.0027895*A15)
-0.8120499	=0.0980762+(-0.0003208*A16)	=0.0687808+(0.0021479*A16)	=0.1273717+(-0.0027895*A16)
-3.237368	=0.0980762+(-0.0003208*A17)	=0.0687808+(0.0021479*A17)	=0.1273717+(-0.0027895*A17)
-1.260661	=0.0980762+(-0.0003208*A18)	=0.0687808+(0.0021479*A18)	=0.1273717+(-0.0027895*A18)
-3.145462	=0.0980762+(-0.0003208*A19)	=0.0687808+(0.0021479*A19)	=0.1273717+(-0.0027895*A19)
1.575637	=0.0980762+(-0.0003208*A20)	=0.0687808+(0.0021479*A20)	=0.1273717+(-0.0027895*A20)
-1.765507	=0.0980762+(-0.0003208*A21)	=0.0687808+(0.0021479*A21)	=0.1273717+(-0.0027895*A21)
1.83322	=0.0980762+(-0.0003208*A22)	=0.0687808+(0.0021479*A22)	=0.1273717+(-0.0027895*A22)
3.09915	=0.0980762+(-0.0003208*A23)	=0.0687808+(0.0021479*A23)	=0.1273717+(-0.0027895*A23)
-1.238619	=0.0980762+(-0.0003208*A24)	=0.0687808+(0.0021479*A24)	=0.1273717+(-0.0027895*A24)
4.951663	=0.0980762+(-0.0003208*A25)	=0.0687808+(0.0021479*A25)	=0.1273717+(-0.0027895*A25)
6.337379	=0.0980762+(-0.0003208*A26)	=0.0687808+(0.0021479*A26)	=0.1273717+(-0.0027895*A26)
-3.055553	=0.0980762+(-0.0003208*A27)	=0.0687808+(0.0021479*A27)	=0.1273717+(-0.0027895*A27)
0.1691589	=0.0980762+(-0.0003208*A28)	=0.0687808+(0.0021479*A28)	=0.1273717+(-0.0027895*A28)
-3.450987	=0.0980762+(-0.0003208*A29)	=0.0687808+(0.0021479*A29)	=0.1273717+(-0.0027895*A29)
-3.920941	=0.0980762+(-0.0003208*A30)	=0.0687808+(0.0021479*A30)	=0.1273717+(-0.0027895*A30)
-2.573298	=0.0980762+(-0.0003208*A31)	=0.0687808+(0.0021479*A31)	=0.1273717+(-0.0027895*A31)
-1.143152	=0.0980762+(-0.0003208*A32)	=0.0687808+(0.0021479*A32)	=0.1273717+(-0.0027895*A32)
3.86901	=0.0980762+(-0.0003208*A33)	=0.0687808+(0.0021479*A33)	=0.1273717+(-0.0027895*A33)

1.343008	=0.0980762+(-0.0003208*A34)	=0.0687808+(0.0021479*A34)	=0.1273717+(-0.0027895*A34)
-0.3078299	=0.0980762+(-0.0003208*A35)	=0.0687808+(0.0021479*A35)	=0.1273717+(-0.0027895*A35)
0.6199784	=0.0980762+(-0.0003208*A36)	=0.0687808+(0.0021479*A36)	=0.1273717+(-0.0027895*A36)
1.84103	=0.0980762+(-0.0003208*A37)	=0.0687808+(0.0021479*A37)	=0.1273717+(-0.0027895*A37)
1.962044	=0.0980762+(-0.0003208*A38)	=0.0687808+(0.0021479*A38)	=0.1273717+(-0.0027895*A38)
-1.689847	=0.0980762+(-0.0003208*A39)	=0.0687808+(0.0021479*A39)	=0.1273717+(-0.0027895*A39)
-7.674593	=0.0980762+(-0.0003208*A40)	=0.0687808+(0.0021479*A40)	=0.1273717+(-0.0027895*A40)
7.674593	=0.0980762+(-0.0003208*A41)	=0.0687808+(0.0021479*A41)	=0.1273717+(-0.0027895*A41)
0	=0.0980762+(-0.0003208*A42)	=0.0687808+(0.0021479*A42)	=0.1273717+(-0.0027895*A42)
-1.868286	=0.0980762+(-0.0003208*A43)	=0.0687808+(0.0021479*A43)	=0.1273717+(-0.0027895*A43)
-0.8863468	=0.0980762+(-0.0003208*A44)	=0.0687808+(0.0021479*A44)	=0.1273717+(-0.0027895*A44)
0.7998219	=0.0980762+(-0.0003208*A45)	=0.0687808+(0.0021479*A45)	=0.1273717+(-0.0027895*A45)
-1.121459	=0.0980762+(-0.0003208*A46)	=0.0687808+(0.0021479*A46)	=0.1273717+(-0.0027895*A46)
2.511472	=0.0980762+(-0.0003208*A47)	=0.0687808+(0.0021479*A47)	=0.1273717+(-0.0027895*A47)
-3.7826	=0.0980762+(-0.0003208*A48)	=0.0687808+(0.0021479*A48)	=0.1273717+(-0.0027895*A48)
4.347396	=0.0980762+(-0.0003208*A49)	=0.0687808+(0.0021479*A49)	=0.1273717+(-0.0027895*A49)
1.029781	=0.0980762+(-0.0003208*A50)	=0.0687808+(0.0021479*A50)	=0.1273717+(-0.0027895*A50)
-0.4579768	=0.0980762+(-0.0003208*A51)	=0.0687808+(0.0021479*A51)	=0.1273717+(-0.0027895*A51)
-3.505507	=0.0980762+(-0.0003208*A52)	=0.0687808+(0.0021479*A52)	=0.1273717+(-0.0027895*A52)
-1.959435	=0.0980762+(-0.0003208*A53)	=0.0687808+(0.0021479*A53)	=0.1273717+(-0.0027895*A53)
4.056054	=0.0980762+(-0.0003208*A54)	=0.0687808+(0.0021479*A54)	=0.1273717+(-0.0027895*A54)
-1.665853	=0.0980762+(-0.0003208*A55)	=0.0687808+(0.0021479*A55)	=0.1273717+(-0.0027895*A55)
2.895914	=0.0980762+(-0.0003208*A56)	=0.0687808+(0.0021479*A56)	=0.1273717+(-0.0027895*A56)
-0.1313834	=0.0980762+(-0.0003208*A57)	=0.0687808+(0.0021479*A57)	=0.1273717+(-0.0027895*A57)
-0.3471966	=0.0980762+(-0.0003208*A58)	=0.0687808+(0.0021479*A58)	=0.1273717+(-0.0027895*A58)
-0.9699602	=0.0980762+(-0.0003208*A59)	=0.0687808+(0.0021479*A59)	=0.1273717+(-0.0027895*A59)
-1.442383	=0.0980762+(-0.0003208*A60)	=0.0687808+(0.0021479*A60)	=0.1273717+(-0.0027895*A60)
-2.251032	=0.0980762+(-0.0003208*A61)	=0.0687808+(0.0021479*A61)	=0.1273717+(-0.0027895*A61)
1.885344	=0.0980762+(-0.0003208*A62)	=0.0687808+(0.0021479*A62)	=0.1273717+(-0.0027895*A62)
-2.327853	=0.0980762+(-0.0003208*A63)	=0.0687808+(0.0021479*A63)	=0.1273717+(-0.0027895*A63)
5.191487	=0.0980762+(-0.0003208*A64)	=0.0687808+(0.0021479*A64)	=0.1273717+(-0.0027895*A64)
0	=0.0980762+(-0.0003208*A65)	=0.0687808+(0.0021479*A65)	=0.1273717+(-0.0027895*A65)
-3.211977	=0.0980762+(-0.0003208*A66)	=0.0687808+(0.0021479*A66)	=0.1273717+(-0.0027895*A66)
1.123282	=0.0980762+(-0.0003208*A67)	=0.0687808+(0.0021479*A67)	=0.1273717+(-0.0027895*A67)
2.364455	=0.0980762+(-0.0003208*A68)	=0.0687808+(0.0021479*A68)	=0.1273717+(-0.0027895*A68)

-0.6535554	=0.0980762+(-0.0003208*A69)	=0.0687808+(0.0021479*A69)	=0.1273717+(-0.0027895*A69)
-2.65818	=0.0980762+(-0.0003208*A70)	=0.0687808+(0.0021479*A70)	=0.1273717+(-0.0027895*A70)
0.2513351	=0.0980762+(-0.0003208*A71)	=0.0687808+(0.0021479*A71)	=0.1273717+(-0.0027895*A71)
-3.48124	=0.0980762+(-0.0003208*A72)	=0.0687808+(0.0021479*A72)	=0.1273717+(-0.0027895*A72)
2.269906	=0.0980762+(-0.0003208*A73)	=0.0687808+(0.0021479*A73)	=0.1273717+(-0.0027895*A73)
4.007472	=0.0980762+(-0.0003208*A74)	=0.0687808+(0.0021479*A74)	=0.1273717+(-0.0027895*A74)
-0.8361692	=0.0980762+(-0.0003208*A75)	=0.0687808+(0.0021479*A75)	=0.1273717+(-0.0027895*A75)
-2.266755	=0.0980762+(-0.0003208*A76)	=0.0687808+(0.0021479*A76)	=0.1273717+(-0.0027895*A76)
0.9003172	=0.0980762+(-0.0003208*A77)	=0.0687808+(0.0021479*A77)	=0.1273717+(-0.0027895*A77)
2.191107	=0.0980762+(-0.0003208*A78)	=0.0687808+(0.0021479*A78)	=0.1273717+(-0.0027895*A78)
-3.156579	=0.0980762+(-0.0003208*A79)	=0.0687808+(0.0021479*A79)	=0.1273717+(-0.0027895*A79)
2.426886	=0.0980762+(-0.0003208*A80)	=0.0687808+(0.0021479*A80)	=0.1273717+(-0.0027895*A80)
1.903032	=0.0980762+(-0.0003208*A81)	=0.0687808+(0.0021479*A81)	=0.1273717+(-0.0027895*A81)
-1.308436	=0.0980762+(-0.0003208*A82)	=0.0687808+(0.0021479*A82)	=0.1273717+(-0.0027895*A82)
-3.298139	=0.0980762+(-0.0003208*A83)	=0.0687808+(0.0021479*A83)	=0.1273717+(-0.0027895*A83)
3.433236	=0.0980762+(-0.0003208*A84)	=0.0687808+(0.0021479*A84)	=0.1273717+(-0.0027895*A84)
1.400837	=0.0980762+(-0.0003208*A85)	=0.0687808+(0.0021479*A85)	=0.1273717+(-0.0027895*A85)
-10.74504	=0.0980762+(-0.0003208*A86)	=0.0687808+(0.0021479*A86)	=0.1273717+(-0.0027895*A86)
9.3442	=0.0980762+(-0.0003208*A87)	=0.0687808+(0.0021479*A87)	=0.1273717+(-0.0027895*A87)
-0.9670682	=0.0980762+(-0.0003208*A88)	=0.0687808+(0.0021479*A88)	=0.1273717+(-0.0027895*A88)
0.2543187	=0.0980762+(-0.0003208*A89)	=0.0687808+(0.0021479*A89)	=0.1273717+(-0.0027895*A89)
0.7127497	=0.0980762+(-0.0003208*A90)	=0.0687808+(0.0021479*A90)	=0.1273717+(-0.0027895*A90)
0	=0.0980762+(-0.0003208*A91)	=0.0687808+(0.0021479*A91)	=0.1273717+(-0.0027895*A91)
16.57535	=0.0980762+(-0.0003208*A92)	=0.0687808+(0.0021479*A92)	=0.1273717+(-0.0027895*A92)
-6.850836	=0.0980762+(-0.0003208*A93)	=0.0687808+(0.0021479*A93)	=0.1273717+(-0.0027895*A93)
-3.750354	=0.0980762+(-0.0003208*A94)	=0.0687808+(0.0021479*A94)	=0.1273717+(-0.0027895*A94)
-5.974157	=0.0980762+(-0.0003208*A95)	=0.0687808+(0.0021479*A95)	=0.1273717+(-0.0027895*A95)
-6.368111	=0.0980762+(-0.0003208*A96)	=0.0687808+(0.0021479*A96)	=0.1273717+(-0.0027895*A96)
6.368114	=0.0980762+(-0.0003208*A97)	=0.0687808+(0.0021479*A97)	=0.1273717+(-0.0027895*A97)
1.222399	=0.0980762+(-0.0003208*A98)	=0.0687808+(0.0021479*A98)	=0.1273717+(-0.0027895*A98)
-0.3869133	=0.0980762+(-0.0003208*A99)	=0.0687808+(0.0021479*A99)	=0.1273717+(-0.0027895*A99)
-0.8354855	=0.0980762+(-0.0003208*A100)	=0.0687808+(0.0021479*A100)	=0.1273717+(-0.0027895*A100)
-4.598326	=0.0980762+(-0.0003208*A101)	=0.0687808+(0.0021479*A101)	=0.1273717+(-0.0027895*A101)
4.598326	=0.0980762+(-0.0003208*A102)	=0.0687808+(0.0021479*A102)	=0.1273717+(-0.0027895*A102)
0	=0.0980762+(-0.0003208*A103)	=0.0687808+(0.0021479*A103)	=0.1273717+(-0.0027895*A103)

-5.438385	=0.0980762+(-0.0003208*A104)	=0.0687808+(0.0021479*A104)	=0.1273717+(-0.0027895*A104)
8.24107	=0.0980762+(-0.0003208*A105)	=0.0687808+(0.0021479*A105)	=0.1273717+(-0.0027895*A105)
-2.802685	=0.0980762+(-0.0003208*A106)	=0.0687808+(0.0021479*A106)	=0.1273717+(-0.0027895*A106)
-9.63439	=0.0980762+(-0.0003208*A107)	=0.0687808+(0.0021479*A107)	=0.1273717+(-0.0027895*A107)
-0.7605743	=0.0980762+(-0.0003208*A108)	=0.0687808+(0.0021479*A108)	=0.1273717+(-0.0027895*A108)
-12.61511	=0.0980762+(-0.0003208*A109)	=0.0687808+(0.0021479*A109)	=0.1273717+(-0.0027895*A109)
12.28603	=0.0980762+(-0.0003208*A110)	=0.0687808+(0.0021479*A110)	=0.1273717+(-0.0027895*A110)
3.295708	=0.0980762+(-0.0003208*A111)	=0.0687808+(0.0021479*A111)	=0.1273717+(-0.0027895*A111)
-11.94843	=0.0980762+(-0.0003208*A112)	=0.0687808+(0.0021479*A112)	=0.1273717+(-0.0027895*A112)
15.43446	=0.0980762+(-0.0003208*A113)	=0.0687808+(0.0021479*A113)	=0.1273717+(-0.0027895*A113)
3.942299	=0.0980762+(-0.0003208*A114)	=0.0687808+(0.0021479*A114)	=0.1273717+(-0.0027895*A114)
2.15548	=0.0980762+(-0.0003208*A115)	=0.0687808+(0.0021479*A115)	=0.1273717+(-0.0027895*A115)
-3.815548	=0.0980762+(-0.0003208*A116)	=0.0687808+(0.0021479*A116)	=0.1273717+(-0.0027895*A116)
1.660068	=0.0980762+(-0.0003208*A117)	=0.0687808+(0.0021479*A117)	=0.1273717+(-0.0027895*A117)
0	=0.0980762+(-0.0003208*A118)	=0.0687808+(0.0021479*A118)	=0.1273717+(-0.0027895*A118)
0	=0.0980762+(-0.0003208*A119)	=0.0687808+(0.0021479*A119)	=0.1273717+(-0.0027895*A119)
12.20885	=0.0980762+(-0.0003208*A120)	=0.0687808+(0.0021479*A120)	=0.1273717+(-0.0027895*A120)
-12.20886	=0.0980762+(-0.0003208*A121)	=0.0687808+(0.0021479*A121)	=0.1273717+(-0.0027895*A121)
6.439554	=0.0980762+(-0.0003208*A122)	=0.0687808+(0.0021479*A122)	=0.1273717+(-0.0027895*A122)
-6.439554	=0.0980762+(-0.0003208*A123)	=0.0687808+(0.0021479*A123)	=0.1273717+(-0.0027895*A123)
-4.136074	=0.0980762+(-0.0003208*A124)	=0.0687808+(0.0021479*A124)	=0.1273717+(-0.0027895*A124)
1.526127	=0.0980762+(-0.0003208*A125)	=0.0687808+(0.0021479*A125)	=0.1273717+(-0.0027895*A125)
-6.337517	=0.0980762+(-0.0003208*A126)	=0.0687808+(0.0021479*A126)	=0.1273717+(-0.0027895*A126)
12.06928	=0.0980762+(-0.0003208*A127)	=0.0687808+(0.0021479*A127)	=0.1273717+(-0.0027895*A127)
-3.121815	=0.0980762+(-0.0003208*A128)	=0.0687808+(0.0021479*A128)	=0.1273717+(-0.0027895*A128)
0	=0.0980762+(-0.0003208*A129)	=0.0687808+(0.0021479*A129)	=0.1273717+(-0.0027895*A129)
-5.972978	=0.0980762+(-0.0003208*A130)	=0.0687808+(0.0021479*A130)	=0.1273717+(-0.0027895*A130)
2.98621	=0.0980762+(-0.0003208*A131)	=0.0687808+(0.0021479*A131)	=0.1273717+(-0.0027895*A131)
-3.238295	=0.0980762+(-0.0003208*A132)	=0.0687808+(0.0021479*A132)	=0.1273717+(-0.0027895*A132)
6.225062	=0.0980762+(-0.0003208*A133)	=0.0687808+(0.0021479*A133)	=0.1273717+(-0.0027895*A133)
2.244935	=0.0980762+(-0.0003208*A134)	=0.0687808+(0.0021479*A134)	=0.1273717+(-0.0027895*A134)
-0.3240948	=0.0980762+(-0.0003208*A135)	=0.0687808+(0.0021479*A135)	=0.1273717+(-0.0027895*A135)
2.115796	=0.0980762+(-0.0003208*A136)	=0.0687808+(0.0021479*A136)	=0.1273717+(-0.0027895*A136)
0.3705974	=0.0980762+(-0.0003208*A137)	=0.0687808+(0.0021479*A137)	=0.1273717+(-0.0027895*A137)
-1.355985	=0.0980762+(-0.0003208*A138)	=0.0687808+(0.0021479*A138)	=0.1273717+(-0.0027895*A138)

-1.776034	=0.0980762+(-0.0003208*A139)	=0.0687808+(0.0021479*A139)	=0.1273717+(-0.0027895*A139)
0.4189119	=0.0980762+(-0.0003208*A140)	=0.0687808+(0.0021479*A140)	=0.1273717+(-0.0027895*A140)
-0.4642792	=0.0980762+(-0.0003208*A141)	=0.0687808+(0.0021479*A141)	=0.1273717+(-0.0027895*A141)
-1.229846	=0.0980762+(-0.0003208*A142)	=0.0687808+(0.0021479*A142)	=0.1273717+(-0.0027895*A142)
0	=0.0980762+(-0.0003208*A143)	=0.0687808+(0.0021479*A143)	=0.1273717+(-0.0027895*A143)
1.093367	=0.0980762+(-0.0003208*A144)	=0.0687808+(0.0021479*A144)	=0.1273717+(-0.0027895*A144)
4.906849	=0.0980762+(-0.0003208*A145)	=0.0687808+(0.0021479*A145)	=0.1273717+(-0.0027895*A145)
-3.08795	=0.0980762+(-0.0003208*A146)	=0.0687808+(0.0021479*A146)	=0.1273717+(-0.0027895*A146)
0.2470493	=0.0980762+(-0.0003208*A147)	=0.0687808+(0.0021479*A147)	=0.1273717+(-0.0027895*A147)
5.441002	=0.0980762+(-0.0003208*A148)	=0.0687808+(0.0021479*A148)	=0.1273717+(-0.0027895*A148)
-4.346087	=0.0980762+(-0.0003208*A149)	=0.0687808+(0.0021479*A149)	=0.1273717+(-0.0027895*A149)
-4.254236	=0.0980762+(-0.0003208*A150)	=0.0687808+(0.0021479*A150)	=0.1273717+(-0.0027895*A150)
-3.153459	=0.0980762+(-0.0003208*A151)	=0.0687808+(0.0021479*A151)	=0.1273717+(-0.0027895*A151)
2.577984	=0.0980762+(-0.0003208*A152)	=0.0687808+(0.0021479*A152)	=0.1273717+(-0.0027895*A152)
4.511391	=0.0980762+(-0.0003208*A153)	=0.0687808+(0.0021479*A153)	=0.1273717+(-0.0027895*A153)
-1.732808	=0.0980762+(-0.0003208*A154)	=0.0687808+(0.0021479*A154)	=0.1273717+(-0.0027895*A154)
1.882732	=0.0980762+(-0.0003208*A155)	=0.0687808+(0.0021479*A155)	=0.1273717+(-0.0027895*A155)
-6.132995	=0.0980762+(-0.0003208*A156)	=0.0687808+(0.0021479*A156)	=0.1273717+(-0.0027895*A156)
2.047155	=0.0980762+(-0.0003208*A157)	=0.0687808+(0.0021479*A157)	=0.1273717+(-0.0027895*A157)
7.442696	=0.0980762+(-0.0003208*A158)	=0.0687808+(0.0021479*A158)	=0.1273717+(-0.0027895*A158)
1.911274	=0.0980762+(-0.0003208*A159)	=0.0687808+(0.0021479*A159)	=0.1273717+(-0.0027895*A159)
-0.0770226	=0.0980762+(-0.0003208*A160)	=0.0687808+(0.0021479*A160)	=0.1273717+(-0.0027895*A160)
-10.5758	=0.0980762+(-0.0003208*A161)	=0.0687808+(0.0021479*A161)	=0.1273717+(-0.0027895*A161)
1.298847	=0.0980762+(-0.0003208*A162)	=0.0687808+(0.0021479*A162)	=0.1273717+(-0.0027895*A162)
-1.460278	=0.0980762+(-0.0003208*A163)	=0.0687808+(0.0021479*A163)	=0.1273717+(-0.0027895*A163)
-6.119846	=0.0980762+(-0.0003208*A164)	=0.0687808+(0.0021479*A164)	=0.1273717+(-0.0027895*A164)
-2.168934	=0.0980762+(-0.0003208*A165)	=0.0687808+(0.0021479*A165)	=0.1273717+(-0.0027895*A165)
-2.889641	=0.0980762+(-0.0003208*A166)	=0.0687808+(0.0021479*A166)	=0.1273717+(-0.0027895*A166)
9.199074	=0.0980762+(-0.0003208*A167)	=0.0687808+(0.0021479*A167)	=0.1273717+(-0.0027895*A167)
3.439632	=0.0980762+(-0.0003208*A168)	=0.0687808+(0.0021479*A168)	=0.1273717+(-0.0027895*A168)
-1.046944	=0.0980762+(-0.0003208*A169)	=0.0687808+(0.0021479*A169)	=0.1273717+(-0.0027895*A169)
1.04694	=0.0980762+(-0.0003208*A170)	=0.0687808+(0.0021479*A170)	=0.1273717+(-0.0027895*A170)
-11.37588	=0.0980762+(-0.0003208*A171)	=0.0687808+(0.0021479*A171)	=0.1273717+(-0.0027895*A171)
5.890173	=0.0980762+(-0.0003208*A172)	=0.0687808+(0.0021479*A172)	=0.1273717+(-0.0027895*A172)
-4.65313	=0.0980762+(-0.0003208*A173)	=0.0687808+(0.0021479*A173)	=0.1273717+(-0.0027895*A173)

3.072556	=0.0980762+(-0.0003208*A174)	=0.0687808+(0.0021479*A174)	=0.1273717+(-0.0027895*A174)
7.816835	=0.0980762+(-0.0003208*A175)	=0.0687808+(0.0021479*A175)	=0.1273717+(-0.0027895*A175)
8.035543	=0.0980762+(-0.0003208*A176)	=0.0687808+(0.0021479*A176)	=0.1273717+(-0.0027895*A176)
-8.786101	=0.0980762+(-0.0003208*A177)	=0.0687808+(0.0021479*A177)	=0.1273717+(-0.0027895*A177)
2.534092	=0.0980762+(-0.0003208*A178)	=0.0687808+(0.0021479*A178)	=0.1273717+(-0.0027895*A178)
-6.666859	=0.0980762+(-0.0003208*A179)	=0.0687808+(0.0021479*A179)	=0.1273717+(-0.0027895*A179)
3.393684	=0.0980762+(-0.0003208*A180)	=0.0687808+(0.0021479*A180)	=0.1273717+(-0.0027895*A180)
0.7390862	=0.0980762+(-0.0003208*A181)	=0.0687808+(0.0021479*A181)	=0.1273717+(-0.0027895*A181)
2.140278	=0.0980762+(-0.0003208*A182)	=0.0687808+(0.0021479*A182)	=0.1273717+(-0.0027895*A182)
-4.391785	=0.0980762+(-0.0003208*A183)	=0.0687808+(0.0021479*A183)	=0.1273717+(-0.0027895*A183)
1.427448	=0.0980762+(-0.0003208*A184)	=0.0687808+(0.0021479*A184)	=0.1273717+(-0.0027895*A184)
0.8240623	=0.0980762+(-0.0003208*A185)	=0.0687808+(0.0021479*A185)	=0.1273717+(-0.0027895*A185)
0.1495848	=0.0980762+(-0.0003208*A186)	=0.0687808+(0.0021479*A186)	=0.1273717+(-0.0027895*A186)
-1.744369	=0.0980762+(-0.0003208*A187)	=0.0687808+(0.0021479*A187)	=0.1273717+(-0.0027895*A187)
-0.7269983	=0.0980762+(-0.0003208*A188)	=0.0687808+(0.0021479*A188)	=0.1273717+(-0.0027895*A188)
3.362231	=0.0980762+(-0.0003208*A189)	=0.0687808+(0.0021479*A189)	=0.1273717+(-0.0027895*A189)
-1.04045	=0.0980762+(-0.0003208*A190)	=0.0687808+(0.0021479*A190)	=0.1273717+(-0.0027895*A190)
-1.033834	=0.0980762+(-0.0003208*A191)	=0.0687808+(0.0021479*A191)	=0.1273717+(-0.0027895*A191)
1.033834	=0.0980762+(-0.0003208*A192)	=0.0687808+(0.0021479*A192)	=0.1273717+(-0.0027895*A192)
-5.839413	=0.0980762+(-0.0003208*A193)	=0.0687808+(0.0021479*A193)	=0.1273717+(-0.0027895*A193)
5.839417	=0.0980762+(-0.0003208*A194)	=0.0687808+(0.0021479*A194)	=0.1273717+(-0.0027895*A194)
0.5471544	=0.0980762+(-0.0003208*A195)	=0.0687808+(0.0021479*A195)	=0.1273717+(-0.0027895*A195)
-4.0081	=0.0980762+(-0.0003208*A196)	=0.0687808+(0.0021479*A196)	=0.1273717+(-0.0027895*A196)
-2.994185	=0.0980762+(-0.0003208*A197)	=0.0687808+(0.0021479*A197)	=0.1273717+(-0.0027895*A197)
6.455131	=0.0980762+(-0.0003208*A198)	=0.0687808+(0.0021479*A198)	=0.1273717+(-0.0027895*A198)
-0.2643433	=0.0980762+(-0.0003208*A199)	=0.0687808+(0.0021479*A199)	=0.1273717+(-0.0027895*A199)
-2.513744	=0.0980762+(-0.0003208*A200)	=0.0687808+(0.0021479*A200)	=0.1273717+(-0.0027895*A200)
2.778088	=0.0980762+(-0.0003208*A201)	=0.0687808+(0.0021479*A201)	=0.1273717+(-0.0027895*A201)
-1.801433	=0.0980762+(-0.0003208*A202)	=0.0687808+(0.0021479*A202)	=0.1273717+(-0.0027895*A202)
-5.781338	=0.0980762+(-0.0003208*A203)	=0.0687808+(0.0021479*A203)	=0.1273717+(-0.0027895*A203)
9.043866	=0.0980762+(-0.0003208*A204)	=0.0687808+(0.0021479*A204)	=0.1273717+(-0.0027895*A204)
-1.461094	=0.0980762+(-0.0003208*A205)	=0.0687808+(0.0021479*A205)	=0.1273717+(-0.0027895*A205)
0	=0.0980762+(-0.0003208*A206)	=0.0687808+(0.0021479*A206)	=0.1273717+(-0.0027895*A206)
-0.217505	=0.0980762+(-0.0003208*A207)	=0.0687808+(0.0021479*A207)	=0.1273717+(-0.0027895*A207)
9.432732	=0.0980762+(-0.0003208*A208)	=0.0687808+(0.0021479*A208)	=0.1273717+(-0.0027895*A208)

-0.3160806	=0.0980762+(-0.0003208*A209)	=0.0687808+(0.0021479*A209)	=0.1273717+(-0.0027895*A209)
-4.422059	=0.0980762+(-0.0003208*A210)	=0.0687808+(0.0021479*A210)	=0.1273717+(-0.0027895*A210)
1.609457	=0.0980762+(-0.0003208*A211)	=0.0687808+(0.0021479*A211)	=0.1273717+(-0.0027895*A211)
-3.732894	=0.0980762+(-0.0003208*A212)	=0.0687808+(0.0021479*A212)	=0.1273717+(-0.0027895*A212)
0.8493743	=0.0980762+(-0.0003208*A213)	=0.0687808+(0.0021479*A213)	=0.1273717+(-0.0027895*A213)
0.0599785	=0.0980762+(-0.0003208*A214)	=0.0687808+(0.0021479*A214)	=0.1273717+(-0.0027895*A214)
-3.664787	=0.0980762+(-0.0003208*A215)	=0.0687808+(0.0021479*A215)	=0.1273717+(-0.0027895*A215)
-4.409441	=0.0980762+(-0.0003208*A216)	=0.0687808+(0.0021479*A216)	=0.1273717+(-0.0027895*A216)
4.811224	=0.0980762+(-0.0003208*A217)	=0.0687808+(0.0021479*A217)	=0.1273717+(-0.0027895*A217)
0	=0.0980762+(-0.0003208*A218)	=0.0687808+(0.0021479*A218)	=0.1273717+(-0.0027895*A218)
-3.304867	=0.0980762+(-0.0003208*A219)	=0.0687808+(0.0021479*A219)	=0.1273717+(-0.0027895*A219)
2.452364	=0.0980762+(-0.0003208*A220)	=0.0687808+(0.0021479*A220)	=0.1273717+(-0.0027895*A220)
-0.6087413	=0.0980762+(-0.0003208*A221)	=0.0687808+(0.0021479*A221)	=0.1273717+(-0.0027895*A221)
0.6844993	=0.0980762+(-0.0003208*A222)	=0.0687808+(0.0021479*A222)	=0.1273717+(-0.0027895*A222)
0.7767439	=0.0980762+(-0.0003208*A223)	=0.0687808+(0.0021479*A223)	=0.1273717+(-0.0027895*A223)
0	=0.0980762+(-0.0003208*A224)	=0.0687808+(0.0021479*A224)	=0.1273717+(-0.0027895*A224)
0	=0.0980762+(-0.0003208*A225)	=0.0687808+(0.0021479*A225)	=0.1273717+(-0.0027895*A225)
0	=0.0980762+(-0.0003208*A226)	=0.0687808+(0.0021479*A226)	=0.1273717+(-0.0027895*A226)
2.148721	=0.0980762+(-0.0003208*A227)	=0.0687808+(0.0021479*A227)	=0.1273717+(-0.0027895*A227)
-1.704856	=0.0980762+(-0.0003208*A228)	=0.0687808+(0.0021479*A228)	=0.1273717+(-0.0027895*A228)
-0.1389918	=0.0980762+(-0.0003208*A229)	=0.0687808+(0.0021479*A229)	=0.1273717+(-0.0027895*A229)
-0.5636511	=0.0980762+(-0.0003208*A230)	=0.0687808+(0.0021479*A230)	=0.1273717+(-0.0027895*A230)
0.2587776	=0.0980762+(-0.0003208*A231)	=0.0687808+(0.0021479*A231)	=0.1273717+(-0.0027895*A231)
-3.849481	=0.0980762+(-0.0003208*A232)	=0.0687808+(0.0021479*A232)	=0.1273717+(-0.0027895*A232)
2.269077	=0.0980762+(-0.0003208*A233)	=0.0687808+(0.0021479*A233)	=0.1273717+(-0.0027895*A233)
-1.612857	=0.0980762+(-0.0003208*A234)	=0.0687808+(0.0021479*A234)	=0.1273717+(-0.0027895*A234)
1.500876	=0.0980762+(-0.0003208*A235)	=0.0687808+(0.0021479*A235)	=0.1273717+(-0.0027895*A235)
1.692384	=0.0980762+(-0.0003208*A236)	=0.0687808+(0.0021479*A236)	=0.1273717+(-0.0027895*A236)
11.32485	=0.0980762+(-0.0003208*A237)	=0.0687808+(0.0021479*A237)	=0.1273717+(-0.0027895*A237)
-4.736944	=0.0980762+(-0.0003208*A238)	=0.0687808+(0.0021479*A238)	=0.1273717+(-0.0027895*A238)
-11.90254	=0.0980762+(-0.0003208*A239)	=0.0687808+(0.0021479*A239)	=0.1273717+(-0.0027895*A239)
-0.4385052	=0.0980762+(-0.0003208*A240)	=0.0687808+(0.0021479*A240)	=0.1273717+(-0.0027895*A240)
5.306061	=0.0980762+(-0.0003208*A241)	=0.0687808+(0.0021479*A241)	=0.1273717+(-0.0027895*A241)
0.4470749	=0.0980762+(-0.0003208*A242)	=0.0687808+(0.0021479*A242)	=0.1273717+(-0.0027895*A242)
-1.378407	=0.0980762+(-0.0003208*A243)	=0.0687808+(0.0021479*A243)	=0.1273717+(-0.0027895*A243)

2.093736	=0.0980762+(-0.0003208*A244)	=0.0687808+(0.0021479*A244)	=0.1273717+(-0.0027895*A244)
-0.4794912	=0.0980762+(-0.0003208*A245)	=0.0687808+(0.0021479*A245)	=0.1273717+(-0.0027895*A245)
1.082806	=0.0980762+(-0.0003208*A246)	=0.0687808+(0.0021479*A246)	=0.1273717+(-0.0027895*A246)
-0.2714548	=0.0980762+(-0.0003208*A247)	=0.0687808+(0.0021479*A247)	=0.1273717+(-0.0027895*A247)
-1.047191	=0.0980762+(-0.0003208*A248)	=0.0687808+(0.0021479*A248)	=0.1273717+(-0.0027895*A248)
-7.32958	=0.0980762+(-0.0003208*A249)	=0.0687808+(0.0021479*A249)	=0.1273717+(-0.0027895*A249)
7.980024	=0.0980762+(-0.0003208*A250)	=0.0687808+(0.0021479*A250)	=0.1273717+(-0.0027895*A250)
-0.6504459	=0.0980762+(-0.0003208*A251)	=0.0687808+(0.0021479*A251)	=0.1273717+(-0.0027895*A251)
2.667684	=0.0980762+(-0.0003208*A252)	=0.0687808+(0.0021479*A252)	=0.1273717+(-0.0027895*A252)
-2.667684	=0.0980762+(-0.0003208*A253)	=0.0687808+(0.0021479*A253)	=0.1273717+(-0.0027895*A253)
0	=0.0980762+(-0.0003208*A254)	=0.0687808+(0.0021479*A254)	=0.1273717+(-0.0027895*A254)
0	=0.0980762+(-0.0003208*A255)	=0.0687808+(0.0021479*A255)	=0.1273717+(-0.0027895*A255)
0	=0.0980762+(-0.0003208*A256)	=0.0687808+(0.0021479*A256)	=0.1273717+(-0.0027895*A256)
-1.688187	=0.0980762+(-0.0003208*A257)	=0.0687808+(0.0021479*A257)	=0.1273717+(-0.0027895*A257)
0.2451673	=0.0980762+(-0.0003208*A258)	=0.0687808+(0.0021479*A258)	=0.1273717+(-0.0027895*A258)
0.3536911	=0.0980762+(-0.0003208*A259)	=0.0687808+(0.0021479*A259)	=0.1273717+(-0.0027895*A259)
0.3185596	=0.0980762+(-0.0003208*A260)	=0.0687808+(0.0021479*A260)	=0.1273717+(-0.0027895*A260)
1.307439	=0.0980762+(-0.0003208*A261)	=0.0687808+(0.0021479*A261)	=0.1273717+(-0.0027895*A261)
5.340759	=0.0980762+(-0.0003208*A262)	=0.0687808+(0.0021479*A262)	=0.1273717+(-0.0027895*A262)
-3.02248	=0.0980762+(-0.0003208*A263)	=0.0687808+(0.0021479*A263)	=0.1273717+(-0.0027895*A263)
-1.598434	=0.0980762+(-0.0003208*A264)	=0.0687808+(0.0021479*A264)	=0.1273717+(-0.0027895*A264)
-0.622777	=0.0980762+(-0.0003208*A265)	=0.0687808+(0.0021479*A265)	=0.1273717+(-0.0027895*A265)
-1.750806	=0.0980762+(-0.0003208*A266)	=0.0687808+(0.0021479*A266)	=0.1273717+(-0.0027895*A266)
-0.271987	=0.0980762+(-0.0003208*A267)	=0.0687808+(0.0021479*A267)	=0.1273717+(-0.0027895*A267)
1.389055	=0.0980762+(-0.0003208*A268)	=0.0687808+(0.0021479*A268)	=0.1273717+(-0.0027895*A268)
1.337959	=0.0980762+(-0.0003208*A269)	=0.0687808+(0.0021479*A269)	=0.1273717+(-0.0027895*A269)
-0.5406647	=0.0980762+(-0.0003208*A270)	=0.0687808+(0.0021479*A270)	=0.1273717+(-0.0027895*A270)
-0.7984486	=0.0980762+(-0.0003208*A271)	=0.0687808+(0.0021479*A271)	=0.1273717+(-0.0027895*A271)
4.118904	=0.0980762+(-0.0003208*A272)	=0.0687808+(0.0021479*A272)	=0.1273717+(-0.0027895*A272)
-1.559026	=0.0980762+(-0.0003208*A273)	=0.0687808+(0.0021479*A273)	=0.1273717+(-0.0027895*A273)
-2.558726	=0.0980762+(-0.0003208*A274)	=0.0687808+(0.0021479*A274)	=0.1273717+(-0.0027895*A274)
-4.825986	=0.0980762+(-0.0003208*A275)	=0.0687808+(0.0021479*A275)	=0.1273717+(-0.0027895*A275)
11.49912	=0.0980762+(-0.0003208*A276)	=0.0687808+(0.0021479*A276)	=0.1273717+(-0.0027895*A276)
-7.876777	=0.0980762+(-0.0003208*A277)	=0.0687808+(0.0021479*A277)	=0.1273717+(-0.0027895*A277)
1.203646	=0.0980762+(-0.0003208*A278)	=0.0687808+(0.0021479*A278)	=0.1273717+(-0.0027895*A278)

0	=0.0980762+(-0.0003208*A279)	=0.0687808+(0.0021479*A279)	=0.1273717+(-0.0027895*A279)
0.8009152	=0.0980762+(-0.0003208*A280)	=0.0687808+(0.0021479*A280)	=0.1273717+(-0.0027895*A280)
-0.5003312	=0.0980762+(-0.0003208*A281)	=0.0687808+(0.0021479*A281)	=0.1273717+(-0.0027895*A281)
0.110105	=0.0980762+(-0.0003208*A282)	=0.0687808+(0.0021479*A282)	=0.1273717+(-0.0027895*A282)
-0.7876451	=0.0980762+(-0.0003208*A283)	=0.0687808+(0.0021479*A283)	=0.1273717+(-0.0027895*A283)
0.3769569	=0.0980762+(-0.0003208*A284)	=0.0687808+(0.0021479*A284)	=0.1273717+(-0.0027895*A284)
-4.554841	=0.0980762+(-0.0003208*A285)	=0.0687808+(0.0021479*A285)	=0.1273717+(-0.0027895*A285)
-3.614588	=0.0980762+(-0.0003208*A286)	=0.0687808+(0.0021479*A286)	=0.1273717+(-0.0027895*A286)
-3.122315	=0.0980762+(-0.0003208*A287)	=0.0687808+(0.0021479*A287)	=0.1273717+(-0.0027895*A287)
0.1989207	=0.0980762+(-0.0003208*A288)	=0.0687808+(0.0021479*A288)	=0.1273717+(-0.0027895*A288)
3.521062	=0.0980762+(-0.0003208*A289)	=0.0687808+(0.0021479*A289)	=0.1273717+(-0.0027895*A289)
3.560872	=0.0980762+(-0.0003208*A290)	=0.0687808+(0.0021479*A290)	=0.1273717+(-0.0027895*A290)
4.010889	=0.0980762+(-0.0003208*A291)	=0.0687808+(0.0021479*A291)	=0.1273717+(-0.0027895*A291)
-5.075323	=0.0980762+(-0.0003208*A292)	=0.0687808+(0.0021479*A292)	=0.1273717+(-0.0027895*A292)
5.075322	=0.0980762+(-0.0003208*A293)	=0.0687808+(0.0021479*A293)	=0.1273717+(-0.0027895*A293)
-9.856217	=0.0980762+(-0.0003208*A294)	=0.0687808+(0.0021479*A294)	=0.1273717+(-0.0027895*A294)
21.55944	=0.0980762+(-0.0003208*A295)	=0.0687808+(0.0021479*A295)	=0.1273717+(-0.0027895*A295)
-11.70322	=0.0980762+(-0.0003208*A296)	=0.0687808+(0.0021479*A296)	=0.1273717+(-0.0027895*A296)
-0.5169454	=0.0980762+(-0.0003208*A297)	=0.0687808+(0.0021479*A297)	=0.1273717+(-0.0027895*A297)
-0.2874789	=0.0980762+(-0.0003208*A298)	=0.0687808+(0.0021479*A298)	=0.1273717+(-0.0027895*A298)
0.2129364	=0.0980762+(-0.0003208*A299)	=0.0687808+(0.0021479*A299)	=0.1273717+(-0.0027895*A299)
-0.1525521	=0.0980762+(-0.0003208*A300)	=0.0687808+(0.0021479*A300)	=0.1273717+(-0.0027895*A300)
1.595135	=0.0980762+(-0.0003208*A301)	=0.0687808+(0.0021479*A301)	=0.1273717+(-0.0027895*A301)
2.241222	=0.0980762+(-0.0003208*A302)	=0.0687808+(0.0021479*A302)	=0.1273717+(-0.0027895*A302)
-0.8698978	=0.0980762+(-0.0003208*A303)	=0.0687808+(0.0021479*A303)	=0.1273717+(-0.0027895*A303)
2.179024	=0.0980762+(-0.0003208*A304)	=0.0687808+(0.0021479*A304)	=0.1273717+(-0.0027895*A304)
-4.401445	=0.0980762+(-0.0003208*A305)	=0.0687808+(0.0021479*A305)	=0.1273717+(-0.0027895*A305)
-0.9915829	=0.0980762+(-0.0003208*A306)	=0.0687808+(0.0021479*A306)	=0.1273717+(-0.0027895*A306)
-1.429919	=0.0980762+(-0.0003208*A307)	=0.0687808+(0.0021479*A307)	=0.1273717+(-0.0027895*A307)
0.8563199	=0.0980762+(-0.0003208*A308)	=0.0687808+(0.0021479*A308)	=0.1273717+(-0.0027895*A308)
0.9130497	=0.0980762+(-0.0003208*A309)	=0.0687808+(0.0021479*A309)	=0.1273717+(-0.0027895*A309)
0.5804291	=0.0980762+(-0.0003208*A310)	=0.0687808+(0.0021479*A310)	=0.1273717+(-0.0027895*A310)
-0.093688	=0.0980762+(-0.0003208*A311)	=0.0687808+(0.0021479*A311)	=0.1273717+(-0.0027895*A311)
-0.7255759	=0.0980762+(-0.0003208*A312)	=0.0687808+(0.0021479*A312)	=0.1273717+(-0.0027895*A312)
3.356555	=0.0980762+(-0.0003208*A313)	=0.0687808+(0.0021479*A313)	=0.1273717+(-0.0027895*A313)

-0.896277	=0.0980762+(-0.0003208*A314)	=0.0687808+(0.0021479*A314)	=0.1273717+(-0.0027895*A314)
-0.4138885	=0.0980762+(-0.0003208*A315)	=0.0687808+(0.0021479*A315)	=0.1273717+(-0.0027895*A315)
-2.963319	=0.0980762+(-0.0003208*A316)	=0.0687808+(0.0021479*A316)	=0.1273717+(-0.0027895*A316)
1.807896	=0.0980762+(-0.0003208*A317)	=0.0687808+(0.0021479*A317)	=0.1273717+(-0.0027895*A317)
-5.554765	=0.0980762+(-0.0003208*A318)	=0.0687808+(0.0021479*A318)	=0.1273717+(-0.0027895*A318)
7.307825	=0.0980762+(-0.0003208*A319)	=0.0687808+(0.0021479*A319)	=0.1273717+(-0.0027895*A319)
-10.95218	=0.0980762+(-0.0003208*A320)	=0.0687808+(0.0021479*A320)	=0.1273717+(-0.0027895*A320)
9.199116	=0.0980762+(-0.0003208*A321)	=0.0687808+(0.0021479*A321)	=0.1273717+(-0.0027895*A321)
0	=0.0980762+(-0.0003208*A322)	=0.0687808+(0.0021479*A322)	=0.1273717+(-0.0027895*A322)
0	=0.0980762+(-0.0003208*A323)	=0.0687808+(0.0021479*A323)	=0.1273717+(-0.0027895*A323)
0	=0.0980762+(-0.0003208*A324)	=0.0687808+(0.0021479*A324)	=0.1273717+(-0.0027895*A324)
-3.905434	=0.0980762+(-0.0003208*A325)	=0.0687808+(0.0021479*A325)	=0.1273717+(-0.0027895*A325)
4.034569	=0.0980762+(-0.0003208*A326)	=0.0687808+(0.0021479*A326)	=0.1273717+(-0.0027895*A326)
-0.1291389	=0.0980762+(-0.0003208*A327)	=0.0687808+(0.0021479*A327)	=0.1273717+(-0.0027895*A327)
0.8509083	=0.0980762+(-0.0003208*A328)	=0.0687808+(0.0021479*A328)	=0.1273717+(-0.0027895*A328)
-0.8509083	=0.0980762+(-0.0003208*A329)	=0.0687808+(0.0021479*A329)	=0.1273717+(-0.0027895*A329)
-4.338505	=0.0980762+(-0.0003208*A330)	=0.0687808+(0.0021479*A330)	=0.1273717+(-0.0027895*A330)
-2.136822	=0.0980762+(-0.0003208*A331)	=0.0687808+(0.0021479*A331)	=0.1273717+(-0.0027895*A331)
6.475325	=0.0980762+(-0.0003208*A332)	=0.0687808+(0.0021479*A332)	=0.1273717+(-0.0027895*A332)
-2.978585	=0.0980762+(-0.0003208*A333)	=0.0687808+(0.0021479*A333)	=0.1273717+(-0.0027895*A333)
1.013514	=0.0980762+(-0.0003208*A334)	=0.0687808+(0.0021479*A334)	=0.1273717+(-0.0027895*A334)
1.965073	=0.0980762+(-0.0003208*A335)	=0.0687808+(0.0021479*A335)	=0.1273717+(-0.0027895*A335)
0	=0.0980762+(-0.0003208*A336)	=0.0687808+(0.0021479*A336)	=0.1273717+(-0.0027895*A336)
15.20313	=0.0980762+(-0.0003208*A337)	=0.0687808+(0.0021479*A337)	=0.1273717+(-0.0027895*A337)
-15.20313	=0.0980762+(-0.0003208*A338)	=0.0687808+(0.0021479*A338)	=0.1273717+(-0.0027895*A338)
0.4416809	=0.0980762+(-0.0003208*A339)	=0.0687808+(0.0021479*A339)	=0.1273717+(-0.0027895*A339)
-0.4416814	=0.0980762+(-0.0003208*A340)	=0.0687808+(0.0021479*A340)	=0.1273717+(-0.0027895*A340)
-0.3050528	=0.0980762+(-0.0003208*A341)	=0.0687808+(0.0021479*A341)	=0.1273717+(-0.0027895*A341)
0.3050537	=0.0980762+(-0.0003208*A342)	=0.0687808+(0.0021479*A342)	=0.1273717+(-0.0027895*A342)

cf2nw	mean OND	High OND (SD+1)	Low OND (SD-1)
0	0.0980762	0.0687808	0.1273717
0	0.0980762	0.0687808	0.1273717
-7.803672	0.100579618	0.052019293	0.149140043
6.495358	0.095992489	0.082732179	0.109252899
7.462149	0.095682343	0.08480875	0.106556035
-6.153832	0.100050349	0.055562984	0.144537814
2.005355	0.097432882	0.073088102	0.121777762
2.084413	0.09740752	0.073257911	0.12155723
-4.089767	0.099388197	0.059996389	0.138780105
0	0.0980762	0.0687808	0.1273717
2.392103	0.097308813	0.073918798	0.120698929
0.2832255	0.097985341	0.06938914	0.126581642
-2.675328	0.098934445	0.063034463	0.134834527
0	0.0980762	0.0687808	0.1273717
-0.8120499	0.098336706	0.067036598	0.129636913
-3.237368	0.099114748	0.061827257	0.136402338
-1.260661	0.09848062	0.066073026	0.130888314
-3.145462	0.099085264	0.062024662	0.136145966
1.575637	0.097570736	0.072165111	0.122976461
-1.765507	0.098642575	0.064988668	0.132296582
1.83322	0.097488103	0.072718373	0.122257933
3.09915	0.097081993	0.075437464	0.118726621
-1.238619	0.098473549	0.06612037	0.130826828
4.951663	0.096487707	0.079416477	0.113559036
6.337379	0.096043169	0.082392856	0.109693581
-3.055553	0.099056421	0.062217778	0.135895165
0.1691589	0.098021934	0.069144136	0.126899831
-3.450987	0.099183277	0.061368425	0.136998228
-3.920941	0.099334038	0.060359011	0.138309165
-2.573298	0.098901714	0.063253613	0.134549915
-1.143152	0.098442923	0.066325424	0.130560523
3.86901	0.096835022	0.077091047	0.116579097
1.343008	0.097645363	0.071665447	0.123625379
-0.3078299	0.098174952	0.068119612	0.128230392
0.6199784	0.097877311	0.070112452	0.12564227
1.84103	0.097485598	0.072735148	0.122236147
1.962044	0.097446776	0.072995074	0.121898578
-1.689847	0.098618303	0.065151178	0.132085528
-7.674593	0.100538209	0.052296542	0.148779977
7.674593	0.095614191	0.085265058	0.105963423
0	0.0980762	0.0687808	0.1273717
-1.868286	0.098675546	0.064767909	0.132583284
-0.8863468	0.09836054	0.066877016	0.129844164
0.7998219	0.097819617	0.070498737	0.125140597
-1.121459	0.098435964	0.066372018	0.13050001
2.511472	0.09727052	0.074175191	0.120365949
-3.7826	0.099289658	0.060656153	0.137923263

4.347396	0.096681555	0.078118572	0.115244639
1.029781	0.097745846	0.070992667	0.124499126
-0.4579768	0.098223119	0.067797112	0.128649226
-3.505507	0.099200767	0.061251322	0.137150312
-1.959435	0.098704787	0.06457213	0.132837544
4.056054	0.096775018	0.077492798	0.116057337
-1.665853	0.098610606	0.065202714	0.132018597
2.895914	0.097147191	0.075000934	0.119293548
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Codebook for Final Dataset

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county
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------
```

```
                  type:  string (str244), but longest is str3

         unique values:  1                        missing "":  0/341

            tabulation:  Freq.  Value
                           341  "003"

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
tract
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  string (str244), but longest is str6

         unique values:  139                      missing "":  0/341

              examples:  "100500"
                         "140500"
                         "191100"
                         "260200"

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
blkgrp
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  string (str244), but longest is str1

         unique values:  7                        missing "":  0/341

            tabulation:  Freq.  Value
                           135  "1"
                           102  "2"
                            60  "3"
                            27  "4"
                             9  "5"
                             5  "6"
                             3  "7"

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
rac_tot
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [73,4182]                    units:  1
         unique values:  291                      missing .:  0/341

                  mean:   975.777
              std. dev:   491.518

           percentiles:        10%       25%       50%       75%       90%
                               556       687       832      1156      1482

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
rac_bla
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)
```

```
              range:  [0,2551]                    units:  1
      unique values:  220                     missing .:  0/341

               mean:   259.038
           std. dev:   374.891

        percentiles:        10%       25%       50%       75%       90%
                              0        22        93       363       674

--------------------------------------------------------------------------------------------------
--------------------------------------------------------
fhh_tot
(unlabeled)
--------------------------------------------------------------------------------------------------
--------------------------------------------------------

               type:  numeric (double)

              range:  [2,1690]                    units:  1
      unique values:  258                     missing .:  0/341

               mean:    421.44
           std. dev:   216.557

        percentiles:        10%       25%       50%       75%       90%
                            220       287       371       502       681

--------------------------------------------------------------------------------------------------
--------------------------------------------------------
fhh_15_64
(unlabeled)
--------------------------------------------------------------------------------------------------
--------------------------------------------------------

               type:  numeric (double)

              range:  [0,557]                     units:  1
      unique values:  122                     missing .:  0/341

               mean:   54.8416
           std. dev:   61.8155

        percentiles:        10%       25%       50%       75%       90%
                              9        23        40        66       100

--------------------------------------------------------------------------------------------------
--------------------------------------------------------
fhh_15_64c
(unlabeled)
--------------------------------------------------------------------------------------------------
--------------------------------------------------------

               type:  numeric (double)

              range:  [0,510]                     units:  1
      unique values:  92                      missing .:  0/341

               mean:    37.607
           std. dev:   52.8905

        percentiles:        10%       25%       50%       75%       90%
                              5        12        24        42        74

--------------------------------------------------------------------------------------------------
--------------------------------------------------------
fhh_65
(unlabeled)
--------------------------------------------------------------------------------------------------
--------------------------------------------------------

               type:  numeric (double)
```

```
                  range:  [0,63]                       units:  1
          unique values:  43                       missing .:  0/341

                   mean:   12.6217
               std. dev:   11.3713

            percentiles:        10%       25%       50%       75%       90%
                                  0         5        10        18        27

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
fhh_65c
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                   type:  numeric (double)

                  range:  [0,18]                       units:  1
          unique values:  5                        missing .:  0/341

            tabulation:  Freq.  Value
                            337  0
                              1  4
                              1  6
                              1  9
                              1  18

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
edu_tot
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                   type:  numeric (double)

                  range:  [29,1725]                    units:  1
          unique values:  280                      missing .:  0/341

                   mean:   637.138
               std. dev:   276.829

            percentiles:        10%       25%       50%       75%       90%
                                364       466       565       761       984

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
edu_male
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                   type:  numeric (double)

                  range:  [23,1622]                    units:  1
          unique values:  235                      missing .:  0/341

                   mean:   290.534
               std. dev:   150.003

            percentiles:        10%       25%       50%       75%       90%
                                155       201       257       354       476

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
edu_mno
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------
```

```
                  type:  numeric (double)

                 range:  [0,42]                       units:  1
         unique values:  21                       missing .:  0/341

                  mean:   1.85337
              std. dev:   4.48811

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         0         7

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
edu_mnt4
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,19]                       units:  1
         unique values:  11                       missing .:  0/341

                  mean:   .604106
              std. dev:   2.38842

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         0         0

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
edu_m5t6
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,22]                       units:  1
         unique values:  17                       missing .:  0/341

                  mean:    1.6393
              std. dev:   3.65362

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         0         7

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
edu_m7t8
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,226]                      units:  1
         unique values:  36                       missing .:  0/341

                  mean:   6.94135
              std. dev:   14.5593

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         5         9        18

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
edu_m9
(unlabeled)
```

```
----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,151]                      units:  1
         unique values:  32                       missing .:  0/341

                  mean:   6.63343
              std. dev:   11.1673

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         5         9        17

----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_m10
(unlabeled)
----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,339]                      units:  1
         unique values:  46                       missing .:  0/341

                  mean:   11.8798
              std. dev:    21.137

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         8        17        27

----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_m11
(unlabeled)
----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,315]                      units:  1
         unique values:  37                       missing .:  0/341

                  mean:   10.6628
              std. dev:   19.1737

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         7        15        23

----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_m12
(unlabeled)
----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,65]                       units:  1
         unique values:  42                       missing .:  0/341

                  mean:   10.7947
              std. dev:   11.0221

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         8        17        25

----------------------------------------------------------------------------------------------
----------------------------------------------------------
```

```
edu_fem
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [6,951]                      units:  1
         unique values:  246                      missing .:  0/341

                  mean:   346.604
              std. dev:    152.77

           percentiles:        10%       25%       50%       75%       90%
                               197       248       312       429       528

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_fno
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,23]                       units:  1
         unique values:  20                       missing .:  0/341

                  mean:   2.65396
              std. dev:   4.67445

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         5         8

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_fnt4
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,16]                       units:  1
         unique values:  13                       missing .:  0/341

                  mean:   1.03519
              std. dev:   2.88178

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         0         5

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f5t6
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,30]                       units:  1
         unique values:  22                       missing .:  0/341

                  mean:   3.29032
              std. dev:    5.2988

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         6        10
```

```
-------------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f7t8
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,89]                      units:  1
         unique values:  43                      missing .:  0/341

                  mean:   10.8065
              std. dev:   12.2711

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         8        17        28

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f9
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,51]                      units:  1
         unique values:  35                      missing .:  0/341

                  mean:   8.11437
              std. dev:   9.62694

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         6        13        22

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f10
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,95]                      units:  1
         unique values:  51                      missing .:  0/341

                  mean:   13.7097
              std. dev:   14.5015

           percentiles:        10%       25%       50%       75%       90%
                                 0         0        11        20        32

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f11
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,102]                     units:  1
         unique values:  50                      missing .:  0/341

                  mean:   13.0733
              std. dev:   14.1375

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         9        18        31
```

```
-----------------------------------------------------------------------------------------------
----------------------------------------------------------
edu_f12
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,69]                       units:  1
         unique values:  42                       missing .:  0/341

                  mean:    13.305
              std. dev:   12.1149

           percentiles:        10%       25%       50%       75%       90%
                                 0         4        11        21        30

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
emp_mciv
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [23,1557]                    units:  1
         unique values:  225                      missing .:  0/341

                  mean:   237.903
              std. dev:   150.979

           percentiles:        10%       25%       50%       75%       90%
                                98       153       214       284       392

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
emp_mune
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,1000]                     units:  1
         unique values:  66                       missing .:  0/341

                  mean:   24.5249
              std. dev:   63.7653

           percentiles:        10%       25%       50%       75%       90%
                                 0         7        15        27        40

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
emp_fciv
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [6,1972]                     units:  1
         unique values:  224                      missing .:  0/341

                  mean:   234.199
              std. dev:   153.547

           percentiles:        10%       25%       50%       75%       90%
```

```
                        113       152       207       275       376

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
emp_fune
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,1558]                     units:  1
         unique values:  65                       missing .:  0/341

                  mean:   23.0645
              std. dev:   89.2127

           percentiles:        10%       25%       50%       75%       90%
                                 0         6        12        22        39

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
occ_tot
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [29,1451]                    units:  1
         unique values:  263                      missing .:  0/341

                  mean:   424.513
              std. dev:   218.249

           percentiles:        10%       25%       50%       75%       90%
                               190       280       383       537       674

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
occ_mprof
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,521]                      units:  1
         unique values:  153                      missing .:  0/341

                  mean:   77.1496
              std. dev:   85.9223

           percentiles:        10%       25%       50%       75%       90%
                                12        24        45        90       202

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_htot
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [2,1690]                     units:  1
         unique values:  258                      missing .:  0/341

                  mean:    421.44
              std. dev:   216.557
```

```
           percentiles:        10%       25%       50%       75%       90%
                               220       287       371       502       681

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_h10
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,660]                      units:  1
         unique values:  148                      missing .:  0/341

                  mean:   75.9384
              std. dev:   81.7487

           percentiles:        10%       25%       50%       75%       90%
                                15        29        52        92       153

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_h14
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,182]                      units:  1
         unique values:  102                      missing .:  0/341

                  mean:   40.0557
              std. dev:   30.6115

           percentiles:        10%       25%       50%       75%       90%
                                 8        18        34        52        86

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_h19
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,165]                      units:  1
         unique values:  85                       missing .:  0/341

                  mean:   37.1173
              std. dev:   26.5838

           percentiles:        10%       25%       50%       75%       90%
                                10        19        32        49        67

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_h25
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,138]                      units:  1
         unique values:  85                       missing .:  0/341

                  mean:   35.0411
              std. dev:   24.5333
```

```
           percentiles:        10%       25%       50%       75%       90%
                                 7        17        32        47        67

------------------------------------------------------------------------------------------------
----------------------------------------------------------
inc_h29
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,115]                      units:  1
         unique values:  74                       missing .:  0/341

                  mean:   29.5425
              std. dev:   19.4884

           percentiles:        10%       25%       50%       75%       90%
                                 7        15        27        40        53

------------------------------------------------------------------------------------------------
----------------------------------------------------------
inc_hmed
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [6714,152338]                units:  1
         unique values:  330                      missing .:  0/341

                  mean:   31944.6
              std. dev:   16671.2

           percentiles:        10%       25%       50%       75%       90%
                             15833     22390     29716     37635     46750

------------------------------------------------------------------------------------------------
----------------------------------------------------------
pub_htot
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [2,1690]                     units:  1
         unique values:  258                      missing .:  0/341

                  mean:    421.44
              std. dev:   216.557

           percentiles:        10%       25%       50%       75%       90%
                               220       287       371       502       681

------------------------------------------------------------------------------------------------
----------------------------------------------------------
pub_hwit
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,281]                      units:  1
         unique values:  71                       missing .:  0/341

                  mean:   23.1818
```

```
             std. dev:   32.3279

          percentiles:        10%       25%       50%       75%       90%
                                0         6        15        29        48

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_ftot
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,681]                      units:  1
        unique values:  214                      missing .:  0/341

                 mean:   219.085
             std. dev:   100.576

          percentiles:        10%       25%       50%       75%       90%
                              114       158       204       267       336

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_f10
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,324]                      units:  1
        unique values:  72                       missing .:  0/341

                 mean:   24.0528
             std. dev:   36.4107

          percentiles:        10%       25%       50%       75%       90%
                                0         7        15        28        50

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_f14
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,105]                      units:  1
        unique values:  50                       missing .:  0/341

                 mean:   13.1554
             std. dev:   15.4069

          percentiles:        10%       25%       50%       75%       90%
                                0         0         9        18        31

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_f19
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,90]                       units:  1
        unique values:  50                       missing .:  0/341
```

```
                 mean:   14.9443
             std. dev:   12.8441

          percentiles:        10%       25%       50%       75%       90%
                                0         6        13        21        30

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_f24
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,92]                       units:  1
        unique values:  51                       missing .:  0/341

                 mean:   16.7507
             std. dev:   13.5369

          percentiles:        10%       25%       50%       75%       90%
                                0         6        14        25        34

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_f29
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,62]                       units:  1
        unique values:  48                       missing .:  0/341

                 mean:   15.7126
             std. dev:   12.5149

          percentiles:        10%       25%       50%       75%       90%
                                0         7        14        22        34

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
inc_fmed
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,178210]                   units:  1
        unique values:  313                      missing .:  0/341

                 mean:     42578
             std. dev:   23973.9

          percentiles:        10%       25%       50%       75%       90%
                            21250     29625     38250     48846     63281

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
pov_htot
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [15,2737]                    units:  1
        unique values:  297                      missing .:  0/341
```

```
                 mean:   918.891
             std. dev:   409.528

          percentiles:        10%       25%       50%       75%       90%
                              534       676       806      1107      1409

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
pov_hbel
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                 type:  numeric (double)

                range:  [0,1783]                     units:  1
        unique values:  222                      missing .:  0/341

                 mean:   187.229
             std. dev:   207.536

          percentiles:        10%       25%       50%       75%       90%
                               45        82       126       211       365

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
pov_ftot
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                 type:  numeric (double)

                range:  [0,681]                      units:  1
        unique values:  214                      missing .:  0/341

                 mean:   219.085
             std. dev:   100.576

          percentiles:        10%       25%       50%       75%       90%
                              114       158       204       267       336

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
pov_fbel
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                 type:  numeric (double)

                range:  [0,457]                      units:  1
        unique values:  87                       missing .:  0/341

                 mean:   32.9267
             std. dev:   47.8795

          percentiles:        10%       25%       50%       75%       90%
                                0        11        21        40        66

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
hou_tot
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                 type:  numeric (double)

                range:  [6,1622]                     units:  1
```

```
         unique values:  274                      missing .:  0/341

                  mean:   421.446
              std. dev:   214.487

           percentiles:        10%       25%       50%       75%       90%
                               220       290       376       502       674

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
hou_rent
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,1082]                     units:  1
         unique values:  230                      missing .:  0/341

                  mean:    201.71
              std. dev:   186.837

           percentiles:        10%       25%       50%       75%       90%
                                45        84       137       262       433

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
cro_tot
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [6,1622]                     units:  1
         unique values:  274                      missing .:  0/341

                  mean:   421.446
              std. dev:   214.487

           percentiles:        10%       25%       50%       75%       90%
                               220       290       376       502       674

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
cro_o15
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,20]                       units:  1
         unique values:  15                       missing .:  0/341

                  mean:   1.43109
              std. dev:   3.38232

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         0         7

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
cro_o20
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)
```

```
                range:  [0,9]                        units:  1
        unique values:  5                        missing .:  0/341

           tabulation:  Freq.  Value
                          330  0
                            2  5
                            2  6
                            4  7
                            3  9

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
cro_omo
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,9]                        units:  1
        unique values:  4                        missing .:  0/341

           tabulation:  Freq.  Value
                          336  0
                            2  4
                            1  6
                            2  9

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
cro_r15
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,42]                       units:  1
        unique values:  30                       missing .:  0/341

                 mean:   3.97947
             std. dev:   7.47404

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         6        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
cro_r20
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,59]                       units:  1
        unique values:  20                       missing .:  0/341

                 mean:   1.90616
             std. dev:   5.76628

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         0         7

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
cro_rmo
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

```
                  type:  numeric (double)

                 range:  [0,11]                       units:  1
         unique values:  8                        missing .:  0/341

            tabulation:  Freq.  Value
                           324  0
                             1  4
                             3  5
                             6  6
                             3  7
                             2  9
                             1  10
                             1  11

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
car_tot
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [6,1622]                     units:  1
         unique values:  274                      missing .:  0/341

                  mean:   421.446
              std. dev:   214.487

           percentiles:        10%       25%       50%       75%       90%
                               220       290       376       502       674

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
car_otot
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,828]                      units:  1
         unique values:  226                      missing .:  0/341

                  mean:   219.736
              std. dev:   120.331

           percentiles:        10%       25%       50%       75%       90%
                                84       141       208       275       370

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
car_onon
(unlabeled)
-------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,188]                      units:  1
         unique values:  94                       missing .:  0/341

                  mean:   35.5308
              std. dev:   28.4057

           percentiles:        10%       25%       50%       75%       90%
                                 7        15        31        48        67

-------------------------------------------------------------------------------------------------
----------------------------------------------------------
```

```
car_rtot
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,1082]                      units:  1
         unique values:  230                       missing .:  0/341

                  mean:    201.71
              std. dev:   186.837

           percentiles:        10%       25%       50%       75%       90%
                                45        84       137       262       433

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
car_rnon
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,714]                       units:  1
         unique values:  168                       missing .:  0/341

                  mean:   88.5337
              std. dev:   107.913

           percentiles:        10%       25%       50%       75%       90%
                                 6        21        51       115       202

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_und1
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,73]                        units:  1
         unique values:  29                        missing .:  0/341

                  mean:   5.93842
              std. dev:   7.96827

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         4        10        16

-----------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_1
(unlabeled)
-----------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,49]                        units:  1
         unique values:  28                        missing .:  0/341

                  mean:   4.90909
              std. dev:   7.25424

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        14
```

```
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
popm_2
(unlabeled)
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,54]                       units:  1
         unique values:  33                       missing .:  0/341

                  mean:   5.33431
              std. dev:   8.04361

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        16

-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
popm_3
(unlabeled)
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,76]                       units:  1
         unique values:  30                       missing .:  0/341

                  mean:   5.80938
              std. dev:   8.16532

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         4         9        16

-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
popm_4
(unlabeled)
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,45]                       units:  1
         unique values:  27                       missing .:  0/341

                  mean:   5.17889
              std. dev:   7.18783

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        16

-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
popm_5
(unlabeled)
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,50]                       units:  1
         unique values:  31                       missing .:  0/341

                  mean:   5.70968
              std. dev:   7.92135

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         3         9        16
```

```
--------------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_6
(unlabeled)
--------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,48]                        units:  1
         unique values:  30                        missing .:  0/341

                  mean:   5.42522
              std. dev:   7.87986

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        14

--------------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_7
(unlabeled)
--------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,63]                        units:  1
         unique values:  32                        missing .:  0/341

                  mean:   6.51026
              std. dev:   9.13771

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         4        10        19

--------------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_8
(unlabeled)
--------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,67]                        units:  1
         unique values:  32                        missing .:  0/341

                  mean:   5.67155
              std. dev:   8.78488

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        16

--------------------------------------------------------------------------------------------------
----------------------------------------------------------
popm_9
(unlabeled)
--------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,51]                        units:  1
         unique values:  28                        missing .:  0/341

                  mean:   5.35484
              std. dev:   7.34568

           percentiles:        10%       25%       50%       75%       90%
```

```
                                  0         0         0         9        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popm_10
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,71]                      units:  1
         unique values:  29                      missing .:  0/341

                  mean:   5.78006
              std. dev:   8.06673

           percentiles:        10%       25%       50%       75%       90%
                                  0         0         4         9        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popm_11
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,46]                      units:  1
         unique values:  29                      missing .:  0/341

                  mean:   5.70968
              std. dev:   7.56156

           percentiles:        10%       25%       50%       75%       90%
                                  0         0         0         9        16

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popm_12
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,61]                      units:  1
         unique values:  27                      missing .:  0/341

                  mean:    4.9912
              std. dev:   7.44015

           percentiles:        10%       25%       50%       75%       90%
                                  0         0         0         8        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popm_13
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,40]                      units:  1
         unique values:  26                      missing .:  0/341

                  mean:   5.02639
              std. dev:   6.85153
```

```
           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        15

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
popm_14
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,49]                       units:  1
         unique values:  29                       missing .:  0/341

                  mean:   5.49267
              std. dev:   7.62219

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        15

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
popm_15
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,44]                       units:  1
         unique values:  28                       missing .:  0/341

                  mean:    5.4956
              std. dev:   7.43585

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        16

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
popm_16
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,46]                       units:  1
         unique values:  29                       missing .:  0/341

                  mean:   5.28739
              std. dev:   7.16114

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        14

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
popm_17
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,34]                       units:  1
         unique values:  29                       missing .:  0/341

                  mean:   5.26979
              std. dev:   6.90805
```

```
           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        14

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
popf_und1
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,39]                       units:  1
         unique values:  30                       missing .:  0/341

                  mean:   4.82405
              std. dev:   7.12193

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        14

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
popf_1
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,51]                       units:  1
         unique values:  28                       missing .:  0/341

                  mean:   5.09971
              std. dev:   7.21286

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        14

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
popf_2
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,54]                       units:  1
         unique values:  31                       missing .:  0/341

                  mean:   4.89736
              std. dev:   7.87651

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        13

-------------------------------------------------------------------------------------------------
------------------------------------------------------------
popf_3
(unlabeled)
-------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,39]                       units:  1
         unique values:  30                       missing .:  0/341

                  mean:   4.99413
```

```
             std. dev:   6.99832

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         8        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_4
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,70]                       units:  1
        unique values:  29                       missing .:  0/341

                 mean:   5.22287
             std. dev:   8.14448

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         8        14

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_5
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,76]                       units:  1
        unique values:  27                       missing .:  0/341

                 mean:   5.19941
             std. dev:   8.08747

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         8        14

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_6
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,53]                       units:  1
        unique values:  27                       missing .:  0/341

                 mean:   4.85337
             std. dev:   7.21654

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         8        13

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_7
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,64]                       units:  1
        unique values:  33                       missing .:  0/341
```

```
                 mean:   5.94721
             std. dev:   8.29583

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         9        16

---------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_8
(unlabeled)
---------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,48]                       units:  1
        unique values:  28                       missing .:  0/341

                 mean:   5.45455
             std. dev:   7.80018

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         9        17

---------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_9
(unlabeled)
---------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,55]                       units:  1
        unique values:  32                       missing .:  0/341

                 mean:   5.78299
             std. dev:   7.96203

          percentiles:        10%       25%       50%       75%       90%
                                0         0         4         9        16

---------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_10
(unlabeled)
---------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,40]                       units:  1
        unique values:  28                       missing .:  0/341

                 mean:   5.86804
             std. dev:   8.07739

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         9        16

---------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_11
(unlabeled)
---------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,57]                       units:  1
        unique values:  27                       missing .:  0/341
```

```
                 mean:   5.48094
             std. dev:   7.43029

          percentiles:        10%       25%       50%       75%       90%
                                0         0         4         9        15

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_12
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,46]                       units:  1
        unique values:  27                       missing .:  0/341

                 mean:   5.59531
             std. dev:   7.11381

          percentiles:        10%       25%       50%       75%       90%
                                0         0         4         9        16

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_13
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,47]                       units:  1
        unique values:  30                       missing .:  0/341

                 mean:   5.27859
             std. dev:   7.87448

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         9        15

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_14
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,44]                       units:  1
        unique values:  32                       missing .:  0/341

                 mean:   5.63636
             std. dev:   7.96443

          percentiles:        10%       25%       50%       75%       90%
                                0         0         0         9        16

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_15
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

                 type:  numeric (double)

                range:  [0,33]                       units:  1
```

```
         unique values:  29                       missing .:  0/341

                  mean:   5.03812
              std. dev:   6.53689

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        15

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_16
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,37]                       units:  1
         unique values:  31                       missing .:  0/341

                  mean:   5.43402
              std. dev:    7.4217

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         8        16

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
popf_17
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,38]                       units:  1
         unique values:  29                       missing .:  0/341

                  mean:   5.31672
              std. dev:   7.19268

           percentiles:        10%       25%       50%       75%       90%
                                 0         0         0         9        16

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
occ_fprof
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,352]                      units:  1
         unique values:  147                      missing .:  0/341

                  mean:   79.4428
              std. dev:    62.379

           percentiles:        10%       25%       50%       75%       90%
                                20        34        61       105       169

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
pop_tot
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)
```

```
                 range:  [73,4182]                    units:  1
         unique values:  291                      missing .:  0/341

                  mean:   975.777
              std. dev:   491.518

           percentiles:        10%       25%       50%       75%       90%
                               556       687       832      1156      1482

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
unemp
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,70.044052]                units:  1.000e-08
         unique values:  320                      missing .:  0/341

                  mean:   9.00687
              std. dev:   8.82374

           percentiles:        10%       25%       50%       75%       90%
                           1.79104   3.69393   6.76568   11.5646   17.4174

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
nocar
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,90.586418]                units:  1.000e-07
         unique values:  338                      missing .:  0/341

                  mean:   28.4605
              std. dev:   17.6065

           percentiles:        10%       25%       50%       75%       90%
                           8.54271   15.1724   25.5255   38.9937   52.5624

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
crowd
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,15.879828]                units:  1.000e-08
         unique values:  183                      missing .:  0/341

                  mean:   1.77417
              std. dev:    2.3061

           percentiles:        10%       25%       50%       75%       90%
                                 0         0   1.11607   2.86624    4.7486

-------------------------------------------------------------------------------------------------
--------------------------------------------------------
rent
(unlabeled)
-------------------------------------------------------------------------------------------------
--------------------------------------------------------

                  type:  numeric (float)
```

```
            range:  [0,100]                      units:  1.000e-07
    unique values:  332                      missing .:  0/341

             mean:   44.1802
         std. dev:   23.7938

      percentiles:        10%       25%       50%       75%       90%
                       13.913   26.0062   40.2402    61.828   77.4049

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
profm
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

             type:  numeric (float)

            range:  [0,58.620689]                units:  1.000e-07
    unique values:  325                      missing .:  0/341

             mean:   16.0015
         std. dev:   12.2576

      percentiles:        10%       25%       50%       75%       90%
                      4.24528   7.94118    11.828   20.6637   37.6855

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
profmrev
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

             type:  numeric (float)

            range:  [41.379311,100]              units:  1.000e-06
    unique values:  325                      missing .:  0/341

             mean:   83.9985
         std. dev:   12.2576

      percentiles:        10%       25%       50%       75%       90%
                      62.3145   79.3363    88.172   92.0588   95.7547

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
proftrev
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------

             type:  numeric (float)

            range:  [6.122449,100]               units:  1.000e-06
    unique values:  339                      missing .:  0/341

             mean:   66.3887
         std. dev:   18.6816

      percentiles:        10%       25%       50%       75%       90%
                      33.1633   58.1325   71.7647    79.469   84.5361

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
pov_h
(unlabeled)
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

```
                  type:  numeric (float)

                 range:  [0,96.79715]                 units:  1.000e-08
         unique values:  338                      missing .:  0/341

                  mean:   19.8264
              std. dev:   14.6761

           percentiles:        10%       25%       50%       75%       90%
                            5.7715   9.45347   16.0194   26.4843   38.9513

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
fhh
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,64.885498]                units:  1.000e-08
         unique values:  311                      missing .:  0/341

                  mean:   9.43867
              std. dev:   9.58138

           percentiles:        10%       25%       50%       75%       90%
                           1.08696   2.77372   6.24133      12.5   21.7822

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
pbasst
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,57.142857]                units:  1.000e-08
         unique values:  272                      missing .:  0/341

                  mean:   5.73931
              std. dev:   6.57832

           percentiles:        10%       25%       50%       75%       90%
                                 0   1.59236   3.80952   7.59494   13.3136

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
inclow
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,100]                      units:  1.000e-07
         unique values:  337                      missing .:  0/341

                  mean:   51.0216
              std. dev:   16.9932

           percentiles:        10%       25%       50%       75%       90%
                           29.3478   39.2857   50.5176   61.8384   74.2775

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
edulow
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
```

```
                  type:  numeric (float)

                 range:  [0,72.131149]                units:  1.000e-08
         unique values:  334                      missing .:  0/341

                  mean:   18.8996
              std. dev:   10.5069

           percentiles:        10%       25%       50%       75%       90%
                          6.18557   11.5207   18.3158   25.3493   31.9813

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
black
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,100]                      units:  1.000e-08
         unique values:  299                      missing .:  0/341

                  mean:   27.2931
              std. dev:   32.9723

           percentiles:        10%       25%       50%       75%       90%
                                0   2.67023   10.4046   47.3837   89.7541

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
pov_fam
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,100]                      units:  1.000e-07
         unique values:  297                      missing .:  0/341

                  mean:   14.8069
              std. dev:     14.92

           percentiles:        10%       25%       50%       75%       90%
                                0   4.67836   10.5714   20.1835   32.5123

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
und18_m
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,724]                      units:  1
         unique values:  157                      missing .:  0/341

                  mean:   98.8944
              std. dev:    75.955

           percentiles:        10%       25%       50%       75%       90%
                               30        55        90       120       169

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
und18_f
(unlabeled)
```

```
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,759]                      units:  1
         unique values:  164                      missing .:  0/341

                  mean:   95.9238
              std. dev:   75.0251

           percentiles:        10%       25%       50%       75%       90%
                                30        51        82       121       167

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
und18
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,57.816765]                units:  1.000e-07
         unique values:  340                      missing .:  0/341

                  mean:   20.6026
              std. dev:   9.47607

           percentiles:        10%       25%       50%       75%       90%
                            7.2498   14.6875   20.5011   26.2485   31.8182

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
neigh
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (double)

                 range:  [1,90]                       units:  1
         unique values:  89                       missing .:  0/341

                  mean:   44.1202
              std. dev:   25.1852

           percentiles:        10%       25%       50%       75%       90%
                                10        18        44        69        78

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
ctblock
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  string (str7)

         unique values:  341                      missing "":  0/341

              examples:  "1005001"
                         "1405002"
                         "1911001"
                         "2602003"

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
Bgrams
(mean) Bgrams
```

```
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [2722,3619.0476]             units:  1.000e-06
         unique values:  341                      missing .:  0/341

                  mean:   3235.21
              std. dev:   165.662

           percentiles:        10%       25%       50%       75%       90%
                             3027.83    3128.3   3249.45   3357.69   3438.78

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
lbw
(sum) lbw
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [0,27]                       units:  1
         unique values:  16                       missing .:  0/341

                  mean:   2.95015
              std. dev:   2.93966

           percentiles:        10%       25%       50%       75%       90%
                                 0         1         2         4         7

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
Plur
(sum) Plur
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (double)

                 range:  [1,137]                      units:  1
         unique values:  74                       missing .:  0/341

                  mean:   31.9384
              std. dev:   19.0292

           percentiles:        10%       25%       50%       75%       90%
                                14        20        29        38        53

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
lbwper
(unlabeled)
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,.33333334]                units:  1.000e-09
         unique values:  121                      missing .:  0/341

                  mean:   .090403
              std. dev:   .065072

           percentiles:        10%       25%       50%       75%       90%
                                 0   .043478   .085714      .125   .166667

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
```

```
neigh_name
(unlabeled)
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  string (str244), but longest is str25

         unique values:  89                       missing "":  0/341

              examples:  "Carrick"
                         "Greenfield"
                         "Morningside"
                         "Sheraden"

               warning:  variable has embedded and trailing blanks

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
ct
(unlabeled)
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  string (str4)

         unique values:  139                      missing "":  0/341

              examples:  "1005"
                         "1406"
                         "1903"
                         "2607"

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
f1nw
(unlabeled)
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [0,75.440323]                units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   29.8456
              std. dev:   13.5928

           percentiles:        10%       25%       50%       75%       90%
                            14.2903   19.8229   27.8348   37.1479   48.8285

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
f2nw
(unlabeled)
----------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [1.0759932,63.706791]        units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   15.7684
              std. dev:   12.8221

           percentiles:        10%       25%       50%       75%       90%
                            4.68791   6.46522   10.3548   21.4829   37.3242

----------------------------------------------------------------------------------------------------
------------------------------------------------------------
```

```
meanfbwn
(unlabeled)
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [7.9082599,63.067802]        units:  1.000e-07
         unique values:  341                      missing .:  0/341

                  mean:   26.6868
              std. dev:   9.89393

           percentiles:        10%       25%       50%       75%       90%
                           16.4295   19.3518   24.4787   31.8892   40.3429

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
fbwn
(mean) meanfbwn
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [13.209972,63.067802]        units:  1.000e-06
         unique values:  89                       missing .:  0/341

                  mean:   26.6868
              std. dev:   9.03915

           percentiles:        10%       25%       50%       75%       90%
                           18.0209    20.332   24.2647   31.1691   39.8526

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
meanf1nw
(mean) f1nw
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [11.103832,73.945847]        units:  1.000e-06
         unique values:  89                       missing .:  0/341

                  mean:   29.8456
              std. dev:    11.711

           percentiles:        10%       25%       50%       75%       90%
                            17.391   20.8129   26.5916   35.6788   45.7993

-------------------------------------------------------------------------------------------------
-----------------------------------------------------------
meanf2nw
(mean) f2nw
-------------------------------------------------------------------------------------------------
-----------------------------------------------------------

                  type:  numeric (float)

                 range:  [3.0765345,63.706791]        units:  1.000e-07
         unique values:  89                       missing .:  0/341

                  mean:   15.7684
              std. dev:   11.9711

           percentiles:        10%       25%       50%       75%       90%
                           5.59303   7.18091   9.14483    21.817   36.4443
```

```
--------------------------------------------------------------------------------------------------
------------------------------------------------------------
cf1nw
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [-30.121586,24.429188]       units:  1.000e-09
         unique values:  317                       missing .:  0/341

                  mean:  -3.9e-08
              std. dev:   6.90061

           percentiles:        10%       25%       50%       75%       90%
                          -7.78938  -3.71107         0   3.13664   7.71011

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
cf2nw
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [-15.203134,21.559439]       units:  1.000e-09
         unique values:  317                       missing .:  0/341

                  mean:  -4.0e-08
              std. dev:   4.59335

           percentiles:        10%       25%       50%       75%       90%
                          -4.65313  -2.25103         0   1.96204   5.19149

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
cfbwn
(unlabeled)
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (float)

                 range:  [-16.131107,33.726723]       units:  1.000e-08
         unique values:  89                        missing .:  0/341

                  mean:  -2.65428
              std. dev:   9.03915

           percentiles:        10%       25%       50%       75%       90%
                          -11.3202  -9.00904  -5.07638   1.82805   10.5115

--------------------------------------------------------------------------------------------------
------------------------------------------------------------
n_bg
(count) lbwper
--------------------------------------------------------------------------------------------------
------------------------------------------------------------

                  type:  numeric (long)

                 range:  [1,15]                       units:  1
         unique values:  14                        missing .:  0/341

                  mean:   6.41349
              std. dev:   3.87325

           percentiles:        10%       25%       50%       75%       90%
                                 2         3         6         9        12
```

```
------------------------------------------------------------------------------------------------
----------------------------------------------------------
f1int
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (float)

                 range:  [-301.11771,250.1033]        units:  1.000e-09
         unique values:  317                      missing .:  0/341

                  mean:  -7.0e-07
              std. dev:   62.7884

           percentiles:        10%       25%       50%       75%       90%
                          -67.6543  -20.2981         0   23.7005   60.6973

------------------------------------------------------------------------------------------------
----------------------------------------------------------
f2int
(unlabeled)
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (float)

                 range:  [-129.76526,158.7664]        units:  1.000e-08
         unique values:  317                      missing .:  0/341

                  mean:   3.0e-07
              std. dev:   35.2312

           percentiles:        10%       25%       50%       75%       90%
                           -32.815  -10.8257         0   12.7202     29.96

------------------------------------------------------------------------------------------------
----------------------------------------------------------
_est_m6
esample() from estimates store
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (byte)

                 range:  [1,1]                        units:  1
         unique values:  1                        missing .:  0/341

           tabulation:  Freq.  Value
                          341  1

------------------------------------------------------------------------------------------------
----------------------------------------------------------
yhat6
Linear predictor, fixed portion
------------------------------------------------------------------------------------------------
----------------------------------------------------------

                  type:  numeric (float)

                 range:  [.0200947,.19128072]         units:  1.000e-09
         unique values:  341                      missing .:  0/341

                  mean:   .090856
              std. dev:   .027827

           percentiles:        10%       25%       50%       75%       90%
                           .060995   .070484   .086903   .105672   .128902
```

```
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
fitted
Fitted values: xb + Zu
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (float)

                 range:  [.01816654,.23524986]        units:  1.000e-09
         unique values:  341                       missing .:  0/341

                  mean:   .090403
              std. dev:   .032124

           percentiles:        10%       25%       50%       75%       90%
                            .052341   .066408   .087787   .107379   .135208

-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
eres
Residual
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (float)

                 range:  [-.10949236,.21507519]       units:  1.000e-11
         unique values:  341                       missing .:  0/341

                  mean:  -1.2e-11
              std. dev:   .050646

           percentiles:        10%       25%       50%       75%       90%
                           -.060332  -.032693  -.005494   .030145   .063102

-----------------------------------------------------------------------------------------------
-------------------------------------------------------------
rstandard
Standardized residuals
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------

                  type:  numeric (float)

                 range:  [-2.0419371,4.0109649]       units:  1.000e-10
         unique values:  341                       missing .:  0/341

                  mean:  -8.9e-10
              std. dev:   .944509

           percentiles:        10%       25%       50%       75%       90%
                           -1.12513  -.609689  -.102467   .562179    1.1768

. summarize

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    LOGRECNO |         0
      sumlev |         0
       state |         0
      county |         0
       tract |         0
-------------+--------------------------------------------------------
      blkgrp |         0
     rac_tot |       341    975.7771     491.518         73       4182
     rac_bla |       341    259.0381    374.8911          0       2551
     fhh_tot |       341    421.4399    216.5567          2       1690
   fhh_15_64 |       341    54.84164    61.81551          0        557
-------------+--------------------------------------------------------
  fhh_15_64c |       341    37.60704    52.89049          0        510
```

fhh_65	341	12.6217	11.3713	0	63
fhh_65c	341	.1085044	1.154257	0	18
edu_tot	341	637.1378	276.8291	29	1725
edu_male	341	290.5337	150.0025	23	1622
edu_mno	341	1.853372	4.488111	0	42
edu_mnt4	341	.6041056	2.388424	0	19
edu_m5t6	341	1.639296	3.653618	0	22
edu_m7t8	341	6.941349	14.55929	0	226
edu_m9	341	6.633431	11.16733	0	151
edu_m10	341	11.87977	21.13695	0	339
edu_m11	341	10.66276	19.17368	0	315
edu_m12	341	10.79472	11.02212	0	65
edu_fem	341	346.6041	152.7705	6	951
edu_fno	341	2.653959	4.674451	0	23
edu_fnt4	341	1.035191	2.881777	0	16
edu_f5t6	341	3.290323	5.298795	0	30
edu_f7t8	341	10.80645	12.27111	0	89
edu_f9	341	8.11437	9.626944	0	51
edu_f10	341	13.70968	14.50155	0	95
edu_f11	341	13.07331	14.13747	0	102
edu_f12	341	13.30499	12.11493	0	69
emp_mciv	341	237.9032	150.9791	23	1557
emp_mune	341	24.52493	63.76531	0	1000
emp_fciv	341	234.1994	153.5469	6	1972
emp_fune	341	23.06452	89.21268	0	1558
occ_tot	341	424.5132	218.2492	29	1451
occ_mprof	341	77.14956	85.92229	0	521
inc_htot	341	421.4399	216.5567	2	1690
inc_h10	341	75.93842	81.74868	0	660
inc_h14	341	40.05572	30.61151	0	182
inc_h19	341	37.1173	26.58379	0	165
inc_h25	341	35.04106	24.53326	0	138
inc_h29	341	29.54252	19.48836	0	115
inc_hmed	341	31944.59	16671.23	6714	152338
pub_htot	341	421.4399	216.5567	2	1690
pub_hwit	341	23.18182	32.32795	0	281
inc_ftot	341	219.085	100.5762	0	681
inc_f10	341	24.05279	36.41069	0	324
inc_f14	341	13.15543	15.40691	0	105
inc_f19	341	14.94428	12.84408	0	90
inc_f24	341	16.75073	13.53686	0	92
inc_f29	341	15.71261	12.51491	0	62
inc_fmed	341	42578	23973.89	0	178210
pov_htot	341	918.8915	409.5281	15	2737
pov_hbel	341	187.2287	207.5357	0	1783
pov_ftot	341	219.085	100.5762	0	681
pov_fbel	341	32.92669	47.87948	0	457
hou_tot	341	421.4457	214.4866	6	1622
hou_rent	341	201.7097	186.8375	0	1082
cro_tot	341	421.4457	214.4866	6	1622
cro_o15	341	1.431085	3.38232	0	20
cro_o20	341	.2258065	1.264461	0	9
cro_omo	341	.0938416	.8170914	0	9
cro_r15	341	3.979472	7.474045	0	42
cro_r20	341	1.906158	5.766281	0	59
cro_rmo	341	.3372434	1.53222	0	11
car_tot	341	421.4457	214.4866	6	1622
car_otot	341	219.7361	120.3312	0	828
car_onon	341	35.53079	28.40572	0	188

car_rtot	341	201.7097	186.8375	0	1082
car_rnon	341	88.53372	107.9131	0	714
popm_und1	341	5.938416	7.968266	0	73
popm_1	341	4.909091	7.254245	0	49
popm_2	341	5.334311	8.043611	0	54
popm_3	341	5.809384	8.165316	0	76
popm_4	341	5.178886	7.187834	0	45
popm_5	341	5.709677	7.921352	0	50
popm_6	341	5.42522	7.879859	0	48
popm_7	341	6.510264	9.137707	0	63
popm_8	341	5.671554	8.784882	0	67
popm_9	341	5.354839	7.34568	0	51
popm_10	341	5.780059	8.066726	0	71
popm_11	341	5.709677	7.561563	0	46
popm_12	341	4.991202	7.440148	0	61
popm_13	341	5.026393	6.851527	0	40
popm_14	341	5.492669	7.622187	0	49
popm_15	341	5.495601	7.435852	0	44
popm_16	341	5.28739	7.161136	0	46
popm_17	341	5.269795	6.908047	0	34
popf_und1	341	4.824047	7.12193	0	39
popf_1	341	5.099707	7.212858	0	51
popf_2	341	4.897361	7.876512	0	54
popf_3	341	4.994135	6.998317	0	39
popf_4	341	5.222874	8.144479	0	70
popf_5	341	5.199413	8.08747	0	76
popf_6	341	4.853372	7.216539	0	53
popf_7	341	5.947214	8.295826	0	64
popf_8	341	5.454545	7.800178	0	48
popf_9	341	5.782991	7.962031	0	55
popf_10	341	5.868035	8.077394	0	40
popf_11	341	5.480938	7.430289	0	57
popf_12	341	5.595308	7.113813	0	46
popf_13	341	5.278592	7.874481	0	47
popf_14	341	5.636364	7.964426	0	44
popf_15	341	5.038123	6.536887	0	33
popf_16	341	5.434018	7.421702	0	37
popf_17	341	5.316716	7.192683	0	38
occ_fprof	341	79.44282	62.37897	0	352
pop_tot	341	975.7771	491.518	73	4182
unemp	341	9.006871	8.823738	0	70.04405
nocar	341	28.4605	17.60645	0	90.58642
crowd	341	1.774172	2.306099	0	15.87983
rent	341	44.18024	23.79379	0	100
profm	341	16.00148	12.25763	0	58.62069
profmrev	341	83.99852	12.25763	41.37931	100
proftrev	341	66.38871	18.68158	6.122449	100
pov_h	341	19.82638	14.67612	0	96.79715
fhh	341	9.438665	9.581384	0	64.8855
pbasst	341	5.739311	6.578321	0	57.14286
inclow	341	51.02156	16.9932	0	100
edulow	341	18.89958	10.50695	0	72.13115
black	341	27.2931	32.97228	0	100
pov_fam	341	14.80687	14.92003	0	100
und18_m	341	98.89443	75.95498	0	724
und18_f	341	95.92375	75.02509	0	759
und18	341	20.60265	9.476071	0	57.81676
neigh	341	44.12023	25.1852	1	90
ctblock	0				
Bgrams	341	3235.208	165.6617	2722	3619.048

```
-------------+--------------------------------------------------------
         lbw |       341    2.950147    2.939664          0         27
        Plur |       341    31.93842    19.02921          1        137
      lbwper |       341    .0904031    .0650725          0   .3333333
  neigh_name |         0
          ct |         0
-------------+--------------------------------------------------------
        f1nw |       341     29.8456    13.59283          0   75.44032
        f2nw |       341    15.76843    12.82209   1.075993   63.70679
    meanfbwn |       341     26.6868    9.893931    7.90826    63.0678
        fbwn |       341     26.6868    9.039153   13.20997    63.0678
    meanf1nw |       341     29.8456    11.71096   11.10383   73.94585
-------------+--------------------------------------------------------
    meanf2nw |       341    15.76843     11.9711   3.076535   63.70679
       cf1nw |       341   -3.92e-08    6.900606  -30.12159   24.42919
       cf2nw |       341   -3.99e-08    4.593345  -15.20313   21.55944
       cfbwn |       341   -2.654284    9.039153  -16.13111   33.72672
        n_bg |       341     6.41349    3.873248          1         15
-------------+--------------------------------------------------------
       f1int |       341   -6.95e-07    62.78842  -301.1177   250.1033
       f2int |       341    2.98e-07    35.23124  -129.7653   158.7664
     _est_m6 |       341           1           0          1          1
       yhat6 |       341    .0908562     .027827   .0200947   .1912807
      fitted |       341    .0904031    .0321242   .0181665   .2352499
-------------+--------------------------------------------------------
        eres |       341   -1.24e-11    .0506463  -.1094924   .2150752
   rstandard |       341   -8.92e-10    .9445093  -2.041937   4.010965

. describe

Contains data from C:\MSTHESIS\Final\Dataset\Final6_27_09temp.dta
  obs:           341
 vars:           152                          22 Jul 2009 12:27
 size:       928,884 (91.1% of memory free)
-------------------------------------------------------------------------------
              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
LOGRECNO        str244 %10s
sumlev          str244 %10s
state           str244 %10s
county          str244 %10s
tract           str244 %10s
blkgrp          str244 %10s
rac_tot         double %10.0g
rac_bla         double %10.0g
fhh_tot         double %10.0g
fhh_15_64       double %10.0g
fhh_15_64c      double %10.0g
fhh_65          double %10.0g
fhh_65c         double %10.0g
edu_tot         double %10.0g
edu_male        double %10.0g
edu_mno         double %10.0g
edu_mnt4        double %10.0g
edu_m5t6        double %10.0g
edu_m7t8        double %10.0g
edu_m9          double %10.0g
edu_m10         double %10.0g
edu_m11         double %10.0g
edu_m12         double %10.0g
edu_fem         double %10.0g
edu_fno         double %10.0g
edu_fnt4        double %10.0g
edu_f5t6        double %10.0g
edu_f7t8        double %10.0g
edu_f9          double %10.0g
edu_f10         double %10.0g
edu_f11         double %10.0g
edu_f12         double %10.0g
emp_mciv        double %10.0g
```

```
emp_mune        double %10.0g
emp_fciv        double %10.0g
emp_fune        double %10.0g
occ_tot         double %10.0g
occ_mprof       double %10.0g
inc_htot        double %10.0g
inc_h10         double %10.0g
inc_h14         double %10.0g
inc_h19         double %10.0g
inc_h25         double %10.0g
inc_h29         double %10.0g
inc_hmed        double %10.0g
pub_htot        double %10.0g
pub_hwit        double %10.0g
inc_ftot        double %10.0g
inc_f10         double %10.0g
inc_f14         double %10.0g
inc_f19         double %10.0g
inc_f24         double %10.0g
inc_f29         double %10.0g
inc_fmed        double %10.0g
pov_htot        double %10.0g
pov_hbel        double %10.0g
pov_ftot        double %10.0g
pov_fbel        double %10.0g
hou_tot         double %10.0g
hou_rent        double %10.0g
cro_tot         double %10.0g
cro_o15         double %10.0g
cro_o20         double %10.0g
cro_omo         double %10.0g
cro_r15         double %10.0g
cro_r20         double %10.0g
cro_rmo         double %10.0g
car_tot         double %10.0g
car_otot        double %10.0g
car_onon        double %10.0g
car_rtot        double %10.0g
car_rnon        double %10.0g
popm_und1       double %10.0g
popm_1          double %10.0g
popm_2          double %10.0g
popm_3          double %10.0g
popm_4          double %10.0g
popm_5          double %10.0g
popm_6          double %10.0g
popm_7          double %10.0g
popm_8          double %10.0g
popm_9          double %10.0g
popm_10         double %10.0g
popm_11         double %10.0g
popm_12         double %10.0g
popm_13         double %10.0g
popm_14         double %10.0g
popm_15         double %10.0g
popm_16         double %10.0g
popm_17         double %10.0g
popf_und1       double %10.0g
popf_1          double %10.0g
popf_2          double %10.0g
popf_3          double %10.0g
popf_4          double %10.0g
popf_5          double %10.0g
popf_6          double %10.0g
popf_7          double %10.0g
popf_8          double %10.0g
popf_9          double %10.0g
popf_10         double %10.0g
popf_11         double %10.0g
popf_12         double %10.0g
popf_13         double %10.0g
```

```
popf_14         double %10.0g
popf_15         double %10.0g
popf_16         double %10.0g
popf_17         double %10.0g
occ_fprof       double %10.0g
pop_tot         double %10.0g
unemp           float  %9.0g
nocar           float  %9.0g
crowd           float  %9.0g
rent            float  %9.0g
profm           float  %9.0g
profmrev        float  %9.0g
proftrev        float  %9.0g
pov_h           float  %9.0g
fhh             float  %9.0g
pbasst          float  %9.0g
inclow          float  %9.0g
edulow          float  %9.0g
black           float  %9.0g
pov_fam         float  %9.0g
und18_m         float  %9.0g
und18_f         float  %9.0g
und18           float  %9.0g
neigh           double %10.0g
ctblock         str7   %9s
Bgrams          double %10.0g                    (mean) Bgrams
lbw             double %9.0g                     (sum) lbw
Plur            double %10.0g                    (sum) Plur
lbwper          float  %9.0g
neigh_name      str244 %20s
ct              str4   %9s
f1nw            float  %9.0g
f2nw            float  %9.0g
meanfbwn        float  %9.0g
fbwn            float  %9.0g                     (mean) meanfbwn
meanf1nw        float  %9.0g                     (mean) f1nw
meanf2nw        float  %9.0g                     (mean) f2nw
cf1nw           float  %9.0g
cf2nw           float  %9.0g
cfbwn           float  %9.0g
n_bg            long   %9.0g                     (count) lbwper
f1int           float  %9.0g
f2int           float  %9.0g
_est_m6         byte   %8.0g                     esample() from estimates store
yhat6           float  %9.0g                     Linear predictor, fixed portion
fitted          float  %9.0g                     Fitted values: xb + Zu
eres            float  %9.0g                     Residual
rstandard       float  %9.0g                     Standardized residuals
-------------------------------------------------------------------------------
Sorted by:

.
end of do-file

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APPENDIX G

MAPS OF SEP MEASURES FOR PITTSBURGH AREA LEVELS

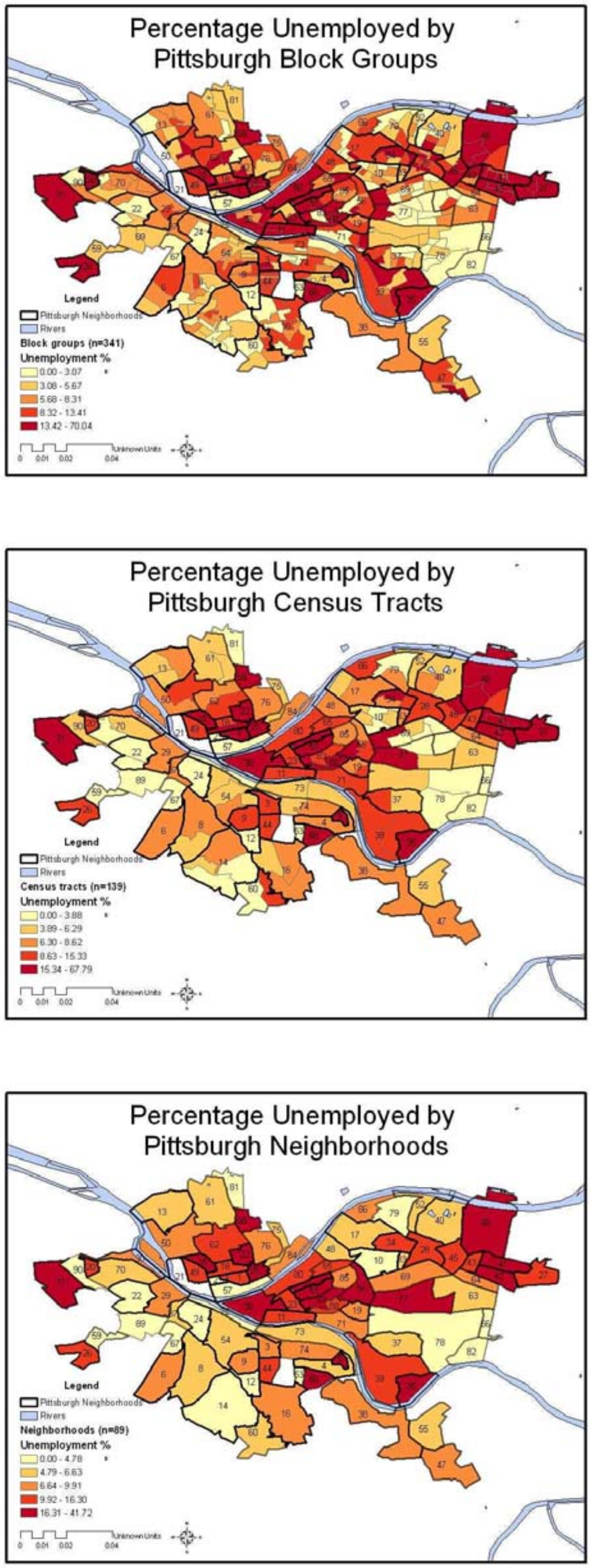


Figure G-1 Percentage Unemployed in Pittsburgh at Each Area Level

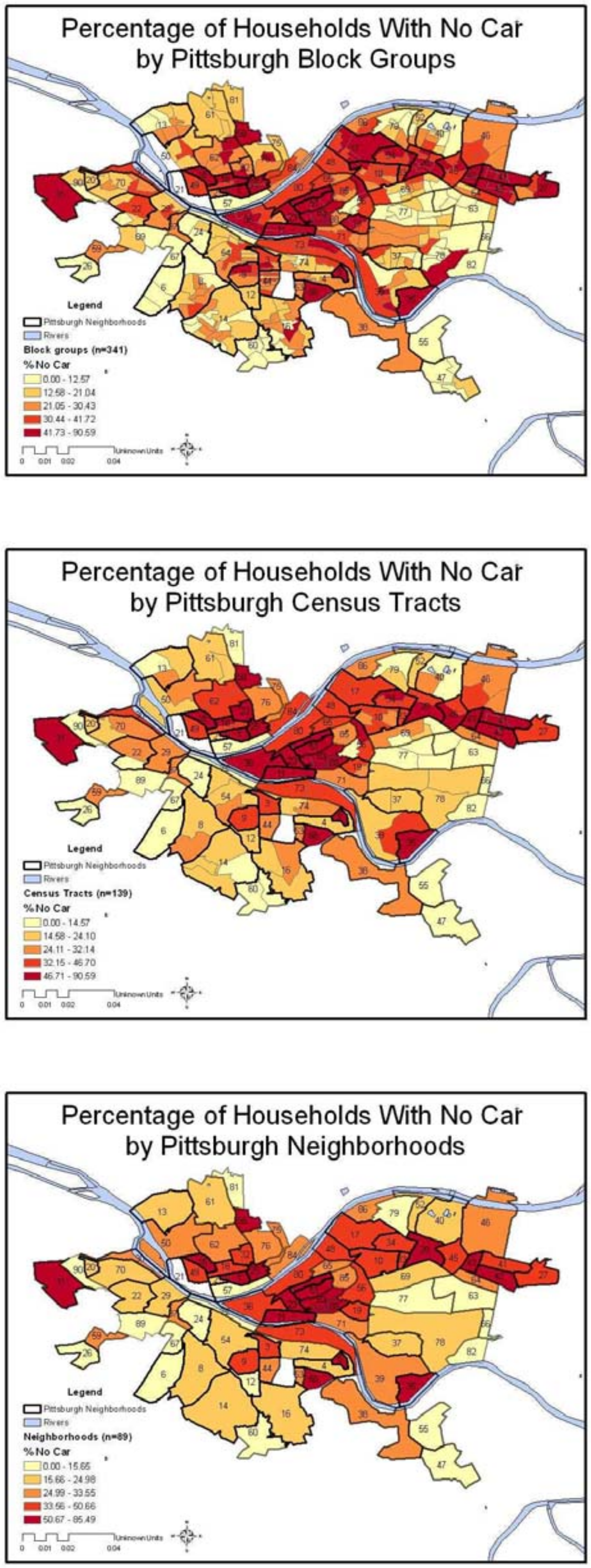


Figure G-2 Percentage of Households with No Car in Pittsburgh at Each Area Level

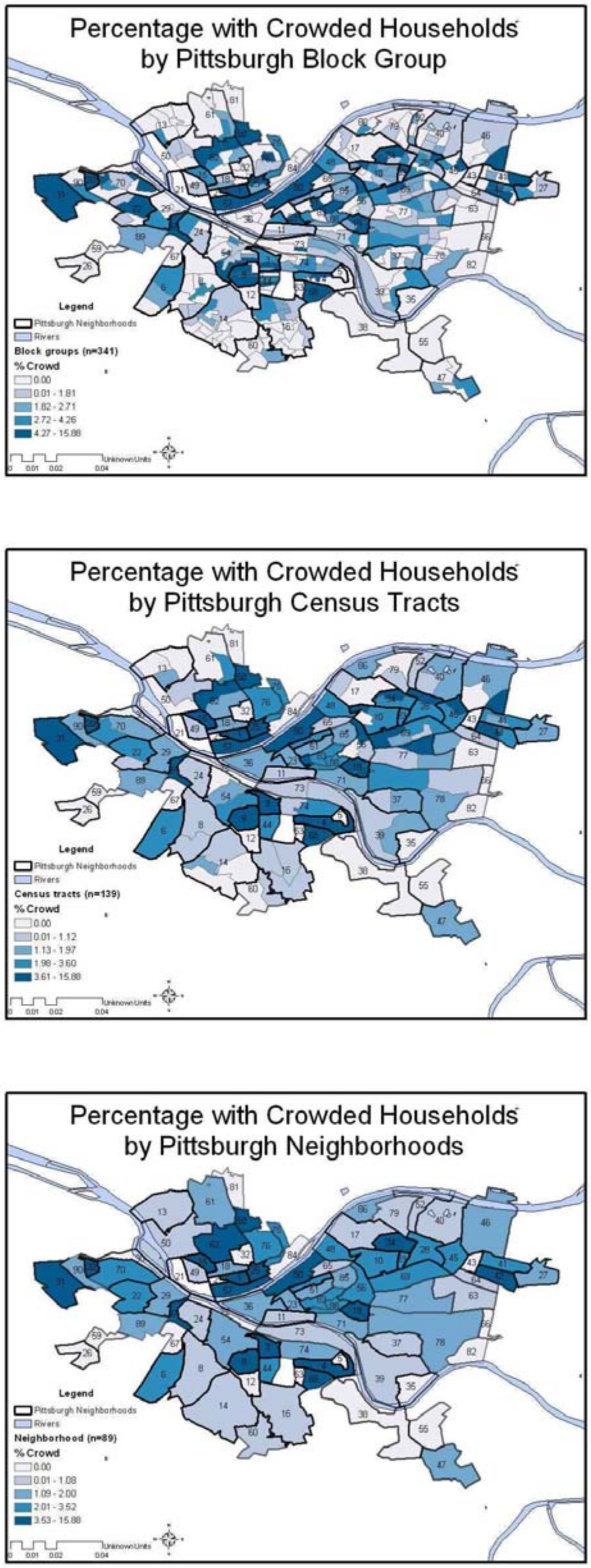


Figure G-3 Percentage of Crowded Households in Pittsburgh at Each Area Level

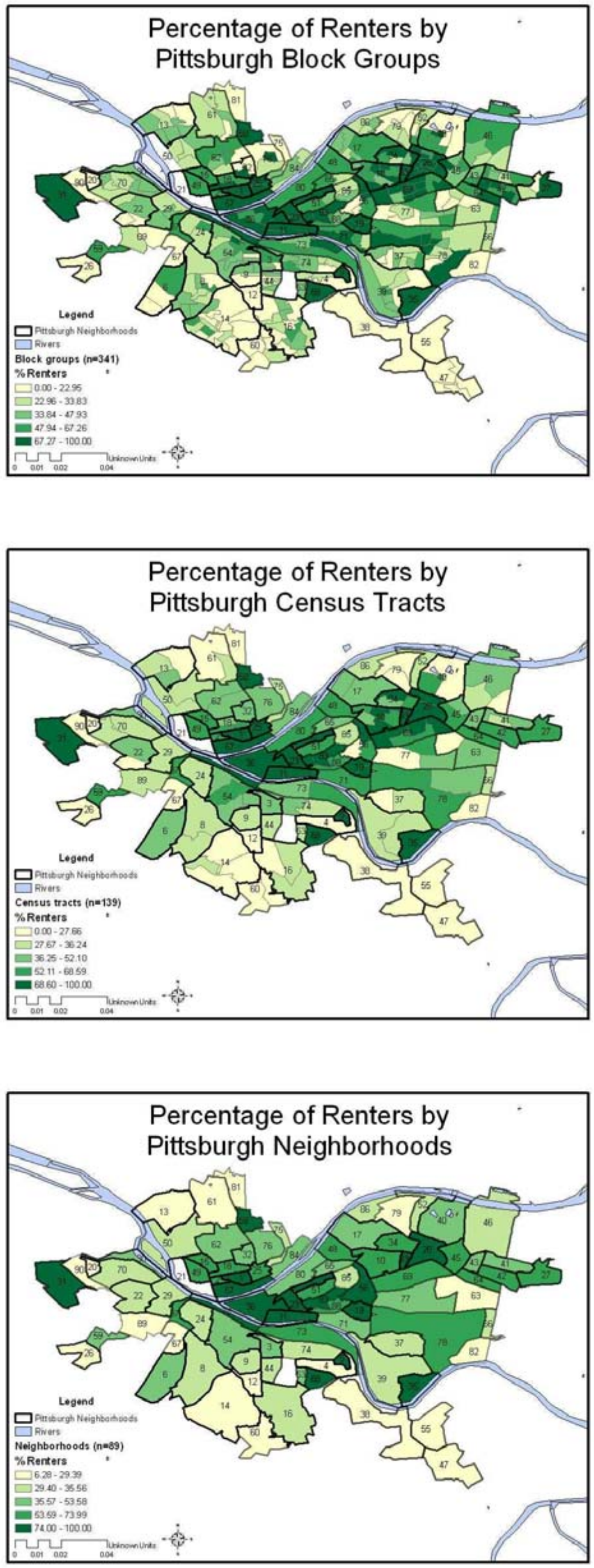
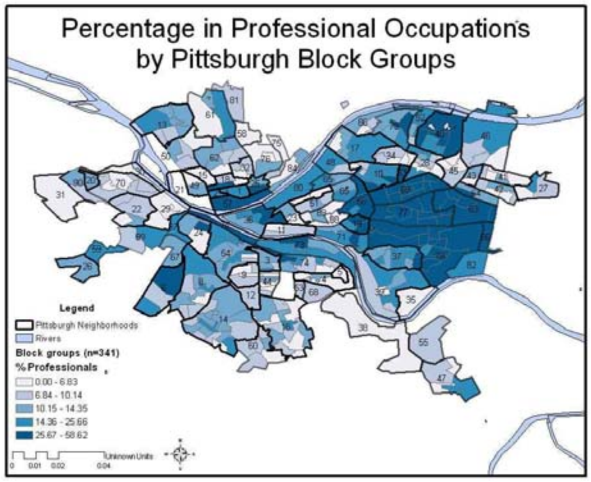
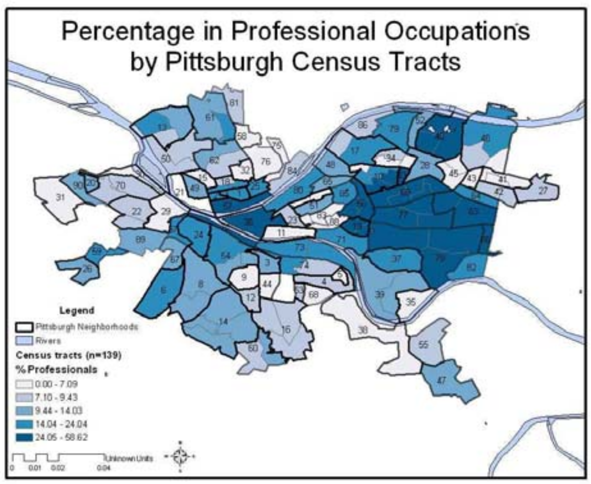


Figure G-4 Percentage of Renters in Pittsburgh at Each Area Level





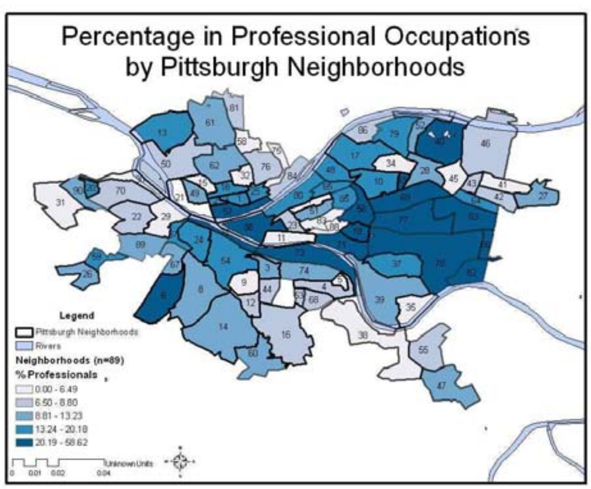
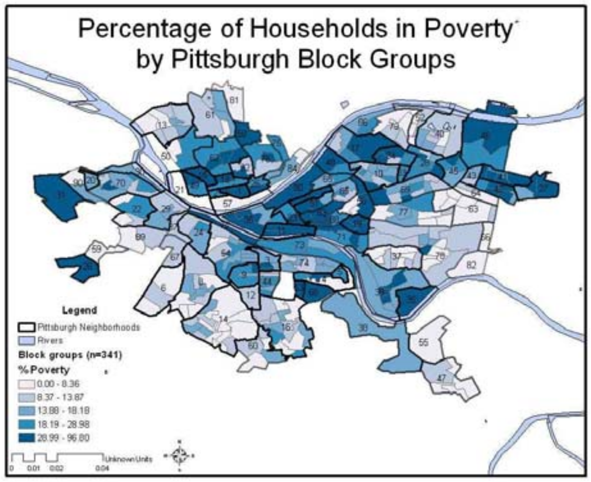
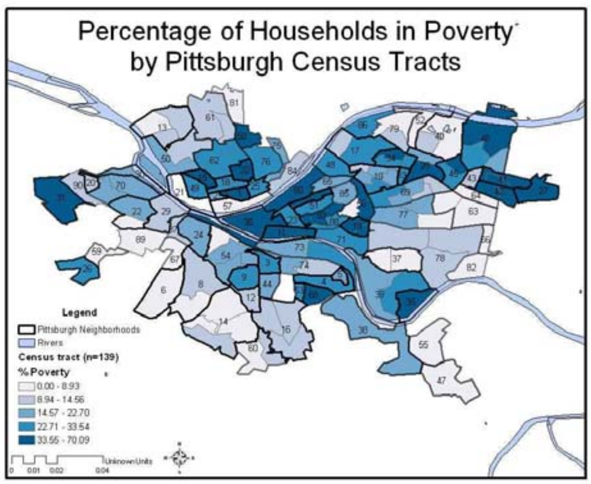


Figure G-5 Percentage in Professional Occupations in Pittsburgh at Each Area Level





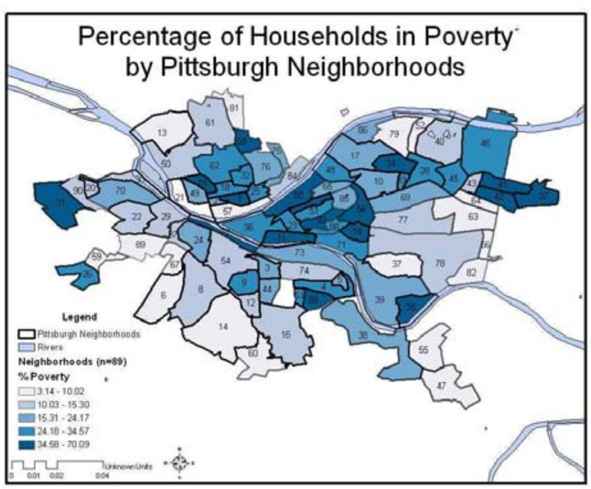
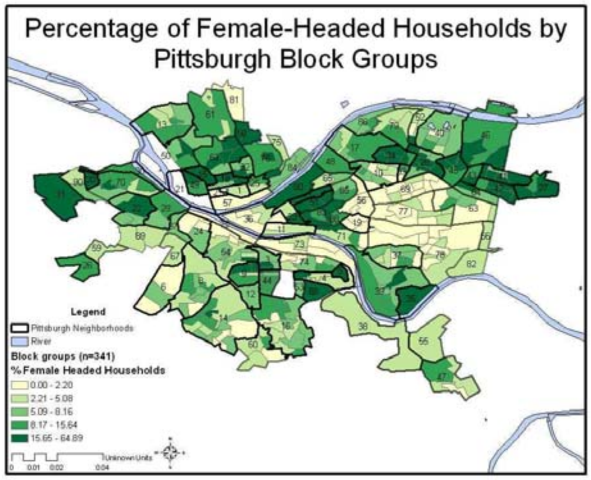
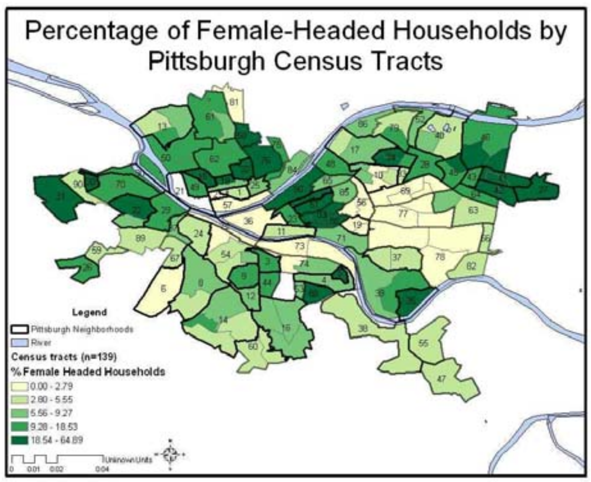


Figure G-6 Percentage of Households in Poverty in Pittsburgh at Each Area Level





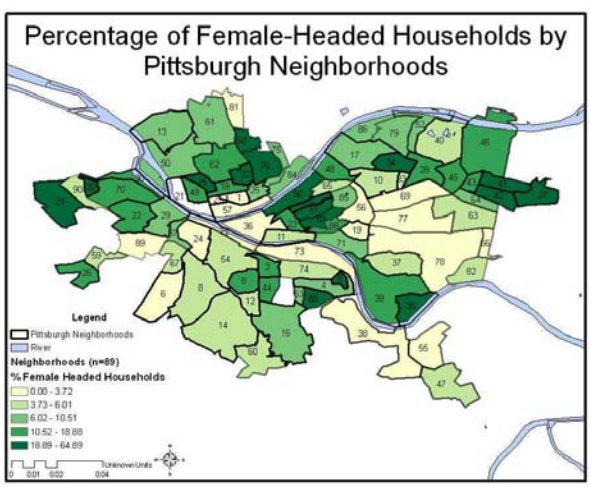
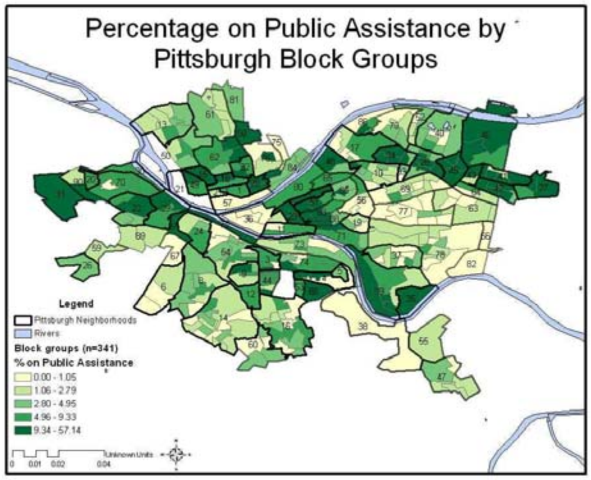
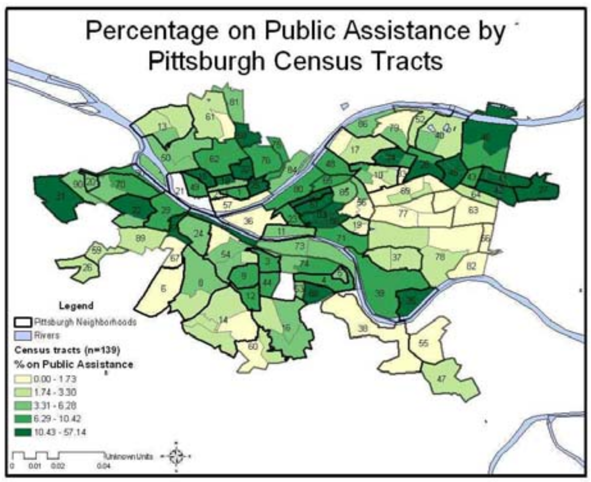


Figure G-7 Percentage of Female-Headed Households in Pittsburgh at Each Area Level





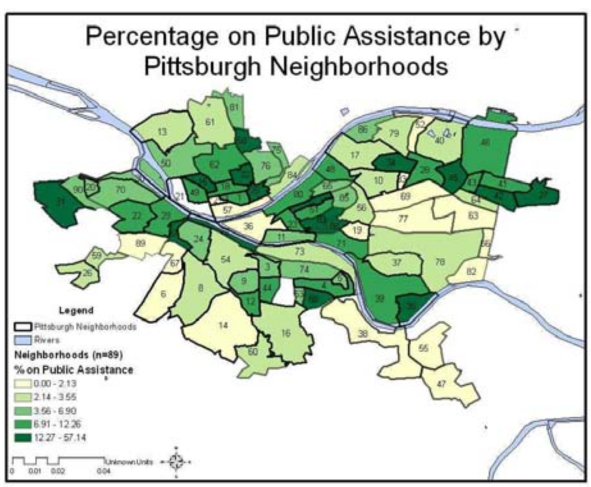
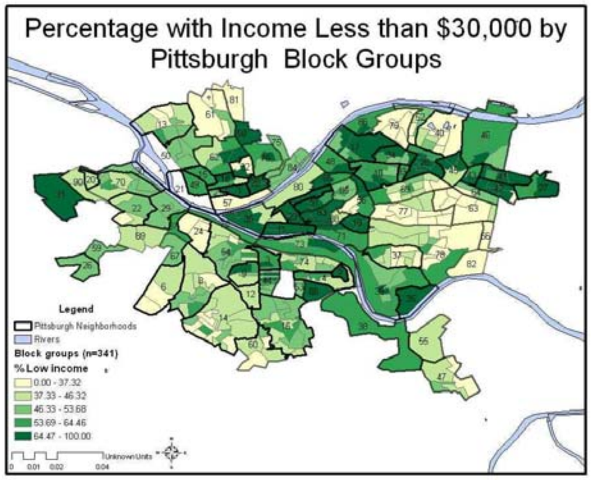
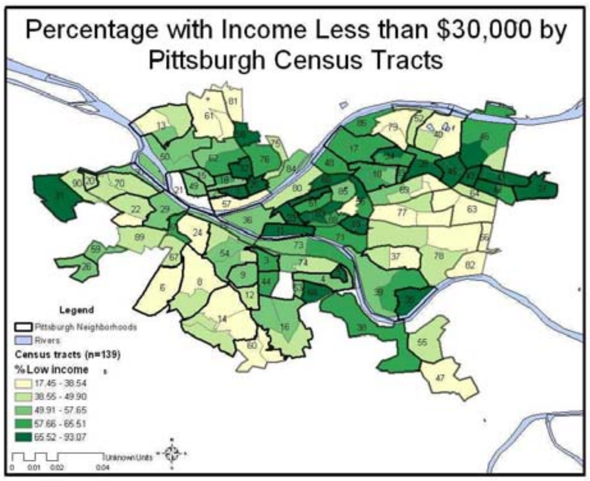


Figure G-8 Percentage on Public Assistance in Pittsburgh at Each Area Level





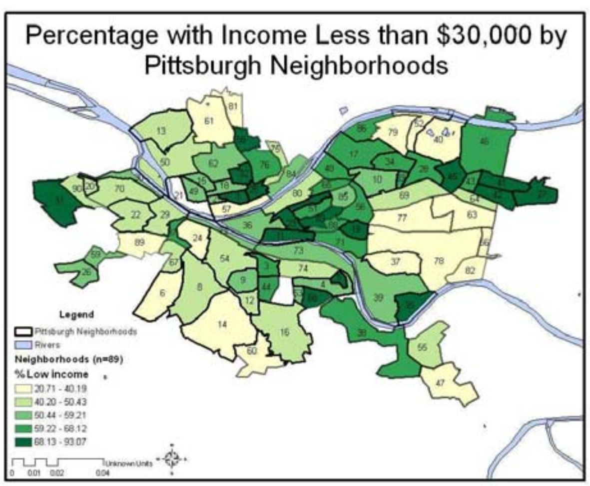
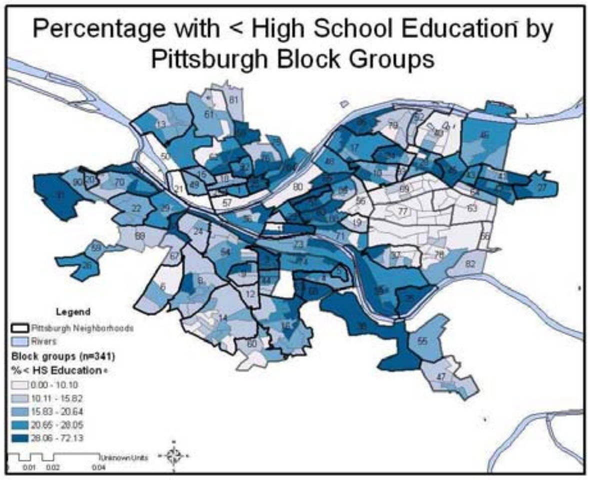
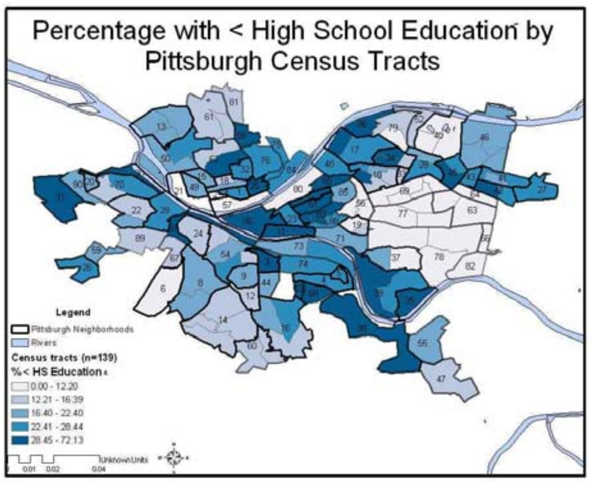


Figure G-9 Percentage of Households with Income Less than $30,000 at Each Area Level





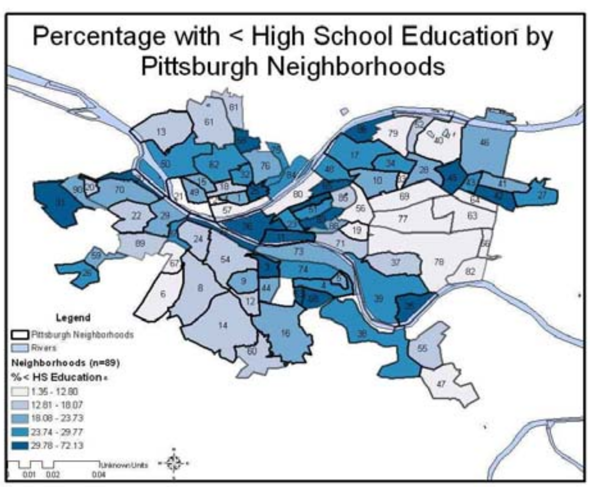


Figure G-10 Percentage with Less Than a High School Education in Pittsburgh at Each Area Level

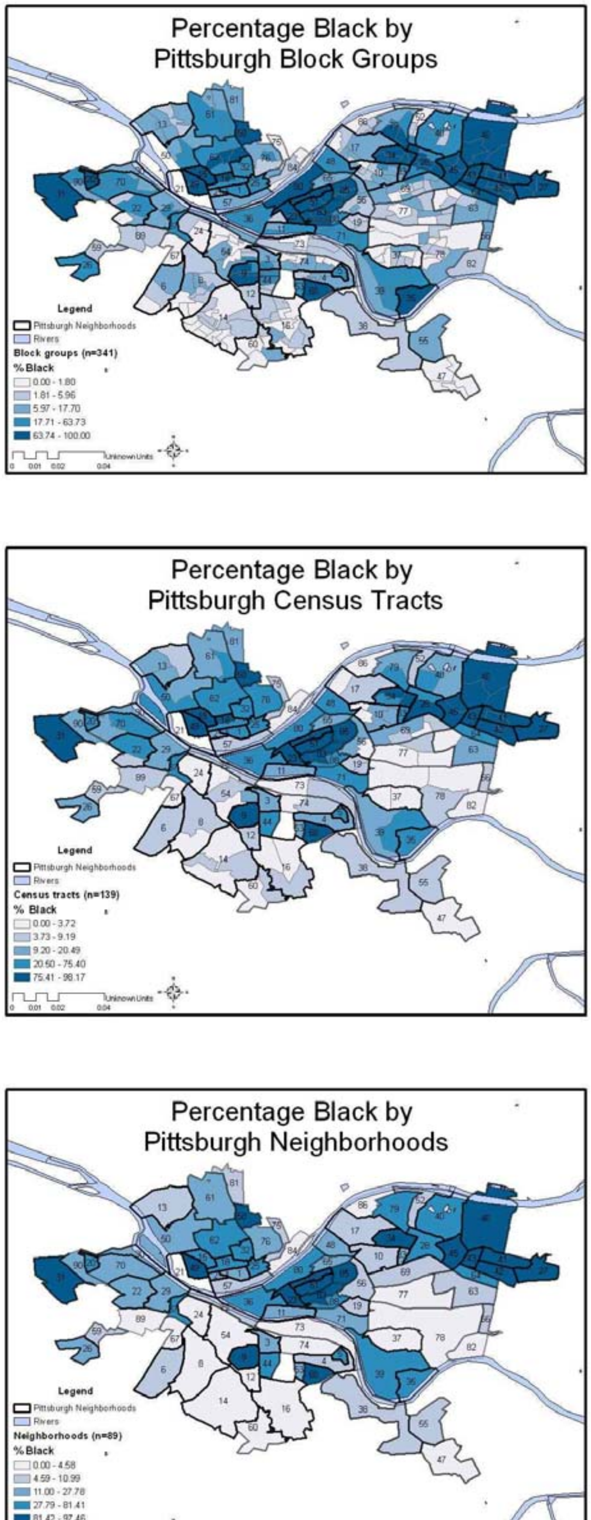
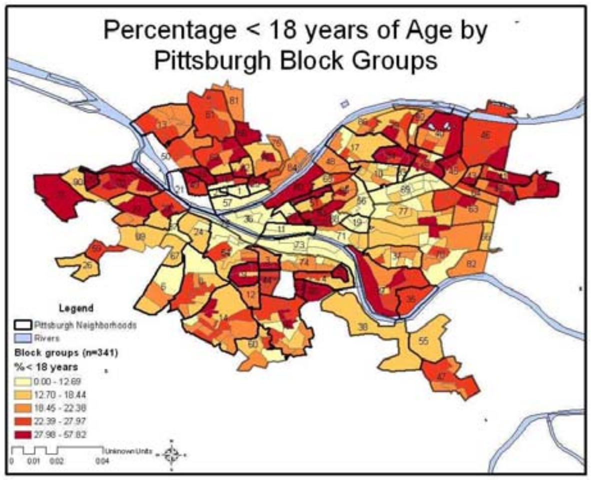
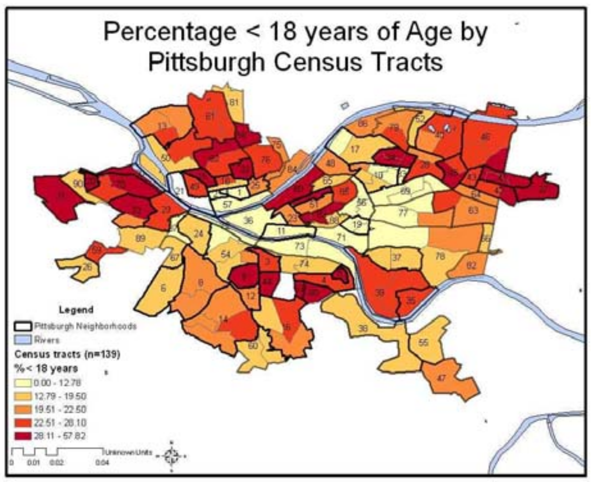


Figure G-11 Percentage Black in Pittsburgh at Each Area Level





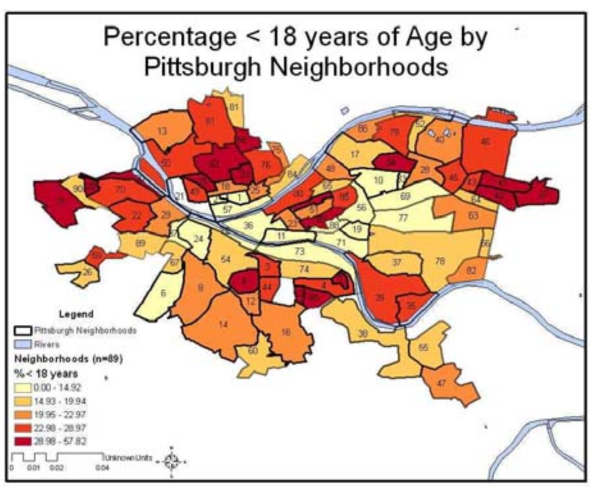


Figure G-12 Percentage Less Than 18 Years of Age in Pittsburgh at Each Area Level

BIBLIOGRAPHY

Allegheny County Health Department (2006). *Allegheny County Birth Statistics--2003*. Pittsburgh, PA: Allegheny County Health Department, Office of Epidemiology and Biostatistics.

Anselin, L. (2004). GeoDA (Version 0.9 5-i5).

Bailey, T. C., & Gatrell, A. C. (1995). *Interactive spatial data analysis*. Harlow Essex, England
New York, NY: Longman Scientific & Technical J. Wiley.

Bentler, P. M. (2006). EQS for Windows (Version 6.1): Multivariate Software, Inc.

Brewer, C. A. (2008). Color Brewer, from http://www.ColorBrewer.org. Retrived on October 1, 2008.

Browning, C. R., Leventhal, T., & Brooks-Gunn, J. (2004). Neighborhood context and racial differences in early adolescent sexual activity. *Demography, 41*(4), 697-720.

Buka, S. L., Brennan, R. T., Rich-Edwards, J. W., Raudenbush, S. W., & Earls, F. (2003). Neighborhood support and the birth weight of urban infants. *Am J Epidemiol, 157*(1), 1-8.

Centers for Disease Control and Prevention (2007). QuickStats: Infant Mortality Rates for 10 Leading Causes of Infant Death--United States, 2005. *MMWR Morb Mortal Wkly Rep, 56*(42), 1115.

Centers for Disease Control and Prevention (2008). QuickStats: Percentage of Children Aged 6-17 Years with Learning Disability (LD) and Attention Deficity Hyperactivity Disorder (ADHD), by Birthweight--National Health Interview Survey, United States, 2004-2006. *MMWR Morb Mortal Wkly Rep, 57*(34), 947.

Chaix, B., Merlo, J., & Chauvin, P. (2005). Comparison of a spatial approach with the multilevel approach for investigating place effects on health: the example of healthcare utilisation in France. *J Epidemiol Community Health, 59*(6), 517-526.

City of Pittsburgh Department of City Planning (2000). Census 2000 Guide: 2000 and 1990 City of Pittsburgh Census Tract Numbers, from http://www.library.pitt.edu/guides/govtpubs/tracts.html. Retrieved on October 1, 2008.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, N.J.: L. Erlbaum Associates.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, N.J.: L. Erlbaum Associates.

Cutrona, C. E., Russell, D. W., Brown, P. A., Clark, L. A., Hessling, R. M., & Gardner, K. A. (2005). Neighborhood context, personality, and stressful life events as predictors of depression among African American women. *J Abnorm Psychol, 114*(1), 3-15.

Diez-Roux, A. V., Kiefe, C. I., Jacobs, D. R., Jr., Haan, M., Jackson, S. A., Nieto, F. J., et al. (2001). Area characteristics and individual-level socioeconomic position indicators in three population-based epidemiologic studies. *Ann Epidemiol, 11*(6), 395-405.

Diez Roux, A. V. (2001). Investigating neighborhood and area effects on health. *Am J Public Health, 91*(11), 1783-1789.

Diez Roux, A. V., Borrell, L. N., Haan, M., Jackson, S. A., & Schultz, R. (2004). Neighbourhood environments and mortality in an elderly cohort: results from the cardiovascular health study. *J Epidemiol Community Health, 58*(11), 917-923.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J.. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272-299.

Folwell, K. (1995). Single measures of deprivation. *J Epidemiol Community Health, 49 Suppl 2*, S51-56.

Foshee, V. A., Karriker-Jaffe, K. J., Reyes, H. L., Ennett, S. T., Suchindran, C., Bauman, K. E., et al. (2008). What accounts for demographic differences in trajectories of adolescent dating violence? An examination of intrapersonal and contextual mediators. *J Adolesc Health, 42*(6), 596-604.

Galobardes, B., Lynch, J., & Smith, G. D. (2007). Measuring socioeconomic position in health research. *Br Med Bull, 81-82*, 21-37.

Galobardes, B., Shaw, M., Lawlor, D. A., Lynch, J. W., & Davey Smith, G. (2006). Indicators of socioeconomic position (part 1). *J Epidemiol Community Health, 60*(1), 7-12.

Gee, G. C., & Payne-Sturges, D. C. (2004). Environmental health disparities: a framework integrating psychosocial and environmental concepts. *Environ Health Perspect, 112*(17), 1645-1653.

Gordis, L. (1996). *Epidemiology*. Philadelphia, Penn.: W.B. Saunders.

Grady, S. C. (2006). Racial disparities in low birthweight and the contribution of residential segregation: a multilevel analysis. *Soc Sci Med, 63*(12), 3013-3029.

Hox, J. J. (2002). *Multilevel analysis : techniques and applications*. Mahwah, N.J.: Lawrence Erlbaum Associates.

Johnson, R. A., & Wichern, D. W. (2007). *Applied multivariate statistical analysis* (6th ed.). Upper Saddle River, N.J.: Prentice Hall.

Krieger, N., Waterman, P., Chen, J. T., Soobader, M. J., Subramanian, S. V., & Carson, R. (2002). Zip code caveat: bias due to spatiotemporal mismatches between zip codes and US census-defined geographic areas--the Public Health Disparities Geocoding Project. *Am J Public Health, 92*(7), 1100-1102.

Krieger, N., Williams, D. R., & Moss, N. E. (1997). Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annu Rev Public Health, 18*, 341-378.

Krieger, N., Zierler, S., Hogan, J. W., Waterman, P., Chen, J., Lemieux, K., et al. (2003). Geocoding and Measurement of Neighborhood and Socioeconomic Position: A U.S. Perspective. In I. Kawachi & L. F. Berkman (Eds.), *Neighborhoods and Health* (pp. 147-178). New York: Oxford University Press.

Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *J Health Soc Behav, Spec No*, 80-94.

Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Menacker, F., Kirmeyer, S., et al. (2009). Births: Final data for 2006 *National vital statistics reports, 57(7).*

Messer, L. C. (2007). Invited commentary: Beyond the metrics for measuring neighborhood effects. *Am J Epidemiol, 165*(8), 868-871; discussion 872-863.

Messer, L. C., & Kaufman, J. S. (2006). Using census data to approximate neighborhood effects. In J. M. Oakes & J. S. Kaufman (Eds.), *Methods in Social Epidemiology*. San Francisco: Jossey-Bass.

Messer, L. C., Kaufman, J. S., Dole, N., Savitz, D. A., & Laraia, B. A. (2006). Neighborhood crime, deprivation, and preterm birth. *Ann Epidemiol, 16*(6), 455-462.

Messer, L. C., Laraia, B. A., Kaufman, J. S., Eyster, J., Holzman, C., Culhane, J., et al. (2006). The development of a standardized neighborhood deprivation index. *J Urban Health, 83*(6), 1041-1062.

Morenoff, J. D. (2003). Neighborhood mechanisms and the spatial dynamics of birth weight. *AJS, 108*(5), 976-1017.

Pearl, M., Braveman, P., & Abrams, B. (2001). The relationship of neighborhood socioeconomic characteristics to birthweight among 5 ethnic groups in California. *Am J Public Health, 91*(11), 1808-1814.

Pfeiffer, D. (2008). *Spatial analysis in epidemiology*. Oxford ; New York: Oxford University Press.

Pickett, K. E., Collins, J. W., Jr., Masi, C. M., & Wilkinson, R. G. (2005). The effects of racial density and income incongruity on pregnancy outcomes. *Soc Sci Med, 60*(10), 2229-2238.

Pickett, K. E., & Pearl, M. (2001). Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *J Epidemiol Community Health, 55*(2), 111-122.

Rasbash, J., Charlton, C., Browne, W. J., Healy, M., & Cameron, B. (2009). MLwin (Version 2.1): Centre for Multilevel Modelling, University of Bristol.

Rauh, V. A., Andrews, H. F., & Garfinkel, R. S. (2001). The contribution of maternal age to racial disparities in birthweight: a multilevel perspective. *Am J Public Health, 91*(11), 1815-1824.

Reise, S. P., Ventura, J., Nuechterlein, K. H., & Kim, K. H. (2005). An illustration of multilevel factor analysis. *J Pers Assess, 84*(2), 126-136.

Rich-Edwards, J. W., Buka, S. L., Brennan, R. T., & Earls, F. (2003). Diverging associations of maternal age with low birthweight for black and white mothers. *Int J Epidemiol, 32*(1), 83-90.

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science, 277*(5328), 918-924.

Schulz, A., & Northridge, M. E. (2004). Social determinants of health: implications for environmental health promotion. *Health Educ Behav, 31*(4), 455-471.

Shaw, M. (2007). *The handbook of inequality and socioeconomic position*. Bristol: Policy.

Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis : an introduction to basic and advanced multilevel modeling*. London ; Thousand Oaks, Calif.: Sage Publications.

StataCorp LP (2007). STATA/SE For Windows (Version 9.2). College Station, TX.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Allyn and Bacon.

Testi, A., Ivaldi, E., & Busi, A. (2004). An index of material deprivation for geographical areas. Retrieved from http://www.diem.unige.it/23.pdf. Retrieved on November 1, 2008.

Townsend, P., Phillimore, P., & Beattie, A. (1988). *Health and deprivation : inequality and the North*. London ; New York: Croom Helm.

U.S. Census Bureau (2000). Census 2000 ZCTAs Zip Code Tabulation Areas: Technical Documentation.
U.S. Census Bureau (2001a). 2000 Census of Population and Housin, Summary File 2: Technical Documentation.
U.S. Census Bureau (2001b). 2000 Census of Population and Housing, Summary File 1: Technical Documentation.
U.S. Census Bureau (2001c). Zip Code Tabulation Area: Frequently Asked Questions, from http://www.census.gov/geo/ZCTA/zctafaq.html#Q7. Retrieved on August 1, 2008.
U.S. Census Bureau (2002). *2000 Census of Population and Housing, Summary File 3: Technical Documentation*.
U.S. Census Bureau (2003). 2000 Census of Population and Housing, Summary File 4: Technical Documentation.
Vittinghoff, E. (2005). *Regression methods in biostatistics : linear, logistic, survival, and repeated measures models*. New York: Springer.