

**DETERMINANTS OF INTERNAL REMITTANCES: A STUDY OF MIGRANT
DOMESTIC WORKERS LIVING IN DAKAR, SENEGAL**

by

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This paper investigates the motives behind internal income transfers through an analysis of original survey data. Though there has been much research on this topic, few studies have addressed the role of seasonal migration and factors specifically relevant to women (such as number of children) in remittance behavior. Both issues are investigated here. Over 100 female migrant domestic workers living in Dakar, Senegal were given a survey on their remittance behaviors, work, and family situations. The correlations between percent of income remitted and explanatory variables such as age, number of children, and status as a seasonal migrant, was used to determine the characteristics of migrants who remit the most. This information was then used to draw conclusions on migrants' motives for remitting. Three main results were established. First, status as a seasonal migrant is associated with a higher percent of income remitted relative to non-seasonal migrants, suggesting that seasonal migrants have a greater stake in their home community due to regular stays at home. This also reflects the idea that families use rural-urban migration as a tool for household consumption smoothing. Secondly, having a small number of children is associated with a higher percent of income remitted relative to those with many or no children, indicating that the women with one or two young children leave them in care of their grandparents, and that remittances are a form of payment for the child's needs. Finally, migrants with a deceased father remit less than those with a living father, which supports an insurance motive.

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1.0 INTRODUCTION

International remittances are often discussed in the media due to their profound impact on sending and especially recipient countries. However, internal remittances play a similarly important role in the economies of developing countries, particularly in relation to the dynamic between urban centers and rural regions. Many of the poorest inhabitants of developing countries rely on remittances from cities to stabilize income from farming, which may be volatile due to natural harvest cycles, as well as unexpected drought or pest issues. On the other end, young and often uneducated workers are flooding into cities, contributing to overcrowding and testing the limits of underdeveloped infrastructure. They have many motivations, the most prominent being to help their families and hopefully work toward a more economically prosperous life for themselves. Because of the vital role of internal remittances in both rural and urban economies, it is critical to understand what motivates these income transfers. Though there have been many studies focusing on determinants of remittances, some questions remain. Little research has examined how plans for return migration impact the dynamic between migrants and those remaining, and none has specifically focused on the effect of seasonal migration on remittance behavior. Furthermore, as most migration studies focus on international remittances, there is insufficient understanding of how internal migrants leaving their young children in the care of their grandparents impacts remittance behavior.

Senegal is an ideal site for a study investigating the role of seasonal migration in remittances. Its geographical position between the desert to the north and tropical forests to the south means that it has a long dry season, lasting from the end of October to June of the following year. During this period, a low level of agricultural activity leads to chronic underemployment in rural areas, pushing inhabitants to migrate to urban centers in search of temporary work (Mbengue 1998). In addition, the large number of young migrant domestic workers living in Dakar provides an ideal population for studying the effect of age and number of children on remittances.

Through the collection and analysis of surveys on the remittance behavior of female domestic workers living in Dakar, this paper investigates the motivations behind internal income transfers. The correlation of percent of income remitted (to the head of household) with the domestic worker's status as a seasonal migrant, among other explanatory variables such as her age, number of children, and the death of a parent, is used to determine the characteristics of migrants who remit the most. This information is then used to draw conclusions about a migrant's motivation to remit. Understanding an internal migrant's incentives for remitting will lend important insight to the dynamic between urban and rural regions, which could help to inform policy initiatives for rural development. Furthermore, when migrants are young, underprivileged women, understanding their role becomes relevant to other issues such as child labor and educational equality for women.

Estimating the determinants of remittances produced three main results. First, status as a seasonal migrant is associated with a statistically significant increase of almost 10% of income remitted. This finding would suggest that seasonal migrants have a greater stake in their home community due to regular stays at home and reflects the idea that families use rural-urban

migration as a tool for household consumption smoothing. Secondly, having a small number of children is associated with an increase in percent of income remitted. This result may indicate that the women with one or two young children leave them in care of their grandparents, and that remittances are a form of payment for childcare services. Finally, migrants with a deceased father remit on average around 14.5% less of their monthly income to their remaining head of household than those with a living father. This result is somewhat counterintuitive if we presume that migrants are remitting for altruistic reasons. However, though women have a right to inherit property by Senegalese law, cultural and religious traditions often dictate otherwise (Gaestel 2010). Thus, the domestic worker's mother may be less able to support her in the future, decreasing her incentives for sending remittances. All of these results were statistically significant.

In order to reach these conclusions, over 100 domestic workers living in Dakar were interviewed regarding their work, family, and remitting behaviors. Data was analyzed using a standard OLS regression of explanatory variables on percent of income remitted. See the Annex on page 30 for a list of questions asked. Most of the workers interviewed were very young, uneducated, and made an average of just \$140 (PPP) per month, about half of which they send to their families who remain in rural areas. Though their ages ranged from 15 to 50, the median age was 21 years old. About a quarter of the domestic workers interviewed stay in Dakar only during the dry season and return home for harvest from July to October.

In general, literature on remittances supports a theory of “tempered altruism”, a term coined by Lucas and Stark in their seminal paper on remittances of internal migrants in Botswana. That is, while migrants do exhibit some altruistic tendencies, they also have self-serving motives for remitting. Factors such as the sender and recipient's income, frequency of

visits home, and level of education have been studied extensively, often with conflicting results. This study both supports and expands upon these findings. The few studies addressing the role of temporary or permanent return to origin also find that those who visit often or plan to return remit more. A similar study on domestic workers in Tunisia finds that probability of remitting increases with age, with the actual amount decreasing, compared to the concave relationship between age and remittances identified here. Only one other paper has found a significant relationship between the migrants' children and remittances; Dustmann and Mestres (2010) note a positive relationship between remittances and number of children abroad.

After a brief review of available literature on remittances in Section 2, I provide relevant background information about migration and domestic work in Sections 3 and 4. The following section gives an overview of survey procedures and a basic summary of data collected. After explaining methodology in Section 6, results of the statistical analysis are presented in Section 7. Section 8 concludes with a discussion of these results.

2.0 LITERATURE REVIEW

A considerable number of studies have already addressed the economic motivation behind remittances, particularly those flowing between countries. Much of the evidence has revealed conflicting and unclear motives, but certain key pieces provide significant insight into the behavior of migrants. See the chart at the end of this section for an overview of findings on different indicators (Table 1). One of the primary conclusions is that migrants remit at least partially in hopes of receiving an inheritance or future assistance (insurance). Lucas and Stark (1985) surveyed internal migrants in Botswana and found that the log of monthly remittances was positively correlated with higher recipient family income, suggesting migrants were motivated by a potential inheritance, or knowledge that the family could insure the migrant in case of hard times. Hoddinott (1994) used evidence from Kenya which also demonstrated a positive relationship between recipient landholdings and the percent of income remitted to support the argument that migrants were motivated by a potential inheritance or for insurance reasons.

Amuedo and Pozo (2006) take a different approach to looking for evidence which supports the insurance motive. Instead of viewing altruism and insurance as competing motives, they view them as two intentions that can coexist and often do. Thus, they use a factor to measure the insurance motive among Mexican immigrants to the United States which is not associated with altruism. They hypothesize that if remittances go down as host country risk

factors such as legal status, access to social benefits and networks, work experience, and length of residence are decreasing, then migrants remit in order to self-insure. If migrants face a high level of risk, then is a greater chance of return migration and a subsequent need for familial support. Thus, migrants who remit more when risk factors are high are hedging against this possibility. Amuedo and Pozo find that migrants are likely to behave as risk-averse individuals; undocumented migrants are both more likely to remit (three percentage points higher) and remit a greater portion of their income (five percentage points higher) (Amuedo and Pozo 2006). Though this study on domestic workers was not able to examine recipient income or measure risk factors, the correlation of decreased remittances with the death of a father suggests that migrants may remit for insurance reasons, as a the migrant's mother or siblings may not have the same capacity to provide for her in the future.

On the other hand, there is also significant evidence for the altruistic behavior of migrants. Lucas and Stark (1985) also found that remittances were countercyclical, supporting the theory that migrants are concerned about the welfare of their families in addition to their own welfare. Cox, Eser, and Jimenez (1998) found that the probability of remitting among Peruvian migrants had in inverse relationship with recipient income, lending further support to the altruism argument. In Mali, there was an inverse relationship between the number of migrants in the recipient household and the amount remitted. This suggests that the migrant's decision to remit is based on his family's expected welfare, rather than a desire to secure personal benefits, which should be unaffected by the remitting behavior of siblings (Gubert 2002). This same result was confirmed in a study of migrants in Guyana, where the probability of remitting was significantly negatively related to the number of other migrants in the family (Agarwal 2002). Though the results of this paper did not point to any specific characteristics causing variation in

remittances that could be used to determine an altruistic motive, there was limited information on characteristics of the recipient's family. Thus, this study certainly does not disqualify altruistic motives. The notion that migrants remit with "tempered altruism", first suggested by Lucas and Stark, seems reasonable given the evidence in the literature for both altruistic and inheritance seeking motives.

Exchange and repayment for services is another motive for remitting. One of Lucas and Stark's (1985) primary findings was that the size of cattle herds among recipient families was positively related to the level of remittances, suggesting that remittances were being used as a means of exchange for care of livestock. This idea is further supported by evidence from Vietnam which shows that the migrant's level of education is positively related to the amount remitted, controlling for income (Niimi, Pham and Reilly, 2008). However, Amuedo and Pozo (2006) find a negative relationship between education and percent of income remitted, suggesting that this good was not necessarily provided by the family of the migrants, and that more educated migrants are in a less tenuous position in the host country, leading to lower insurance-related remittances. The evidence in this study supports the hypothesis that exchange for services is a motive for remitting. Migrants with one or two children remitted more than their child-less counterparts, suggesting that their remittances were in part a payment for childcare services.

Concentrating on a similar subject population as this study, a paper by Dostie and Vencatachellum (2006) on the remittances of domestic workers in Tunisia focused on the differences between determinants of compulsory and voluntary transfers. They found that as the domestic worker aged, her probability of being subject to compulsory remittances decreased, while the probability that she would choose to remit voluntarily increased. Conversely, the

dollar amount of compulsory remittances was increasing in age (most likely reflecting higher incomes), while the amount of voluntary remittances was decreasing in age. In addition, having a higher number of younger sisters was correlated with higher compulsory remittances, while having more older brothers was related to higher voluntary remittances. It was reasoned that a higher number of brothers made it more likely that the family would be able to offer the migrant financial support in the future, while more sisters meant a higher level of need for additional income from the family. It is worth noting that the phenomenon of contractually mandated remittances for young domestic workers is not prevalent in Dakar, as none of the participants in this study reported their income being transferred directly from the employers to their families. However, findings on the relationship between remittances and age in Dakar lend important insight into the discoveries of Dostie and Vencatachellum. Both papers reflect an eventual decrease in percent of income remitted as a domestic worker ages. The data on domestic workers in Dakar shows an initial increase in percent of income remitted as age increases, while the data on domestic workers in Tunisia shows an increase in the probability of remitting. These findings both reflect that there may be conflicting factors at play in our observance of the correlation of age and remittances. Perhaps workers remit more as they become more established in Dakar and are more mature in handling their finances, but remit less as they begin to grow distant from family in the rural areas.

Another relevant factor in the motivation for remitting is the role of the migrant's gender. There is evidence to support that females differ from males both in the amount they remit and their motivation for doing so. Female Cuban migrants were more likely to remit than their male counterparts (Blue 2004). A paper by Vanwey (2004) examining the remittance behavior of internal migrants in Thailand split remittance motivations into those of a contractual nature

(repayment, inheritance), and those of an altruistic nature. It was discovered that females tend to behave in a more altruistic manner by being more likely to remit to families with low incomes who send few other migrants. Another study by de la Brière et al. (2002) showed that the amount of remittances from Dominican female migrants to the U.S. were positively correlated with the number of annual lost work days due to illness by the recipient family. No such response was observed from male migrants. This countercyclical remittance behavior suggests altruism as a motive. On the other hand, Merkle and Zimmerman (1991), find that male immigrants in West Germany had a higher level of remittances in comparison to female migrants. However, the majority of research seems to support the idea that females tend to remit more, and for more altruistic reasons. Though this paper does not examine differences in remitting behavior between males and females, all subjects are women, so it is important to understand how their conduct may differ from that of the average migrant.

Though there has not been any research investigating the specific connection between seasonal migration and remittances, Dustmann and Mestres (2010) look at how temporary migration is related to international remittances. They find a significant positive relationship between the log of amount remitted and plans to return home based on data collected from migrants in Germany, which suggests that migrants sometimes remit as a form of investment or savings for their eventual homecoming. These same findings are also reflected in a study on internal migrants in Kenya, where it was shown that each additional year away from the home community is correlated with decreasing percent of income remitted (Johnson 1974). Data on remittances from Cuban immigrants also showed a positive relationship between frequency of visits home and the amount remitted (Blue 2004). This illustrates how temporary visits may influence the social obligation aspect of remitting. Remitting could act as a tool to retain respect

and influence in the home community. My findings concur with those of Blue (2004) and Dustman and Mestres (2010). Seasonal migrants retain strong ties with their home region through yearly stays of at least two months, and not surprisingly, this is reflected in the amount they remit. I found that seasonal migrants remit almost 10% more of their monthly income than non-seasonal migrants.

Table 1: Summary of Literature

Summary of Literature							
Note: + denotes positive relationship with remittances, - denotes negative relationship							
Authors	Lucas and Stark	Dostie and Vencatach-ellum	Agarwal and Horowitz	Johnson and Whitelaw	Amuedo and Pozo	Blue	Merkle & Zimmerman
Income	+	+		+			
Home Income	+		-				+
Schooling			+	+	-		
Female	+		+		-	+	-
Duration of Absence	+, -			-	-	-	
Age		+			+		+
Age Squared		-					-
Household size	+	+,-	+	+	+		+
Number of Migrants			-				-
Return Migration							+
Children at Home							
	De la Brière et al	Cox et al.	Dustmann and Menstres	Gubert	Hoddinott	Niimi	Vanwey
Income			+			+	
Home Income		-					
Schooling			-		+	+	+
Female							
Duration of Absence	+		+,- quadratic				-
Age	+		+		+		-
Age Squared	-				-		+
Household size							
Number of Migrants				-			-
Return Migration			+				
Children at Home			+				

3.0 INTERNAL MIGRATION IN SENEGAL

Senegal is an ideal country in which to study remittances due to the prevalence of migration and urbanization. While there is significant movement within and into rural areas, migration is most notably towards the bustling urban center of Dakar, which received a net influx of 33,343 internal migrants over the five year period from 2003 to 2008 (République du Sénégal 2009). The trend of urbanization in Senegal is nothing new; in 1993 Dakar had an annual growth rate of 3.8% compared to 2.7% for the rest of Senegal (Mbengue 1998). In fact, over one third of Dakar's residents were born outside of the city (Cohen et al. 1997). This population pressure has led to a large labor surplus, much of which is pushed into the informal sector. Though the city of Dakar occupies only 0.3% of Senegal's land, it contains around 21% of its population (République du Sénégal 2004).

Migrants relocate for a variety of reasons, but are usually motivated by economic or family incentives. Marriage is an especially strong motivation for women; over 33% of all female internal migrants relocate for this reason (République du Sénégal 2004). The fact that women are much more likely to relocate for marriage than men is reflected in the ratio of male to female migrants at different age ranges. Internal migration under the age of 25 is dominated by women, while migrants over the age of 25 are more likely to be male (Ndiaye 1989). However, this figure also captures the large number of young women who migrate temporarily in order to work as domestic workers before getting married. Women who migrate for economic reasons

actually have lower birthrates due to later marriages and separation from their spouses (Cohen et al. 1988).

Continually deteriorating economic and environmental conditions in the rural areas east of Dakar also create a strong pull to the city. Production of cash crops, particularly groundnuts, was stressed heavily during the colonial period, taking precedence over food production. This led to a high population density in the groundnut basin: the regions of Diourbel, Kaolack, Fatick, and Theis (Ba et al. 1994). In fact, many inhabitants of the Senegal River basin migrated to this area during the colonial period (Hanna 1987). However, production of groundnuts has fallen off since independence as a result of both decreased demand for peanut products and increased competition from emerging economies such as China and India (Cohen et al. 1997). The area continues to rely on imports for food, most notably rice. Production is becoming increasingly insufficient to support the growing population. Incidence of household poverty in 2002 was 57.7% in rural areas, compared to 33.3% in Dakar (République du Sénégal 2004).

Furthermore, environmental causes such as desertification, erosion, and irregular rainfall have made it increasingly difficult for farmers to sustain production that is sufficient to support the rural population. For example, the total production of groundnuts was less than half in 2009 of what it was in 2008, mostly due to insufficient rainfall (République du Sénégal, 2009). In addition, poor agricultural practices such as over-farming have led to decreased soil fertility, while production is further limited by poor seed quality and insufficiency of capital goods.

As a result of these problems, rural households are continually seeking ways to diversify their income and cut down on the number of people who need to be supported. Sending certain family members into Dakar to find work is often a collective decision for group survival. Previous migrants from the same village pave the way for new migrants by helping them to find

jobs and places to live. Consequently, migrants hold strong ties with their regions of origins, both through monetary contributions and frequent visits. Almost 60% of all internal migrants remit money to the head of the household remaining in the village, and 85.3% visit at least once a year (République du Sénégal, 2004). Only 3 of the participants in this study didn't send remittances, and 92% of migrants said they visited their rural homes at least once a year. Many also have plans to return home after a specified period of time or a significant event such as marriage.

Seasonal migration is also highly prevalent in Senegal due to the long period of agricultural inactivity during the dry season, which lasts from mid-September to mid-June of the following year. Having some family members working in the non-agricultural sector helps to generate revenue for the household and smooth consumption during this period of economic inactivity. The census in 1988 found that over 5% of the Senegalese population is seasonal migrants, and furthermore, that woman dominated this figure in the 10-14 age group, as well as in the 15-19 age group for the regions of Fatick and Ziguinchor (Cohen et al., 1997). This would suggest that domestic workers, who are almost exclusively female and usually quite young, make up a significant portion of seasonal migrants.

4.0 DOMESTIC WORK IN DAKAR

Unlike in most developed countries, the employment of at least one domestic worker, even in middle to lower- middle class households, is quite common in Dakar and other regional capitols in Senegal. The high relative cost of utilities and household appliances in relation to the availability and low cost of human labor contribute to this prevalence. About 24.9% of economically active females over the age of 10 in Dakar are employed as domestic workers (République du Sénégal, 2004). The majority of these workers have migrated from the interior of Senegal, particularly the heavily agricultural mid-western regions closest to Dakar- Thies, Fatick, Diourbel, and Kaolack (see Figure 1). In fact, only 6 of the 102 domestic workers participating in this survey were born in Dakar.



Figure 1: Distribution of Regions of Origin

Domestic workers are hired to provide a variety of services for their employers. While some may perform only specific tasks such as laundry, childcare, or cooking, the majority spends the entire day at the home of their employer, doing any and every household chore asked of them. About one third of the domestic workers surveyed also lived in the home of their employer, a benefit that on one hand alleviates the cost of rent, but on the other often leads to

working late hours. Work arrangements are often informal, with no written contract. Domestic workers usually secure employment through an acquaintance or family member, an employment

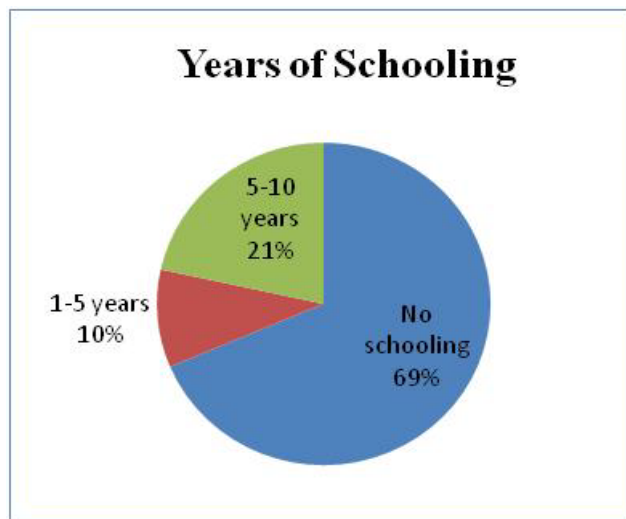


Figure 2: Domestic Workers' Formal Schooling

“agency”, or by simply going door-to-door. Their employment situation is often tenuous; the median tenure of survey respondents was just 5 months. Because of the informality of their working situation and lack of awareness of their legal rights, domestic workers are extremely vulnerable to violence, sexual harassment and abuse, false accusations of

stealing, and failure to be remunerated for their services. Even those who are not victims of outright abuse often withstand less than ideal working conditions. Many have only one day off every two weeks, and are treated unkindly by their employers. “The people we work for treat us like slaves” says Mossane Ndiaye, a domestic worker living in Dakar (Faye 2006).

Almost all domestic workers have either no formal education at all, or dropped out shortly after completing primary school, usually in order to migrate and begin work. This generalization is reflected in the survey data; 69% of respondents had never been to school, and the rest

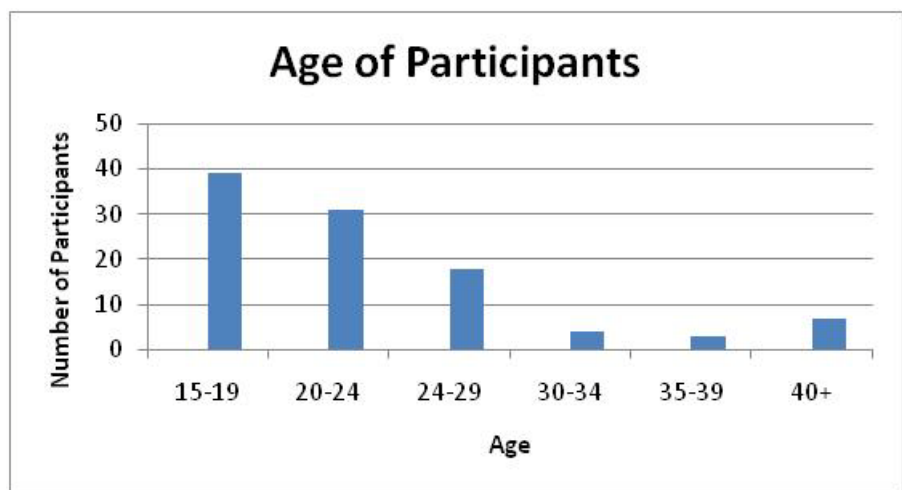


Figure 3: Age Distribution of Participants

had completed an average of just 5.6 years of schooling (see Figure 2). The ages of the domestic workers also explain why many are uneducated; about 1/3 of respondents were of school age (see Figure 3). Thus, alternative opportunities for employment are severely limited for most domestic workers. However, many take solace in the hope of returning home to marry or have children. About 85% of survey respondents reported plans to ultimately return to their village of origin. This also explains why there are so few domestic workers over the age of 30.

5.0 COLLECTION AND ANALYSIS OF SURVEY DATA

One hundred and two domestic workers were interviewed in May-June of 2010 in Dakar, Senegal. The survey was implemented in Senegal's national language, Wolof (spoken by all respondents) with the assistance of a translator. Participants were recruited using referral. The investigator began by interviewing the domestic workers of personal acquaintances, and continued by being referred to other potential participants by the employers or the domestic workers themselves. Unfortunately, it was not possible to use random sampling techniques because domestic work is traditionally informal, and there is no record or registration of domestic workers in Dakar. Additionally, certain employers are hesitant to allow access to their domestic workers due to fear of legal or human rights issues. It is probable that the implemented method of participant recruitment led to a bias towards domestic workers from similar backgrounds. However, a similar method was implemented by Dostie and Vencatachellum (2002), and the data collected appears consistent with the expected characteristics and backgrounds of domestic workers in Senegal, as will be detailed in the following section.

All survey respondents were women, with ages ranging from 15 to 50 (see Figure 3). Workers younger than 15 were not interviewed, as that is the legal age for work in Senegal, though only two potential respondents were turned away for this reason. The distribution of ages was heavily skewed to the left: 75% of domestic workers interviewed were under 24 and the median age was 21. However, the average age when respondents reported beginning work was

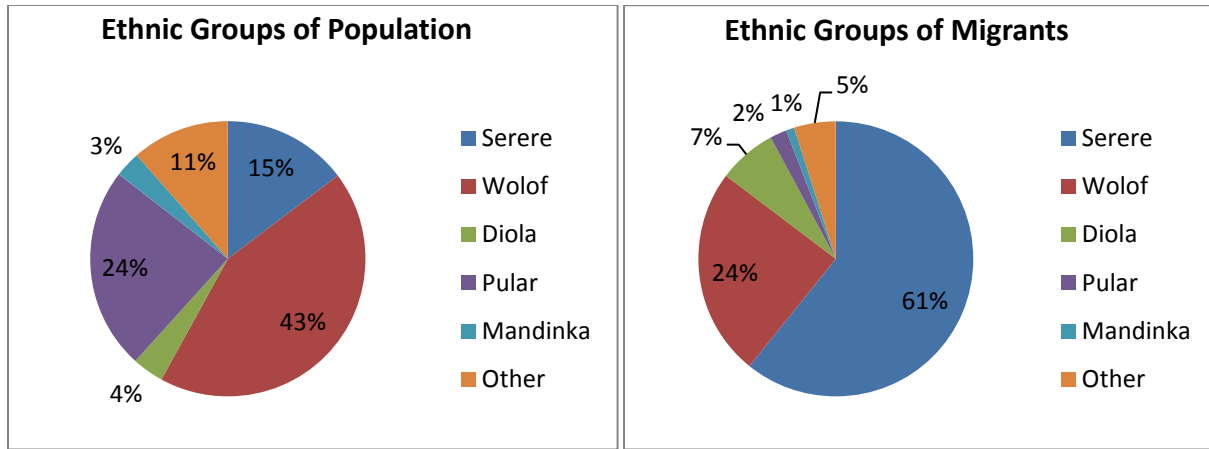


Figure 4: Distribution of Ethnic Groups, Population **Figure 5: Distribution of Ethnic Groups, Sample**

14.5 years old. About 35% of respondents were married, but only 32.3% had children (not all of those who had children were married), and only 14.7% had children over the age of six.

The vast majority of survey respondents came from the groundnut basin regions of Thies, Fatick, Diourbel, and Kaolack (see Figure 1). Only six of the domestic workers interviewed were born in Dakar. Somewhat surprisingly, Serere women were about two thirds of the sample population, while that ethnic group makes up less than one sixth of the general population (see Figures 4 and 5). This could be due to the fact that migration is often seen as a rite of passage for young Serere woman, but may also be a result of the non-random sampling technique. These women did not have any defining characteristics in common besides their ethnicity, so it is unlikely that this will impact results. Almost 27% of the sample had lost their fathers, and only 68% had both parents still living. The domestic workers came from families with an average of over 6 children, higher than the national fertility rate of 4.8 births per woman (The World Bank). If their families were working, they were usually farmers, and almost a quarter of the domestic workers were seasonal migrants and returned home for the harvest period. See the Appendix for a summary of statistics on respondents.

The mean salary was 28,800 CFA francs per month, or just under \$140 PPP (Penn World

Tables). However, around one third reported also receiving room and board from their employer, and 51% said they received non-monetary benefits such as meals, gifts, or medical expenses. Although it is questionable as a standard for living wage, the minimum wage in Senegal is 209 CFA francs (around \$1 PPP) per hour, or 33,440 CFA francs per month based on a 40 hour work week (U.S. State Department). Thus, with additional benefits, domestic workers earn a wage on par with the minimum. On average, domestic workers sent 48.4% of their income to the head of the household in the community of origin. Only three domestic workers remitted nothing, and three remitted 100% of their salaries. This figure is on the high end of average remittance rates calculated in similar studies, but is not surprising considering the close relationship of domestic workers with their home regions, as demonstrated by return seasonal migration, and intentions to return.

6.0 METHODOLOGY

The data was analyzed using Ordinary Least Squares (OLS) estimation. Much of the remittance literature uses a standard Tobit regression model due to a high number of "0" observations.

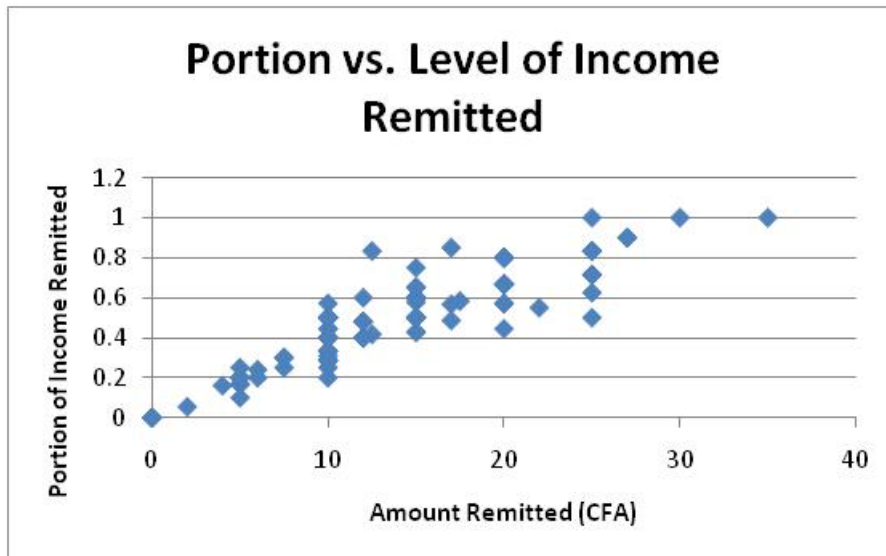


Figure 6: Relationship between Amount and Percent of Income Remitted

"percent of income remitted to parents or head of household" was regressed on potential explanatory variables based on information from the surveys. Though many studies in the literature on remittances use the log of the amount remitted as the dependent variable, the percent of income remitted reveals information on the migrants' willingness and ability to sacrifice a portion of their earnings. In this case, the level of remittances and the percent of income remitted were also highly correlated (see Figure 6). Salary was controlled for but not found to have a significant relationship with percent of income remitted.

However, as only three participants in this study reported remitting nothing, and only two 100% of their income, use of OLS was sufficient. The dependent variable

The following equation was estimated:

$$\hat{Y} = \beta_0 + \beta_1(\text{age}) + \beta_2(\text{age}^2) + \beta_3(\text{children}) + \beta_4(\text{children}^2) + \beta_5(\text{age when starting work}) + \beta_6(1 \text{ if father deceased}) + \beta_7(1 \text{ if from Diourbel}) + \beta_8(1 \text{ if Seasonal Migrant}) + \beta_9(1 \text{ if autonomous in migration decision})$$

Due to the general homogeneity of the domestic workers interview, there was concern that certain participants who seemed to stand out due to their old age, higher than average salary, or because they were divorced. Following a strategy promoted by Belsley, Kuh, and Welsch (1980), the DFITS statistic was used to test if certain respondents were associated with high combinations of residuals and leverage statistics. However, no participants were found to have a DFITS statistic over $2(k/n)^{1/2}$ where k is the number of explanatory variables and n is the number of observations under consideration.

For age and number of children, observations are heavily concentrated on the smaller end, so heteroskedasticity was also a concern. It is possible that this could lead to bias in the coefficients or prevent us from getting an accurate idea of the relationship between remittances and higher number of children. However, the Breush-Pagan/Cook-Weisberg test failed to reject the null hypothesis of constant variance at the .10 significance level, and a regression with robust t-statistics did not change the results enough to warrant inclusion.

Although remittances are generally calculated using only data from migrant workers, six of the interviewed domestic workers were born in Dakar. These participants did, however, report remitting (or transferring money) to the household of their parents, and were therefore included in the analysis.

7.0 RESULTS AND DISCUSSION

Detailed charts characterizing the primary regression and the relationships individual explanatory variables with the percent of income remitted can be found in Tables 2 and 3 at the end of this section. The following results have been established. Age is found to have a positive and statistically significant association with percent of income remitted initially, followed by a decrease in this effect for older respondents. The turning point is at around 34 years of age. This result holds both in the final regression isolating the relationship between percent of income remitted and age.

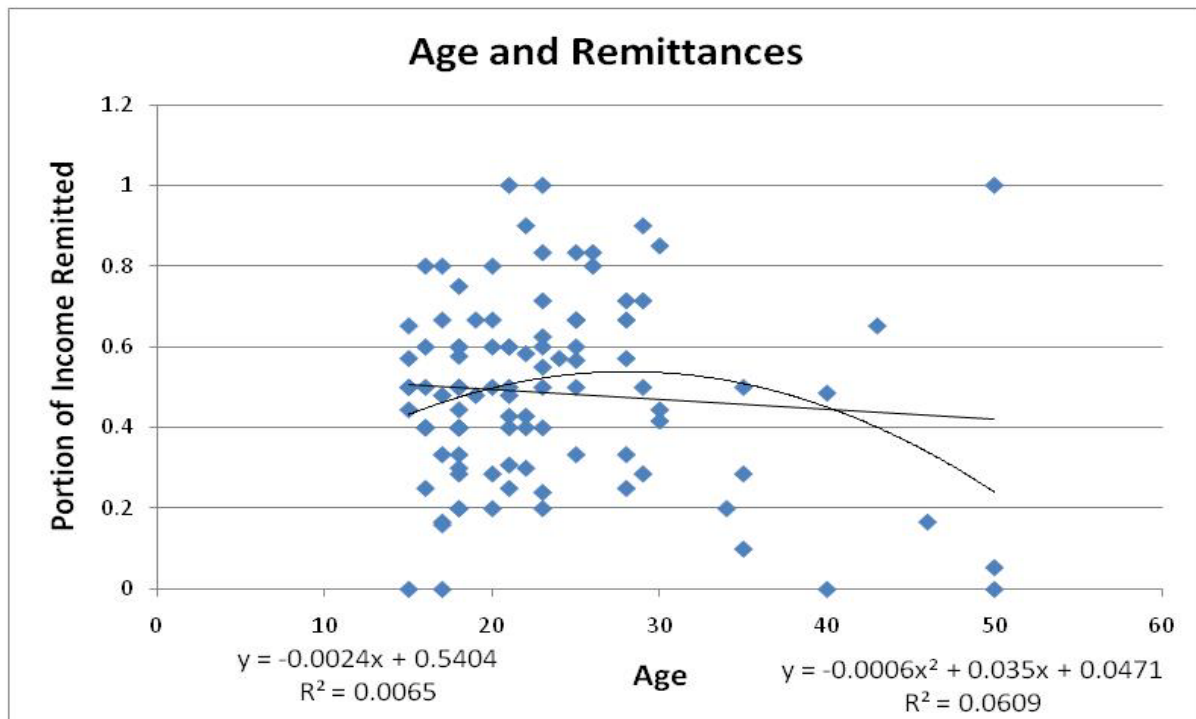


Figure 7: Relationship between Age and Percent of Income Remitted

Please see Figure 7 for a linear and quadratic representation of the relationship between age and percent of income remitted. Evidently, the quadratic estimation is a much better fit than the linear equation. These findings are partially consistent with those of Dostie and Vencatachellum's 2004 study on domestic workers, which found that the probability of observing voluntary remittances to increase with age, though the actual amount decreases.

However, it is important to note that any relationship between the domestic worker's age and her remitting behavior evidently interacts with the effect caused by the domestic worker's children. The strong positive relationship between age and number of children can be seen in

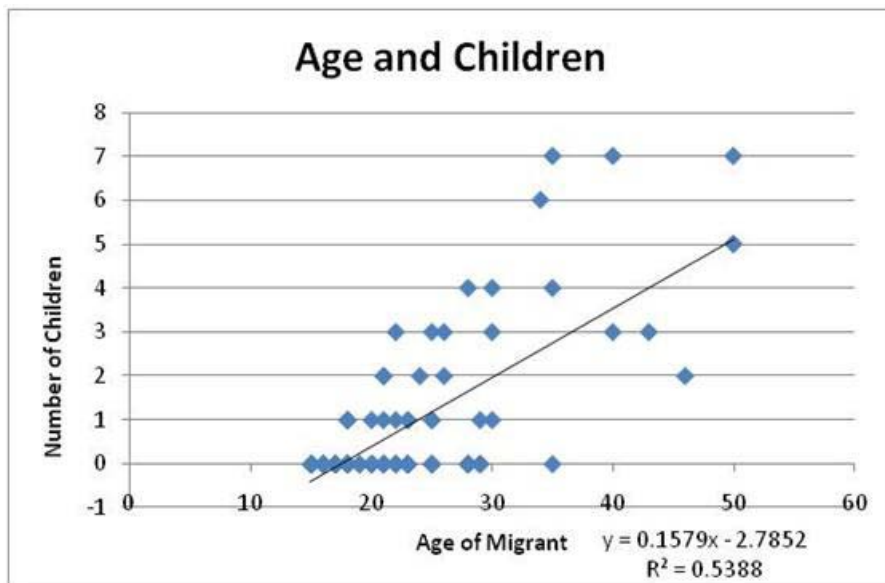


Figure 8: Relationship between Age and Number of Children

Figure 8. The relationship between remittances and number of children is concave, and more statistically significant than the age effect. This can be seen in the graphical representation of Figure 9. In fact, when

only age and children are included in the regression, age is not statistically significant, though its relationship with percent of income remitted remains the same. To see the interaction between age and children, consider that a 22 year old migrant is expected to remit about 2.5% more of her income than a 20 year old migrant, according to the coefficients in the primary regression. However, if that 22 year old migrant has once child, she is expected to remit almost 10% more of her income, holding everything besides age and children constant. The effect of additional

children is positive and maximized at two children, but decreases and eventually becomes negative after four children. See Figure 13 in the Appendix for information on the distribution of number of children in the sample.

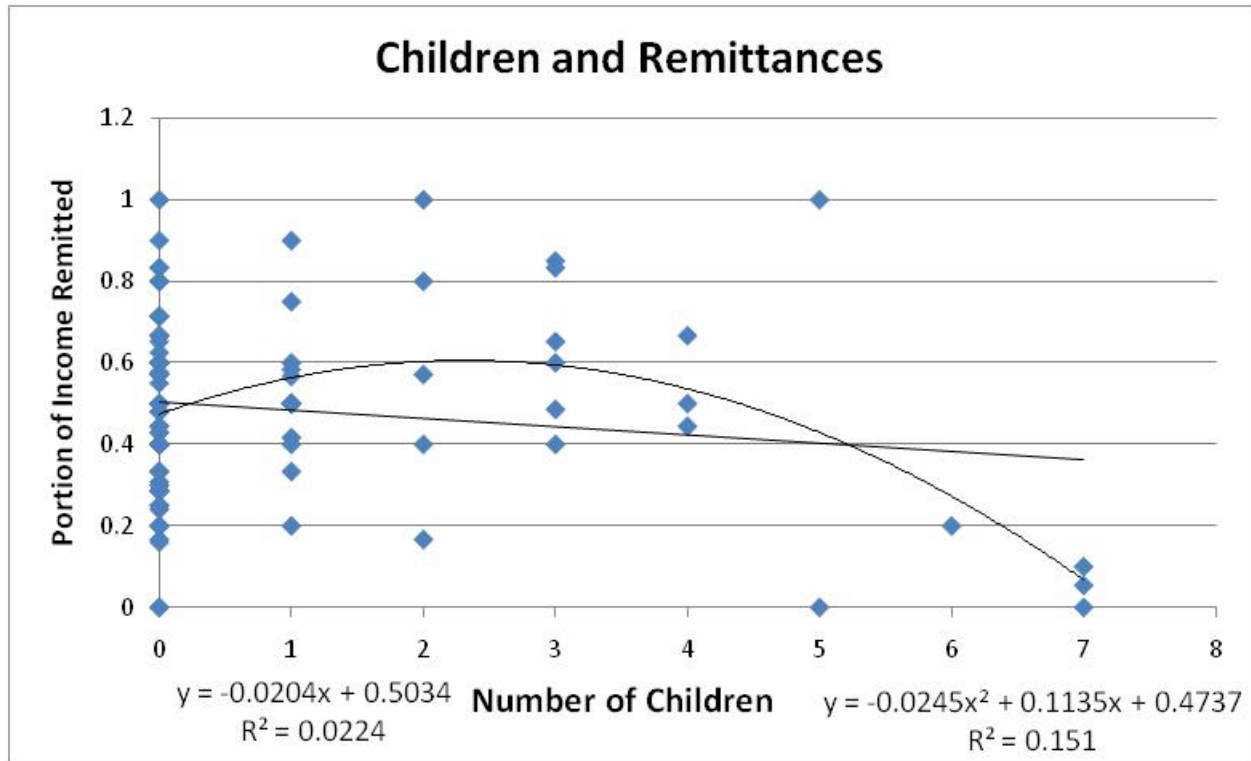


Figure 9: Relationship between Children and Percent of Income Remitted

This initially positive relationship between number of children and remittances might be evidence for an exchange motivation for remitting. That is, migrants with only one or two young children leave them in the care of their grandparents in order to be free to migrate for work. The migrants then send additional remittances to cover the costs of caring for the child such as school supplies and clothing. Regrettably, no data was collected on the location of the migrant’s children, which limits the confidence behind this hypothesis. However, conversations with the migrant workers outside the context of the formal survey did suggest that leaving children at home was a common practice, so it is certainly a plausible explanation for the pattern observed in the data. This explanation also supports the exchange for services hypothesis first proposed

and supported by the research of Lucas and Stark in Botswana. The negative relationship observed between remittances and number of children for migrants with a higher number of children can also be reconciled with this exchange hypothesis. A higher number of children, most likely older, could indicate that the domestic worker is supporting her children and does not have as much money available to send to her parents. However, only 9 of 102 respondents actually had 4 or more children, so it is unclear whether predictions in this range are likely to be representative of actual behavior. Specifically, the results of the analysis are highly influenced by the three workers with seven children, who all remitted very little. To get a clearer picture of the relationship between

children and remittances, I remove all respondents with four or more children. The results of this analysis can be seen in Figure 10.

The quadratic term becomes insignificant, but there is clearly still a positive

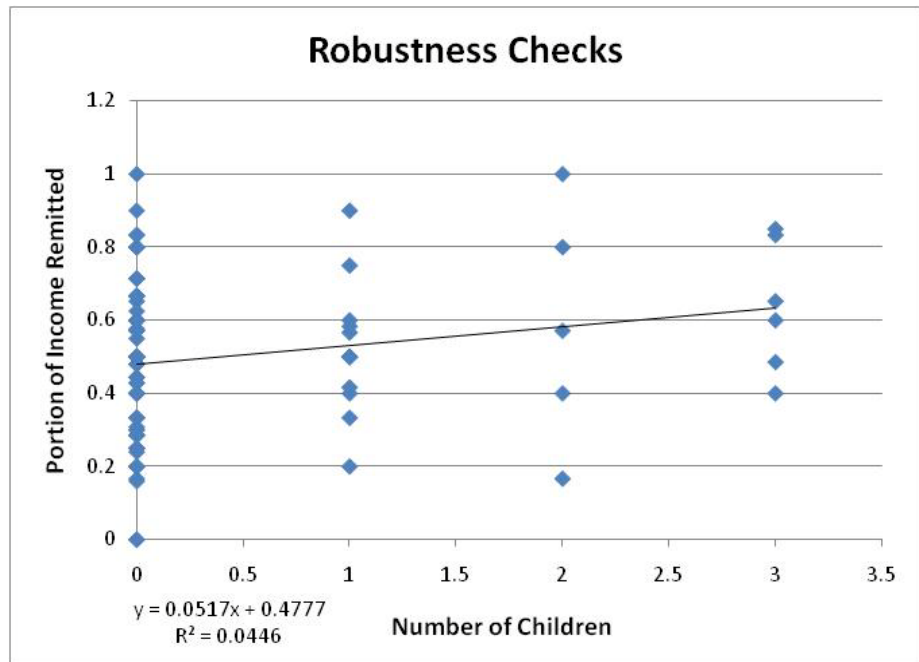


Figure 10: Relationship between Number of Children and % of Income Remitted with Potential Outliers Dropped

linear relationship between children and remittances, which is significant at the .05 level. However, the overall importance of children also decreases; number of children explains only 4.5% of the variation in percent of income remitted. Given the limitations of the information collected in the sample, it would be worthwhile to devote further study to the relationship

between remittances and the migrants' children, as it appears to be a relevant factor.

Another important factor in determining remittance rate was the whether or not the domestic worker's father was deceased. Respondents whose fathers had died had an expected 14.5 point decrease in their remittance rates. This figure was also significant at the .01 level in the primary regression, and significant at the .05 level in a regression describing only the relationship between percent of income remitted and whether the domestic worker's father had died. This result is somewhat difficult to interpret without knowing specific data on the economic contributions of the domestic worker's family members. If the father's work was the family's primary source of income, it is much less likely that the domestic worker's family would be able to support her in case of hard times. In this case, the domestic workers' behavior supports an insurance motive for remitting. It is also important to take into consideration that if the migrant's father has died, there is one less person in the family to support, and therefore a decreased need for remittances. In this case, the migrants' behavior supports an altruistic motive for remitting. However, this theory seems unlikely because there was no statistically significant relationship between percent of income remitted and the number of the migrants' siblings.

The original variable of interest, the domestic worker's status as a seasonal migrant, was also found to have a statistically significant impact on remittances. Seasonal migrants were expected to remit almost 10% more than their non-seasonal counterparts. This is logical as a domestic worker who spends three months of each year in her village will have a stake in the community and her family's financial solvency. This is also consistent with the literature that has found that visits home and plans for return migration are correlated with higher remittances. One important characteristic to note about seasonal workers is that these migrants appear to be either very young or concentrated at the older end of the sample (see Figure 12 in the Appendix).

The preponderance of seasonal migrants in the 15-19 age range seems to be because seasonal migrants eventually decide to return home permanently, or stop participating in the harvest. Some of the non-seasonal migrants interviewed mentioned that they used to go home for the harvest, but had stopped and decided to live in Dakar permanently.

Table 2: Regression Results

Determinants of Domestic Worker's Remittances			
Dependent Variable: Percent of Income Remitted, Observations: 102			
	Children Only R ² =.02, Adj R ² =.01	Age and Children only R ² = .17, Adj. R ² = .14	Primary Equation R ² = .35, Adj. R ² = .29
Explanatory Variable		Coefficient (T-Ratio)	Coefficient (T-Ratio)
Age		.02364 (1.55)	.03168** (2.13)
Age Squared		-.00038 (-1.53)	-.00046** (-1.99)
Total Number of Children	-.02007 (-1.50)	.10187** (2.57)	.09654** (2.53)
Total Number of Children Squared		-.02235** (-3.49)	-.02250*** (-3.78)
1 if Father is Deceased			-.14499*** (-3.02)
1 if Seasonal Migrant			.09604** (2.08)
Age when respondent began work for pay			.00975** (2.18)
1 if Domestic Worker Decided on her own to Migrate			-.11034** (-2.26)
1 if from Diourbel			.09445** (2.02)
Constant			-.040107 (-0.20)
***=significant at .01 level, **=significant at .05 level, *=significant at the .10 level "--" denotes negative relationship between percent of income remitted and explanatory variable			

The age at which a domestic worker started working was also positively correlated her remittances. Respondents who didn't start work until later in life were likely to remit more,

likely because they were supported by their family for a longer period of time. In this case, it seems again as though the migrants were motivated by a desire to repay their family for benefits they have received. Participants who reported making an autonomous decision to migrate for work were expected to remit less than those whose decision was made by a parent or elder. This takes into account the "compulsory" aspect of remittances; it is probable that many domestic workers remit due to social pressure or orders from their parents. Though this is a difficult condition to measure, the domestic worker's response about whether her decision was autonomous gives us some insight. Finally, it was also found that domestic workers from the region of Diourbel were expected to remit about 9% more of their income than migrants from other regions. One possible explanation for this pattern is that Touba, the headquarters of the Mouride brotherhood a Sufi order of Islam, is located in Diourbel. The teachings of Mouridism emphasize hard work and devotion to the marabout (spiritual guide). Giving money for the poor to the marabout during the yearly pilgrimage to Touba, or near the festival of Tabaski (Eid al-Adha), is expected, and said to bring good fortune (Flynn, 2007). It is possible that Mourides from this region remit more in order to add to their family's contributions to the marabout.

Table 3: Individual Variable Regression Results

Individual Variable Regressions on Percent of Income Remitted (Including Quadratic Terms)									
Dependent Variable: Percent of Income Remitted, Observations: 102									
Variable	Age	Age Squared	Children	Children Squared	1 if father deceased	1 if seasonal migrant	Age starting work	1 if decided to migrate	1 if from Diourbel
Coefficient (T-stat)	.03450** (2.20)	-.0006** (-2.39)	.11434*** (3.14)	-.02459*** (-3.93)	-.10563** (-2.10)	.05794 (1.09)	.00724 (1.64)	-.08228 (-1.51)	.08969* (1.77)
[R ² , Adj. R ²]	[.06, .04]		[.15, .14]		[.04, .03]		[.01, .00]	[.03, .02]	[.02, .01]
***=significant at .01 level, **=significant at .05 level, *=significant at the .10 level "--" denotes negative relationship between percent of income remitted and explanatory variable									

8.0 CONCLUSION

Using data from an original survey of over 100 domestic workers living in Dakar, Senegal, this paper analyses the determinants of internal remittance and obtains three major results. First, status as a seasonal migrant is associated with a statistically significant increase of almost 10% of income remitted. Second, having a small number of children is associated with an initial increase in percent of income remitted, while having a higher number of children is correlated with lower remittances. Finally, migrants with a deceased father remit on average around 14.5% less of their monthly income to their remaining head of household than those with a living father.

These findings lend important insights into our understanding of remitting behaviors, and could have policy implications. The knowledge that seasonal household income fluctuation is often a motive for the temporary migration of young girls is important to the issue of early school drop-out rates. Though it is difficult to discourage this practice (indeed, many families rely on it), the development of a program facilitating seasonal migration which offers job placement and night classes could alleviate many of the issues associated with migration and domestic work. This would not only help domestic workers to continue their education, but it would diminish some of the risk factors related to migration. In addition, as having children residing in the home community seems to be a major motive for remittances, a fund for children's issues could be created to pool these resources. It could be used to supply school materials such as books and uniforms, or even to fund universal vaccinations for young children.

Though this study has revealed interesting and novel results, there are still plenty of questions remaining related to remittance behaviors. Future studies could ask participants directly about the purpose of their remittances. Demonstrated characteristics and behaviors reveal the nature of motivations, but a direct question could reveal subtleties about each migrant's situation. For example, perhaps a migrant has a sick family member and remits to help pay for the cost of healthcare. Surprisingly, there is no data in any of the previous studies which addresses this issue. The correlation between number of children and remittances should also be studied further in the context of internal migration. As data on the location of the migrants' children was unavailable for analysis in this study, it would be useful to obtain data which could confirm the hypothesis that young children often stay in the home community, and that remittances increase as a result. A more extensive study with a larger sample would also help to clarify the behavior of migrants with many children, as they did not constitute a large portion of this sample. Furthermore, an analysis of the remitting behaviors of male seasonal migrants could be insightful in showing whether this is a gender related phenomenon. Overall, this study has made meaningful contributions to the literature on determinants of remittances, specifically in relation to the role of seasonal migration and number of children in remittance behavior.

APPENDIX A

ADDITIONAL INFORMATION ON SURVEY RESPONDENTS

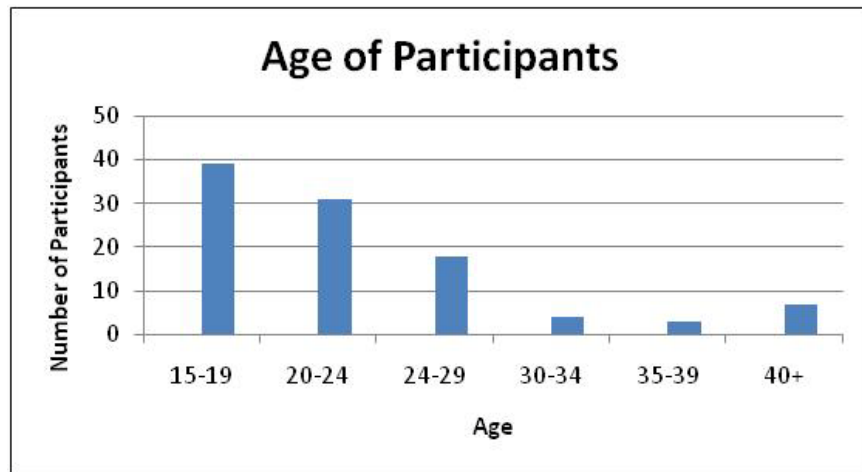


Figure 11: Age Distribution of Participants

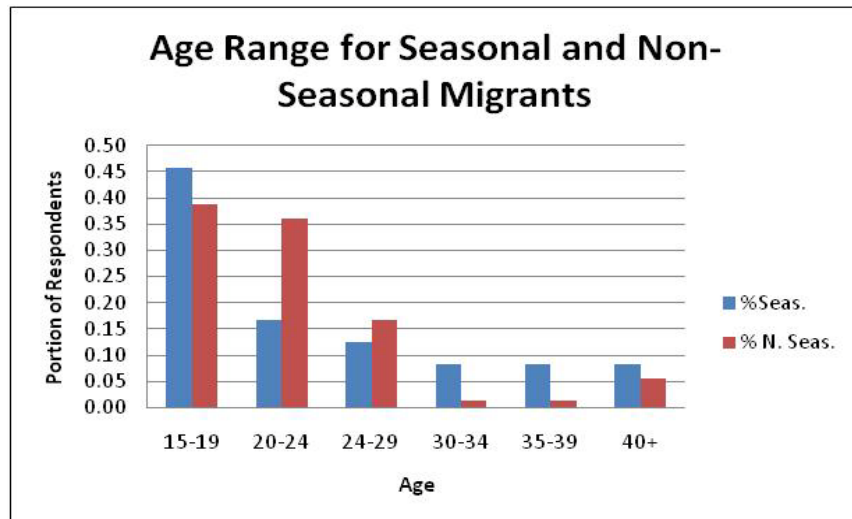


Figure 12: Age Distribution of Seasonal and Non-Seasonal Workers

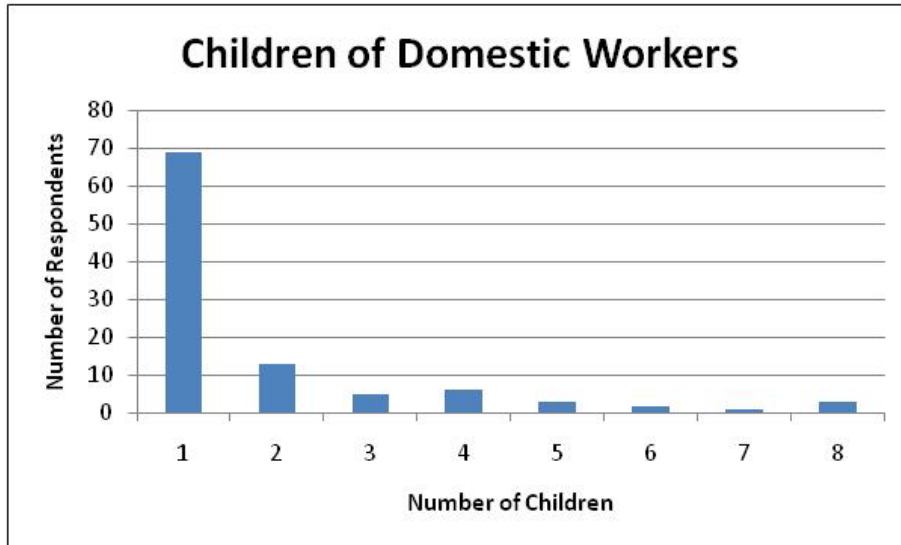


Figure 13: Distribution of Number of Children among Migrants

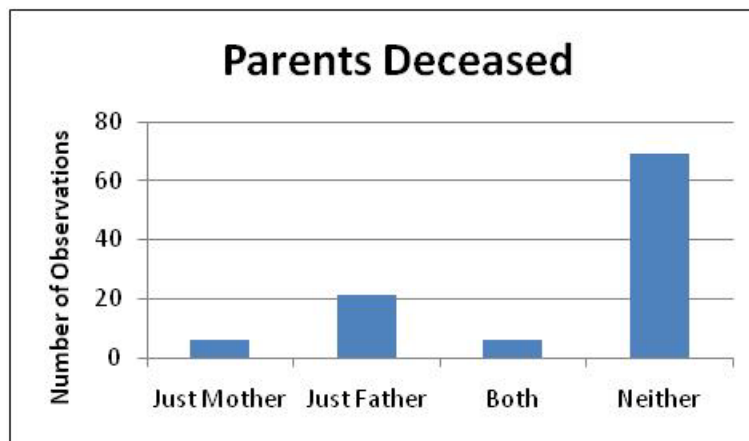


Figure 14: Frequency of Deceased Parents among Respondents

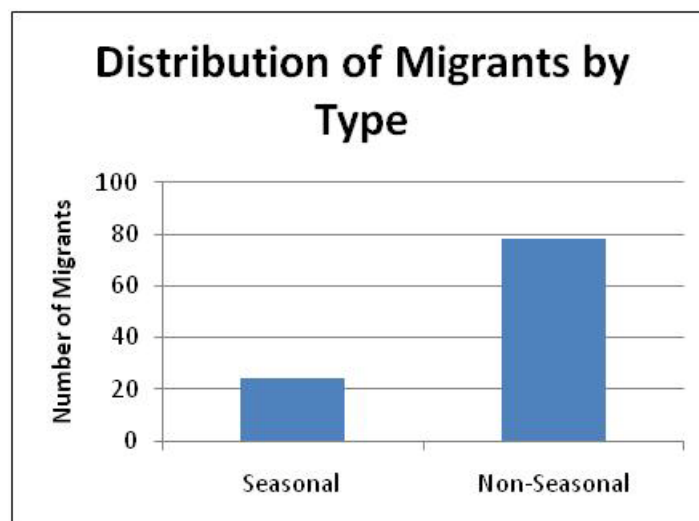


Figure 15: Portion of Seasonal and Non-Seasonal Workers

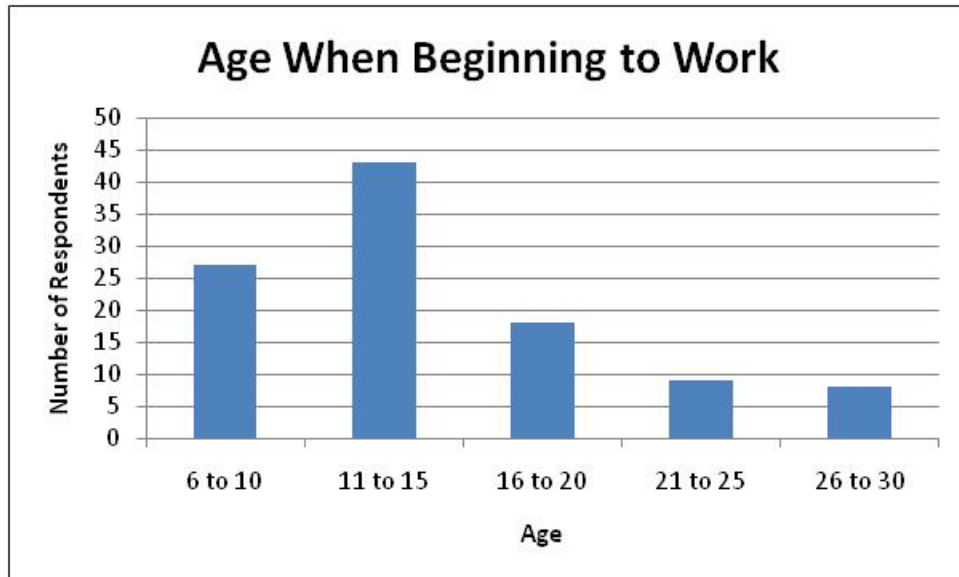


Figure 16: Distribution of Ages that the Respondents Reported Beginning to Work for Wages

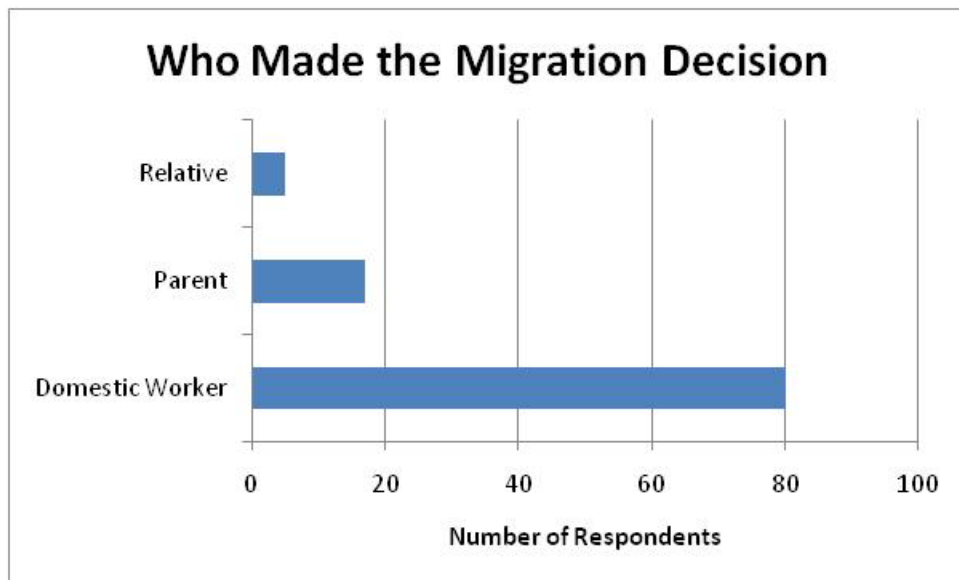


Figure 17: Autonomy of Domestic Workers

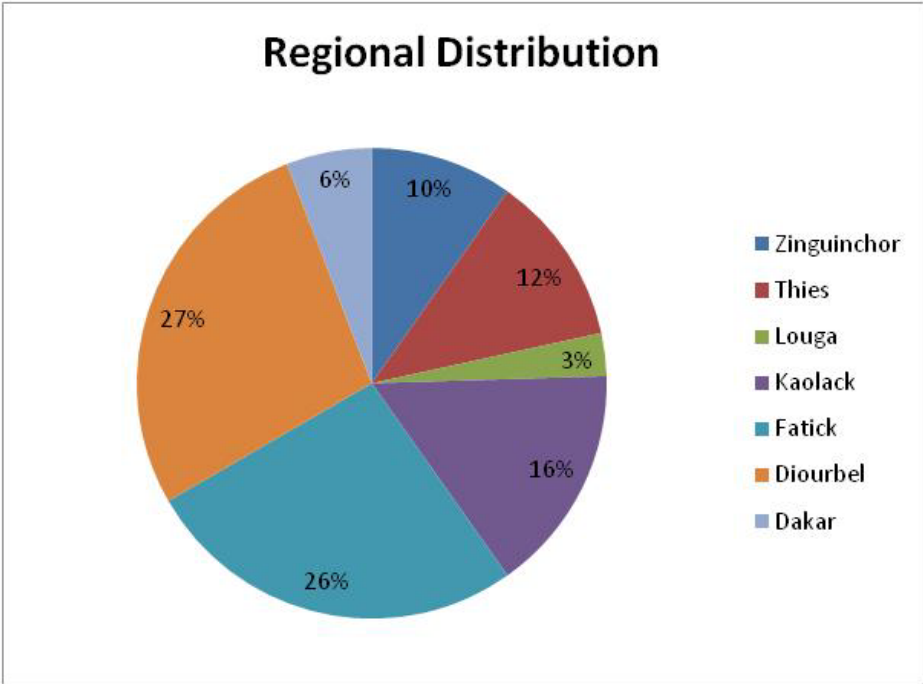


Figure 18: Distribution of Geographical Origins of Respondents

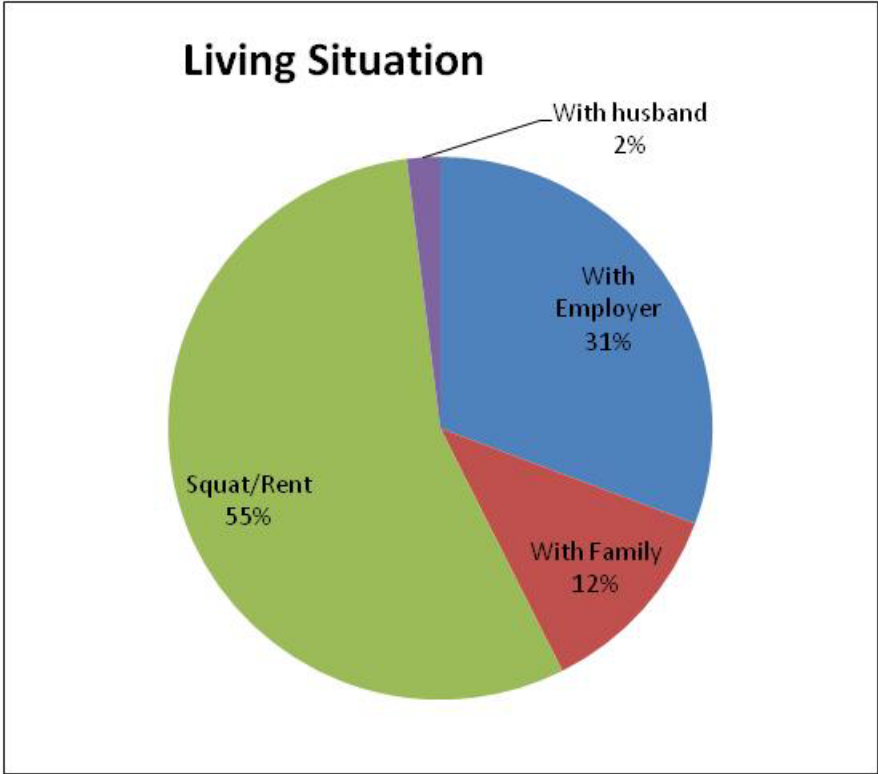


Figure 19: Living Situation of Respondents

Table 4: Additional Descriptive Statistics

Additional Descriptive Statistics on Surveyed Population	
Mean Salary	28,800 CFA
Mean Remittance Rate	48.5% of Salary
Most Common Ethnicity	Sérère (60.7%)
Mean Number of Siblings	5.3
Percent of respondents whose parents are farmers	75.50%
Percent of respondents whose parents are not working	20.60%
Mean Tenure	15.6 months
Median Tenure	5 months
Mean number of years since migration to Dakar	7.5 years
Rate of Domestic Workers making an autonomous decision to migrate	78.40%
Literacy Rate	19.6%
Median age when starting work	13 yrs old
Marriage Rate	35.3%
Respondents who are Seasonal Migrants	23.5%

APPENDIX B

QUESTIONNAIRE

1. Age:
2. Gender:
3. Neighborhood in Dakar:
4. Marital Status:
5. Children (Age, Gender):
6. Literacy: Y/N
7. What language(s) can you speak?
8. What was your last completed level of formal education?
9. Village/Region of Origin:
10. Ethnic background:
11. Parents (Age):
12. Siblings (Age, Gender):
13. How many of your siblings have migrated in search of work? Do they send money to your parents or household?
14. Do any family members live in Dakar? If so, what are their relationships to you?
15. What is your parents' primary occupation?
16. Does your family engage in any other income generating activities outside of their primary occupation (ex: sale of vegetables, eggs, crafts)?
17. Does your family own land?
18. Do you or have you ever received financial assistance in the form of a loan from your family?
19. How often do you return home to visit your family? What is a typical duration of this visit?
20. Do you return home during a specific time of the year in order to do agricultural work for your family? If so, during which months do you return home?
21. Who made the decision for you to work in Dakar?
22. At what age did you begin working for wages?
23. How long have you lived in Dakar?
24. How were you able to find your current household?
25. How long have you worked for your current employer?

26. Do you live with your employer? If not, with whom do you live?
27. How much are you paid each month?
28. Do you or your family receive non-monetary benefits from your employer (housing, meals, medical services, gifts, etc)?
29. How much of your wages are sent directly from your employer to your family (monthly)?
30. How much of your remaining wage do you voluntarily give to your family?
31. Does the amount you send back to your family vary? If so, what is the reason for the changes?
32. Do you have any savings?
33. Do you intend to stay in Dakar? If not, will you return to your family?

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