# EQUITY IN HIGHER EDUCATION: SOCIOECONOMIC STATUS AND ITS EFFECT ON ACCESS TO HIGHER EDUCATION IN POST-SOCIALIST MONGOLIA

by

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# EQUITY IN HIGHER EDUCATION: SOCIOECONOMIC STATUS AND ITS EFFECT ON ACCESS TO HIGHER EDUCATION IN POST-SOCIALIST MONGOLIA

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Higher education participation has grown worldwide in the past two decades. Mongolia is not an exception. Higher education enrollment grew twelve-fold in Mongolia after the collapse of socialism. This dissertation examines whether the higher education enrollment increase has improved the opportunity to access higher education for students from lower income families.

The dissertation addressed the following research questions. To what extent does socioeconomic status influence access to higher education in post-socialist Mongolia? To what extent are government financial assistance programs reaching their target groups? And, how has the role of socioeconomic status in influencing access to higher education changed in the past two decades?

Using probabilistic data from cross-sectional Household Social and Economic Survey in Mongolia from 2008 and 2011, I ran logistic regressions, multinomial regressions, age-cohort analyses, and cross-tabulations to find answers to these questions. The statistical models were based on economics and sociology of education literature and status attainment theories. Sequential model building technique was implemented.

The key contribution of this study is the innovative approach in creating a composite socioeconomic status variable (SES) out of six sub-scales, taking advantage of the wealth of information on diverse household revenues and expenditures available in the household surveys. The key findings of this study include: family background (SES) is a highly significant predictor of college access in post-socialist Mongolia. As of 2012, government financial assistance programs lack strong priorities, rather demonstrating a flattened-out distribution of the limited resources among students from the entire societal spectrum. Female students have higher probability of accessing higher education than their male counterparts throughout all four locations of residence.

Age-cohort analyses revealed that socioeconomic status was a significant predictor of college access for all age-cohorts whose college entrance years ranged from 1994 to 2010. The effect of family background remained relatively stable for these years. Predicted probability of attending college increased for three older age-cohorts, except the fourth—the youngest cohort. And the increase in the probability of attending college from one generation to another was less for the lower SES groups and larger for the highest SES groups.

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**PREFACE**

I dedicate this journey of my doctoral program and dissertation to my partner Batjargal Namjil for the sacrifices and patience he has shown his family.

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# 1.0    BACKGROUND AND STUDY PROBLEM

This is a study of equality of opportunity in higher educational attainment in Mongolia. In recent years, enrollment in secondary and post-secondary education in Mongolia has expanded. Until 1990, the country enjoyed high levels of      educational attainment that came about as a result of seven decades as a Soviet satellite country. Beginning in the early 1990s, following the notorious collapse of the socialist system worldwide, enrollment rates in education in Mongolia started declining. The so called "transitional period," which marked the post-socialist Mongolia struggling to build a free market economy with democratic values, meant a system-wide change in all spheres of the country—political and social.

These changes were abrupt and dramatic. Yet, for the last twenty years, Mongolia has relentlessly pursued free market oriented economic development that mandates democracy, human rights, and political pluralism, and has claimed significant improvements in educational attainment. Aggregated enrollment data for primary, basic and secondary levels of education show levels of attainment at or close to the same levels as during the socialist period.

The story behind the higher education system in Mongolia and its development during the socialist and post-socialist era is, however, rather unique in comparison to the lower levels of the education system. Enrollment at highly elite higher education institutions, which comprised about fifteen to twenty% of the relevant age cohort prior to the dismantling of the socialist

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system, experienced a substantial increase. Since the early 1990s, the higher education system has expanded largely due to the institutional diversification and an increase in enrollment.

Educational enrollment increase is not unique only to Mongolia. The world has been witnessing this phenomenon especially over the last couple of decades. As education systems expand and enrollments soar, however, an important question begs an answer: Is the educational growth affecting everyone equally? Does educational expansion contribute to social justice, and how? Inquiries regarding the relationship between educational growth and social justice as well as equality of opportunity have been a primary focus for some researchers, especially those interested in the sociology of education, for several decades.

This study aims to explore the current state of opportunity in higher educational attainment in Mongolia with a particular emphasis on equity in higher education. Equity in higher education is a complex matter. It encompasses access to higher education and completion or graduation followed by successful employment in the labor market. Making higher education more equitable in any given society requires addressing these three levels thoroughly.

However, this study will specifically focus on equity in access to higher education. The significance of equity in access is concerned with individuals' prior socioeconomic backgrounds, higher education cost, family factors, as well as many other circumstances. These aspects are often related to social origin, including ethnicity, race, language and region of residence, to name a few. This study will explore equity in access to higher education with a specific emphases on individuals' socioeconomic backgrounds.

The study will, therefore, examine the past and current states of the higher education system in Mongolia and the policies intended to make the higher education system more socially

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just and equal. Moreover, it will pay specific attention to the paradigm change in higher education finance during the post-socialist transformations and their effects on students from lower income families in Mongolia. In doing so, the study will construct a measurement for the socioeconomic status of individuals and test its effect on access to higher education in post-socialist Mongolia.

## 1.1    CONTEXT OF THE STUDY: TRENDS IN CENTRAL ASIAN POST-SOCIALIST COUNTRIES

This section will describe the importance of accessing and obtaining a higher education degree in post-socialist Central Asia and Mongolia, and how the issue of equity in access to higher education is more crucial, nowadays, in individuals' future social and economic statuses in the region than about two decades ago.

Higher education presents a high stake in individuals' future socioeconomic status worldwide. The implication of human capital theory, that educational investment increases human productivity thus is directly related with their future income, is widely observed in all regions of the world because attaining a college degree makes a significant difference in individuals' lives. On average, in the United States, a college graduate makes 84% more over a lifetime than their high school-educated counterparts (Carnevale et al., 2011). In 1996, in Organization for Economic Co-operation and Development (OECD) countries, men aged 25-64 who had completed a higher education degree could expect 5.6 more years of employment

during their working lifetimes than men who had not completed secondary education (World Bank, 2000).

The situations in former socialist countries in Eastern Europe are similar too. The corresponding figures for the Czech Republic, Hungary and Poland are 10.8, 13.3, and 8.8 years, respectively (World Bank, 2000, p. 29). Between 1993-1996, household poverty in Belarus, the Czech Republic, Estonia, Hungary, Poland, Romania and the Slovak Republic was closely related to the education of the head of the household. Higher education essentially guaranteed that a household would not be poor whereas households whose primary income earner had completed only basic education were 20-60% more likely to be poor than the average household (Milanovic, 1998, p.68-69 cited by World Bank, 2000, p. 29).

Former socialist countries in the Central Asian region portray similar images. There is a high return to higher education in Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan, as well as in Mongolia (World Bank, 2007; 2010). In all of the first four countries, poverty rates were less for those with a higher education than those with lower levels of education. For example, in Kazakhstan, 7% of those with a higher education lived on less than $2.15 per day, while the percentage for those who lived with the daily expenditure with no education or unfinished primary education was 19%.

In some Central Asian nations, the stakes are even higher. Poverty rates, for example, for those with a higher education degree and without one in the Kyrgyz Republic were 41% versus 92%, 50 versus 75% in Tajikistan, and 24 versus 48% for Uzbekistan (Brunner & Tillet, 2007, p. 59). Other studies also highlight similar evidence in displaying relationships between educational attainment, employment status, wage levels and poverty levels in former socialist countries in

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Europe and Central Asia (Weidman et al., 2004; Vicol, 2005). Consequently, educational qualifications are more important today than they were during the communist era in the post-socialist regions.

The importance of equal access to higher education has been emphasized repeatedly by international agencies in their declarative documents. The World Conference on Higher Education in 1998 highlighted the significance of more equitable access. The Universal Declaration of Human Rights has been reaffirmed by UNESCO in Article 26 (1) stating, "Everyone has the right to education… higher education shall be equally accessible to all on the basis of merit" (UNESCO, 2009, p. 37). In former socialist countries, equity in higher education has become an issue of more importance since there is rising inequality in these countries. The increase in the inequality gap has been more dramatic in Russia, Ukraine and Bulgaria, outpacing the yearly change of Gini coefficient increase in the UK and U.S. by three to four times (Milanovic, 1998 cited in World Bank 2000, p. 20).

Undoubtedly, there is an increase in higher education enrollment across the board. Globally, the percentage of the age cohort enrolled in higher education has grown from 19 in 2000 to 26 in 2007 (UNESCO, 2009).  Half of the students enrolled in higher education worldwide live in developing countries, and according to an estimate of international agencies, the 65 million students enrolled in colleges and universities in 1991 will grow to 97 million by 2015 (World Bank & UNESCO 2000). Central Asia as a region is not an exception to this trend.

The enrollment rates in Central Asian countries differ from each other significantly due to dissimilar approaches to post-socialist political reform practices and rationalizations. In Uzbekistan, where authoritarian presidential rule still dominates and full transition from a single-

party system is resisted, the gross enrollment rates in higher education were 8% for females and 12% for males in 2008. In Mongolia, where there was an abrupt transition to a free market economy with a multi-party political system, the 2008 gross enrollment rate in higher education was 58% for females and 37% for males (World Bank 2010, cited in Weidman & Yoder 2010).

In post-socialist countries, including the Central Asian Republics[1] (CARs) and Mongolia, access and equality are proclaimed as citizens' rights to education, either by stating it as a part of the constitution or in other laws. It is believed that the opportunity to attend a higher education institution has increased as a result of the transitions from an elite-oriented higher education system to a mass higher education system. However, ensuring equality of opportunity to access higher education for all who desire it remains a challenge in the region.

There are dual characteristics of the change in higher education in this region. That is, on the one hand, transition from elite to relatively mass higher education that opens doors to many individuals who were not previously able to access it. On the other, higher education systems are becoming more market-oriented than ever before in these countries. Therefore, equal opportunity to access higher education is more crucial than ever before in these emerging free market countries in the post-socialist era.

International agencies have provided some evidence for the increasing inequality among national higher education systems as well as within countries in the last twenty years. For instance, UNESCO (2009) states that despite many policy initiatives in recent years, broader

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[1] Here CARs refer to: Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan. These four countries were officially part of USSR during the socialist period, where as Mongolia has maintained its independence from the USSR despite the heavy influence on Mongolian politics from the USSR and Mongolia's economic dependence on it.

postsecondary participation has not benefited all groups of society equally. The study, which looks at the trends in higher education, shows that although greater inclusion is evident in higher education, the privileged classes have retained their relative advantage in nearly all nations. Although there is no data on socioeconomic background of students and its impact on access to higher education, national household surveys indicate that most students come from wealthy families and, as such, inequality in higher education persists (World Bank, 1994; 2002; UNESCO 2009).


## 1.2    COUNTRY BACKGROUND: MONGOLIA


This traditionally nomadic, heavily agrarian Asian nation employed worldwide fame for Chinggis Khaan and the Mongol Empire under his and his offsprings' rules in the 13th and 14th centuries. Following the infamous fall of the Mongol empire Mongolia was ruled for approximately six hundred years, first by Ming Dynasty and then by the Manchu of the Chin dynasty. The period of Manchu's rule left a dark, unremarkable mark in Mongolia's history. During this time period, only Lamaist teaching was encouraged for the masses by the Manchus (Spaulding, 1992). However, nationalist movements started rising around the nation's territory in the late 1880s through the 1890s. Finally in 1911 national anti-subordination movements took over the regional control of Manchus. However, a real sense of independence was declared only in 1921 with the help of military support and leadership from the USSR's Red Army. As a result,

Mongolia, which was still a nomadic and heavily agrarian nation, became the second socialist country in the world.

Modern Mongolia is a landlocked country sandwiched between Russia and China. As of 2014, the population is approximately 2,972,700 and resides in a territory of 1.56 million square kilometers (National Statistics Office), making Mongolia one of the most sparsely populated nations in the world. In 2011, about 41% of the population lived in rural areas, children aged 14 and under accounted for a third of the population, and the average age of its relatively young population was 23.5 (Bat-Erdene, 2011). Socialist Mongolia took a deep pride in its educational and social service performance indicators. The egalitarian approach to education provision under the strict command of the ruling party, the only political party in existence during that period, achieved remarkable results in this sparsely populated nation on a vast land. High enrollment rates in primary and secondary education and high functional literacy rates achieved during the peak of socialist development in Mongolia was even recognized by UNESCO.

Such achievements were possible most importantly because of the heavy financial subsidy from the USSR as a soviet periphery since its independence in 1921. Until the late 1980s, 17% of government expenditure and 11% of GDP was invested in education (Robinson, 1995). Such investment enabled remarkable gross enrollment ratios of 98%, 85%, and 15% of the age cohorts in primary and secondary school and higher education, respectively (Wu, 1994).

However, anti-communist movements started in 1989 in the country. Mongolia had a peaceful democratic revolution in early 1990, which brought fundamental transformations in the political and social systems of the country, leading it to a multi-party system with a market economy.

**1.3    HIGHER EDUCATION IN MONGOLIA: PAST AND PRESENT**

Higher education in socialist Mongolia was a small sub-sector comprised of approximately 15% of the age cohort. The Soviet model of higher education, deeply specialized from early years, was represented by a handful of public higher education institutions. The first university, Mongolian State University (MSU), was established in 1942 with three departments: pedagogy, medicine and veterinary medicine (Weidman et al., 1998). Later in 1958, a faculty of the MSU separated, branching out as the Agricultural Institute, and similarly, the Medical Institute and the Polytechnic Institute were branched out from MSU in 1961 and 1982 respectively (Weidman et al., 1998). All universities and colleges were fully funded, regulated, and managed by the government. The State Planning Commission controlled enrollment to higher education institutions. The graduates were guaranteed a job in relevant areas as per their specializations upon successful graduation and were told where to go and to *serve for their country* by the government. Mainly children from elite families or the very best and brightest of average families (which could be referred to as working class nowadays) entered higher education on the basis of extremely selective, competitive national examinations.

About 15 to 20% of the age cohort were enrolled in higher education. Another 30% were enrolled in *technikums*, or the second layer in the educational hierarchy right below universities, to become specialized personnel. An additional 30%, approximately, were enrolled in '*TMS*' ([technic mergejliin surguuli] or technical vocational schools)—a two year training school—after successful completion of the first eight years of education to learn a particular hands-on labor skill and become workers with a specialty. The rest (roughly 10%), went straight to the labor

market upon completion of secondary education. Table 1 below shows the enrollment equivalent to the bachelor's level in Mongolian higher education during the last decade of the pre-transition period, also known as the last decade prior to the collapse of the socialist regime.

**Table 1.** Higher Education Student Enrollment in 1980 – 1990 in Mongolia

| Academic years | Bachelor degree total enrollment |
|---|---|
| 1980 – 1981 | 17, 152 |
| 1981 – 1982 | 17, 731 |
| 1982 – 1983 | 18,705 |
| 1983 – 1984 | 19,692 |
| 1984 – 1985 | 19,152 |
| 1985 – 1986 | 18,487 |
| 1986 – 1987 | 17, 358 |
| 1987 – 1988 | 16, 482 |
| 1988 – 1989 | 15, 074 |
| 1989 – 1990 | 14,101 |
| 1990 – 1991 | 13,826 |

Source: Government of Mongolia, 1999 cited in American University of Mongolia, 2012.

It is challenging to find information on the backgrounds of students enrolled in universities and institutes during the socialist period in Mongolia. The strictly merit-based, highly-selective higher education during the socialist era was never really questioned how socially just it was or whether it was providing any equality of opportunity for everyone to compete for it, just like the other social issues at that time. Therefore, the answer to the question 'who went to university' at the time may entail a rather straightforward answer: those few who were talented and prepared enough to go.

Children of well-educated families or the elite segment of the society might have had the best chance to attend postsecondary institutions. This was the case because they were more likely to be better equipped in terms of various capitals, not necessarily financial capital, but rather social and cultural capital that were crucial in exposing them to better preparations for the

competitive enrollment examinations as well as information about higher education opportunities. However, it should be noted that the egalitarian approach of socialist ideology informed the public policy frameworks and their implementation practices as well. Giving an opportunity to children from the working class or the *proletariats*, to access higher education especially to those few who are exceptionally gifted and talented, was an essential characteristic of higher education access policies at that time as well. Therefore, it would not be a surprise to find children of herders or working class families enrolled in a university at the time.

### 1.3.1    Current Situation of Higher Education: Financial Reform

The transformational change Mongolia witnessed in the early 1990s due to the collapse of the USSR (Union of Soviet and Socialist Republics) brought about many challenges that the nation had to face. The impact the collapse had on education was extremely severe. At its peak in the middle of the 1980s, a third of Mongolia's GDP was provided by the Soviet Union (Weidman &Yeager, 1999). The subsidy from the USSR was terminated virtually overnight, and the external trade system among the Council of Mutual Economic Assistance [Hamtiin ajillagaanii niigemlegiin ornuud] was halted. Domestic taxable resources were not only curbed, but also, the taxing control was not as systematic and rigorous yet. Many newly evolving private businesses easily manipulated the tax regulations to avoid paying taxes. In the late 1980s, Mongolia was able to devote 17% of government expenditures and 11% of GDP to education (Robinson, 1995). However, the government allocation to education fell to 3% by 1993, and most of the allocation was spent on primary and secondary education (Spaulding, 1993).

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Such drastic and sudden change entailed dramatic transitions with expansive implications in all spheres of society, which is summarized in Table 2 below. As Bat-Erdene et al. (1998) framed, politically, the country transitioned from a single-party rule with the ultimate authority in decision making that preached a strong ideology and monitored its practice in the society, to the declaration of pluralism—decision making process based on the constitution and open door policy—all to be executed through a multi-party working parliament. Economically, it moved from a centrally planned economy with full government control over national financial management where all property was owned by the government, into a market-oriented economy through price liberalization, taxation reform and consent on private sector development. Socially, the so called classless society that symbolized collective well-being and social equity where government took the full charge of health care and social safety under the socialist ideology, had to take a completely different route allowing capitalism—personal achievement that leads to a various different class segments where individual well-being is an individual responsibility, and health insurance is paid by individuals themselves with a minor involvement of the government.

**Table 2.** Political, economic and social transitions in post-socialist Mongolia

|  |  | From: | To: |
|---|---|---|---|
| Political transitions | | Strong ideological monitoring | Tolerance of pluralism |
| | | Single party rule | Multiparty democracy |
| | | Ultimate authority held by party | Constitution-based authority |
| | | Symbolic parliament | Working parliament |
| | | Isolation | Open door policy |
| | | Centralization | Decentralization |
| | | Limitation of human rights | Freedom of human rights |
| Economic transitions | | Centrally-planned (command) economy | Market-oriented economy |
| | | Government controls on prices of goods and services | Liberalization of pricing |
| | | Turnover taxes and profit taxes on state enterprises and co-operatives | Taxation reform (personal income and private enterprises) |
| | | State ownership of all property | Private ownership of property |
| Social transitions | | "Classless" society, social equity, collective well-being | Class based on personal achievement, capitalism, individual well-being |
| | | Socialist/communist ideal | Personal responsibility |
| | | Government-provided health care and social "safety net" | Individually paid health insurance program, limited government involvement |

Source: Bat-Erdene, S. Davaa & Yeager, J. (1998). The National University of Mongolia: The winds of change. *In* Paula L.W. Sabloff (Ed.) Higher education in Post-communist world: Case studies of eight university. New York: Garland.

Based on the Bat-Erdene et al. (1998) model on transitions, described in Table 2, Weidman et al. (1998) further characterized the transitions that the Mongolian education system faced after the collapse of the Soviet Union. Table 3 below demonstrates the transformations Mongolia's education system had to go through in the early 1990s. One of the key elements in the educational transitions was the shift from fully funded education to a system of participatory financing, in which students and their parents/families needed to be responsible for a significant portion of students' educational expenses. Higher education, in particular, was left with extremely minimal government support, and thus, needed to go through a full swing of the

pendulum. A vast majority of the higher education cost has become a responsibility of the students and their parents.

Table 3. Educational transitions in post-socialist Mongolia

| From: | To: |
|---|---|
| Rigid, standardized curriculum determined by government | Diversified curriculum determined by local community needs |
| Strong ideological influence | Oriented toward common values of humanity and science |
| Fully funded by the state | Participatory financing, with cost recovery from students/parents |
| Centralized administration | Decentralization |
| Based on societal and manpower needs | Based on personal demand |
| Compulsory involvement in education | Right to choose, voluntary involvement |
| Teacher-centered instruction | Student-centered instruction |

Accessing higher education is no longer just a matter of merit worldwide. It requires financial capacity, which is a more contentious issue in former socialist countries where, until recently, higher education was fully funded by the government (i.e., all costs were borne by the government/tax money) than anywhere else. The shift from fully funded higher education to privatized higher education, where students and their parents are required to assume some responsibility for tuition and fees, and in many cases, most of the costs, was a somewhat heated discussion, especially in the beginning of the transition. This very phenomenon, shifting some of the higher education costs to the individuals, is referred to as cost-sharing (Johnstone, 2006).

The level of financial austerity governments faced, coupled with the growing demand for higher education and increasing per student cost in post-socialist countries, did not leave much choice for the governments but to introduce cost-sharing by charging tuition. These countries faced additional pressure from international agencies because the World Bank (1994), for

instance, recommended that all transitional and developing countries reduce government involvement in higher education. Recommendations from such donors play a significant role in educational policies in developing countries because the compliance with the recommendations often become a precondition of financial aid to them.

Mongolia was a vivid example of a country that went through extreme and abrupt socio-economic transitions, which left the government in dire financial austerity in the aftermath of sudden loss of monetary assistance from the USSR. Its GNP fell, suddenly, to about $300 per capita, and Mongolia became one of the poorest countries in the world (Bray et al., 1994). The collapse of the socialist ideology forced the country to adopt a free market economy with democratic values. A new Parliament was assembled through the first democratic election, and it ratified a new Constitution which approved a multi-party system for political governance.

Despite its controversies, especially around the potential role of the private sector influencing educational agendas, cost-sharing was introduced to higher education abruptly and irreversibly. In 1991, amendments to the Education Law first legalized the charge of tuition in the higher education system, and higher education institutions started implementing it in the 1992 – 1993 academic year (Altantsetseg, 2003). Higher education institutions, with deteriorating buildings, inadequate libraries, and inaccessible computer laboratories, had to rely on tuition and fees from students in order to barely survive the turbulence left in the wake of the abrupt collapse of the socialist structure in Mongolia. Although diversification of higher education funding raises many other issues, including institutional autonomy, educational quality, and the role of government in standard-setting and monitoring, private higher education

and cost-sharing in public higher education have been well practiced in Mongolia for over twenty years.

*Tuition* was introduced for the first time in the country's history of higher education in 1992, and became observed nationwide in 1993. Tuition initially equaled about four months' salary of a university senior lecturer (Otgonjargal, 2005). The setting of the tuition amount depends on the variable costs of the institutions, including teaching staff salaries, social insurance, and book supplies, to name a few. Table 4 illustrates an estimation of higher education expenses borne by parents and/or students in Mongolia in the 2002-2003 academic year.

Otgonjargal (2005) calculated the estimation based on interviews with a number of individuals and consumer prices at the time in the country. The expenses are estimated in both MNT (Mongolian national currency) and the international dollar converted in PPP (purchasing power parity), as of 2002. According to the estimation, in the 2001-2002 academic year, a student had to spend MNT 1,623,000 per year for a top public university, and MNT 2,064,000 for a highly reputed private one, an amount that comprises instructional materials, including tuition and living expenses.

**Table 4.** Higher education expenses borne by parents/students, per year, first degree, 2002-2003. (Approximate conversion of togrogs (MNT) to dollars by 2002 PPP $1=MNT266.5)

| | | Currency | Public | | Private | |
|---|---|---|---|---|---|---|
| | | | High public[2] | Low public[3] | High private[4] | Low private[5] |
| Instructional expenses | Special one time or up—front fees | MNT | 3000 | 1500 | 4000 | 1200 |
| | | US$ | 11.2 | 5.6 | 15 | 4.5 |
| | Tuition | MNT | 450,000 | 300,000 | 650,000 | 250,000 |
| | | US$ | 1688.5 | 1125.7 | 2439 | 938 |
| | Other fees | MNT | 0 | 0 | 0 | 0 |
| | | US$ | 0 | 0 | 0 | 0 |
| | Books and other instructional expenses | MNT | 80,000 | 60,000 | 80,000 | 60,000 |
| | | US$ | 300 | 225 | 300 | 225 |
| | *Sub—total of instructional expenses* | *MNT* | *533,000* | *361,500* | *734,000* | *311,200* |
| | | *US$* | *2000* | *1356.4* | *2754.2* | *1167.7* |
| Student living expenses | Lodging | MNT | 360,000 | 0 | 600,000 | 0 |
| | | US$ | 1350 | 0 | 2251.4 | 0 |
| | Food | MNT | 500,000 | 200,000 | 500,000 | 200,000 |
| | | US$ | 1876 | 750.4 | 1876 | 750.4 |
| | Transportation (bus and home visit once a year) | MNT | 50,000-60,000 | 50,000 | 50,000-60,000 | 50,000 |
| | | US$ | 187 - 225 | 187 | 187 - 225 | 187 |
| | Other personal expenses | MNT | 120,000 | 120,000 | 120,000 | 120,000 |
| | | US$ | 450 | 450 | 450 | 450 |
| | *Sub—total of living expenses* | *MNT* | *1,090,000* | *370,000* | *1,330,000* | *370,000* |
| | | *US$* | *4090* | *1388.3* | *4990.6* | *1388.3* |
| Total cost to parent and student | | MNT | 1,623,000 | 731,500 | 2,064,000 | 681,200 |
| | | US$ | 6090 | 2744.8 | 7744.8 | 2556 |

Source: Otgonjargal, 2005

Table 4 illustrates that unlike many other countries, the tuition at public higher education institutions and private ones does not differ significantly. Since government appropriations to public higher education institutions is still very limited, the underlying costs behind the amount

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[2] Highest tuition and living in dormitory or shared apartment
[3] Lowest tuition and living with parents
[4] Highest tuition and living in dormitory or shared apartment
[5] Lowest tuition and living with parents

of tuition at private and public institutions are very similar. Both the public and private institutions cover their fundamental costs (such as salary, teaching materials, and technology upgrades, to name a few) by revenues from tuition fees.

Moreover, Table 6 illustrates the average public and private higher education tuition from the 2002-2003 to 2011-2012 academic years as announced by the Ministry of Education and Science. The estimation is illustrated in three currencies: MNT (Togrog), International dollar in implied PPP conversion rate, and U.S dollar in market rate of corresponding years. I estimated the tuition in both PPP rates and market rates for the equivalent of the Mongolian togrog amounts for a comparison between the higher education cost in Mongolia and other western countries. The international dollar equivalent demonstrates a better reflection of higher education cost of Mongolia for readers outside the country. Callen (2007) compares the usage of the market rate and PPP rate in conversion of local currency, and argues that PPP rates are more advantageous—especially for non-trade goods and services across countries—and are more helpful in portraying more realistic purchasing power of consumers in emerging markets of developing countries.

Table 5 displays the implied PPP conversion rate for Mongolian national currency, provided by the World Economic Outlook (WEO) database, made available by the International Monetary Fund (International Monetary Fund, 2015). The US dollar market rate is made available by the central bank of Mongolia. These rates were used in the conversion of the tuition amounts shown in Table 6.

**Table 5.** Implied PPP Conversion Rate and US dollar market rate for Mongolian national currency togrog

| Year | PPP conversion[6] rate | US$ rate[7] | Year | PPP conversion rate | US$ rate |
|------|------------------------|-------------|------|---------------------|----------|
| 2000 | 158.575 | 1,097 | 2008 | 494.478 | 1,180 |
| 2001 | 168.755 | 1,101 | 2009 | 455.590 | 1,450 |
| 2002 | 175.784 | 1,124 | 2010 | 476.214 | 1,243 |
| 2003 | 189.117 | 1,170 | 2011 | 537.127 | 1,346 |
| 2004 | 216.362 | 1,211 | 2012 | 594.837 | 1,397 |
| 2005 | 252.738 | 1,226 | 2013 | 602.316 | 1,741 |
| 2006 | 308.710 | 1,164 | 2014 | 629.127 | 1,997 |
| 2007 | 361.480 | 1,170 | 2015 | 666.094 | 1,888 |
|      |         |       | 2016 | 703.063 | 1,995 |

*Source: International Monetary Fund (2015) and Bank of Mongolia official website.*

As Table 6 shows, the average tuition stayed relatively stable until the academic year of 2007-2008, after which, it increased noticeably, with a significant surge in 2011-2012. However, by the 2011-2012 academic year, despite the sky rocketing inflation rate (devalue of domestic currency), the ratio between the average tuition and a university lecturer's salary had decreased. In 1993, average tuition equaled to four months' salary of a university lecturer (Otgonjargal, 2005). But, in 2011, it roughly equaled two months' salary of a university faculty member.

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[6] Source: International Monetary Fund (2015)
[7] Source: Bank of Mongolia, Official daily foreign exchange rate:
http://www.mongolbank.mn/eng/dblistofficialdailyrate.aspx

**Table 6.** Bachelor degree tuition, average public and average private.

| Academic year | Currencies | Average Public | Average Private |
|---|---|---|---|
| 2002 – 2003 | MNT | 350,000 | 450,000 |
| | Inter.$ | 1,991 | 2,560 |
| | US$ (market rate) | 332 | 401 |
| 2006—2007 | MNT | 336,500 | 350,700 |
| | Inter.$ | 1,092 | 1,138 |
| | US$ (market rate) | 290 | 302 |
| 2007—2008 | MNT | 383,000 | 402,400 |
| | Inter.$ | 1,060 | 1,115 |
| | US$ (market rate) | 328 | 344 |
| 2008—2009 | MNT | 506,500 | 539,400 |
| | Inter.$ | 1,025 | 1,092 |
| | US$ (market rate) | 430 | 457 |
| 2009—2010 | MNT | 587,400 | 629,800 |
| | Inter.$ | 1,290 | 1,384 |
| | US$ (market rate) | 405 | 434 |
| 2010—2011[8] | MNT | Missing | Missing |
| | Inter.$ | -- | -- |
| 2011—2012 | MNT | 817,900 | 900,700 |
| | Inter.$ | 1,523 | 1,677 |
| | US$ (market rate) | 608 | 670 |

Source: combination from Otgonjargal, 2005 & Ministry of Education and Science, 2014.

The government regulation that initially endorsed cost-sharing indicated that tuition should not exceed the per student variable costs (Government Resolution N. 107 of July, 3, 1992). Unlike many other countries, which introduced tuition to their higher education systems, the burden on the shoulders of students and their parents from tuition, is not a light one. However, higher education institutions are expected to cover most of their costs, including salaries of teaching staff, from revenues collected from tuition.

Table 7 shows the proportion of tuition in total revenue for 26 higher education institutions in 2008 (Bat-Erdene et al., 2010). Accordingly, about 90% of total institutional

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[8] Information for this year was missing.

revenue comes from tuition revenue. Although Table 1.4.1.4 demonstrates the proportion of a single year, the data provides a good, if not modest, representation in general. 2008 was a 'good year' for higher education institutions in Mongolia, because the government's direct appropriation to the institutions soured dramatically to MNT 6.8 billion from MNT 0.4 billion in 2007 (Bat-Erdene et al., 2010).

**Table 7.** Proportion of tuition revenue of selected higher education institutions as of 2008.

| Higher education institutions | Number of HE institutions | Proportion of tuition in total revenue, % | Minimum % | Maximum % |
|---|---|---|---|---|
| Universities | 6 | 90 | 82 | 97 |
| Institutes | 12 | 90 | 47 | 100 |
| Colleges | 7 | 91 | 68 | 100 |
| State HE | 13 | 92 | 82 | 100 |
| Private HE | 12 | 88 | 47 | 100 |
| Institutions with over 3,000 students | 3 | 88 | 82 | 94 |
| Institutions with 500-3,000 students | 14 | 88 | 47 | 99 |
| Institutions with less than 500 students | 8 | 94 | 68 | 100 |

Source: MECS, 2008 cited in Bat-Erdene, 2010.

As Table 7 illustrates, the tuition revenue makes up about 90% of revenue for all higher education institutions, thus, making tuition the single most important revenue to run the institutions. Since tuition revenue covers the most of higher education institutional costs, the amount of tuition is relatively high in comparison to an average household income. However, the cap of tuition amount is remotely controlled by the government, thus, the public and private tuition does not differ significantly.

In addition to the introduction of tuition in public higher education, the Mongolian higher education system changed dramatically when the government legalized private higher education

institutions with the 1991 amendments in the Education Law. The number of private higher education institutions has flourished since adding to the growth of higher education in the country.

Higher education grew almost twelve folds from 1990 to 2011 in Mongolia (see Table 13). On one hand, the growth in the higher education enrollment is the result of finance-driven reform policies enforced by the government in post-socialist period in Mongolia. These policies included the introduction of tuition and its importance in the institutions' revenue, as well as encouragement of private higher education development. On the other hand, the increasing demand for higher education from the individuals' point of view, who believe in a higher significance of education in free market economy, has contributed to the growth, as well.

Table 8 demonstrates the change in the Mongolian higher education institutions in three clusters of years between 2002 and 2012. The number of private institutions mushroomed during the first decade of post-socialist Mongolia, in 1990-2002. Consequently, by 2003, there were 136 private institutions established, most of which are located in the country's capital city (American University of Mongolia, 2010).

Nonetheless, as demonstrated in Table 8, late 2000s, the number of both public and private institutions decreased, mostly because the Ministry of Education merged several public institutions, and also pressed upon much harsher criteria and more rigid requirements for the private institutions in their institutional accreditation processes. The government was responding to public criticism against mushrooming small private higher education institutions that provided inadequate quality of instruction. As demonstrated in Table 8, by the 2011-2012 academic year, there were 101 higher education institutions, 81 of which were private. However, even now,

except for a few high quality private institutions that have gained an admirable reputation among students and parents, most private institutions focus on the humanities and rely on mostly part-time faculty members—some of whom are already full or part-time faculty members in other institutions. These small social science and humanities-focused private institutions do not conduct any research either.

**Table 8.** Higher education institutions by locations, public and private

| Institutions | 2002-2003 | | | 2009-2010 | | | 2011-2012 | | |
|---|---|---|---|---|---|---|---|---|---|
| | All | Location | | All | Location | | All | Location | |
| | | UB | *Aimags* | | UB | *Aimags* | | UB | *Aimags* |
| All Universities, Institutes and Colleges | 185 | 143 | 42 | 146 | 115 | 31 | 101 | 92 | 9 |
| Public HEIs | 42 | 23 | 19 | 42 | 23 | 19 | 15 | 12 | 3 |
| Private HEIs | 136 | 114 | 22 | 99 | 88 | 11 | 81 | 76 | 5 |
| Foreign University Branches | 7 | 6 | 1 | 5 | 4 | 1 | 5 | 4 | 1 |

Source: American University of Mongolia, 2012.

Institutional diversification was formally reflected in educational legislations. The Education Law, first amended in 1991, was amended repeatedly in 1995, 1998, 2003 and 2006. The amendments made in 2003 to the Education Law stated the classifications for higher education institutions. According to the Law, higher education institutions are classified as Universities, Institutes, and Colleges, mainly based on their prerogatives for degree awards (Bat-Erdene et al., 2010). Colleges may grant a diploma after three years of study and a bachelor's degree upon completion of a four-year program. The Institutes may grant all of the above plus a Masters degree, whereas, Universities are entitled to grant all degrees, including doctoral.

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Although there has not been any formal ranking done among higher education institutions in Mongolia, there is a widely accepted view among students, parents, and also employers that public institutions are of higher quality compared to their private counterparts. Despite the lack of an official ranking, private institutions are believed to offer a lower quality education, except a few exceptional ones. Although there isn't any research supporting this claim, it is common knowledge that students not accepted by public institutions or the few private highly reputed ones, enroll in private institutions. The tuition driven revenue generation in all higher education institutions and extremely limited government appropriations make the institutions become less selective in enrolling new entrants.

The increase in undergraduate student enrollment was particularly high in the first decade of the post-socialist era (Table 9). As the students enrolling in diploma studies continuously decreased, the number of students enrolled in bachelor programs increased from 13, 825 to 89,125 in 1990-2002, and so did the graduate student enrollment.

**Table 9.** Higher education enrolment by academic degree. 1990 – 2002.

| Year | Diploma | Bachelor | Graduate (masters and doctoral degree) |
|------|---------|----------|----------------------------------------|
| 1990 | 17609 | 13825 | |
| 1991 | 14986 | 13223 | |
| 1992 | 8116 | 16917 | 192 |
| 1993 | 5566 | 22135 | 383 |
| 1994 | 5849 | 26490 | 435 |
| 1995 | 5584 | 31973 | 804 |
| 1996 | 3730 | 39157 | 1201 |
| 1997 | 4426 | 44864 | 1671 |
| 1998 | 4094 | 59444 | 1734 |
| 1999 | 4371 | 67554 | 2100 |
| 2000 | 4224 | 77281 | 3465 |
| 2001 | 3605 | 83200 | 3839 |
| 2002 | 5249 | 89125 | 4052 |

Source: MOSEC, 2003

During the second post-socialist decade, enrollment continued increasing despite the aforementioned decrease in the total number of public and private institutions. A recent article in one of the major news agency's website, written by a respected columnist, argues that the continuous increase in the enrollment is partially due to the "widening base of the pyramid, although the height of it has lowered" (Batbayar, 2014). Some institutions increased the number of indexes of specialties they offer as a response to the government's effort to cap the tuition in order to enroll more students for more tuition revenue, as the article highlighted. Table 10 shows the rapid growth of the Mongolian higher education system during the second decade of post-socialist time. As shown in the table, women continue to outnumber men. What is not known, however, is whether and to what extent the rapid expansion has reached the poorest and most disadvantaged segments of the Mongolian population.

**Table 10.** Main indicators of Mongolian Higher Education

| Academic Years | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Higher Education Institutions** | | | | | | | | | | |
| Universities, Institutes and Colleges | 185 | 183 | 184 | 180 | 170 | 162 | 154 | 146 | 113 | 101 |
| Public HEIs | 42 | 48 | 49 | 49 | 48 | 47 | 48 | 42 | 16 | 15 |
| Private HEIs | 136 | 128 | 129 | 125 | 116 | 109 | 101 | 99 | 92 | 81 |
| Branches of foreign universities | 7 | 7 | 6 | 6 | 6 | 6 | 5 | 5 | 5 | 5 |
| Accredited HEIs | 58 | 68 | 85 | 88 | 88 | 91 | 86 | 86 | 68 | 67 |
| **Higher Education Students** | | | | | | | | | | |
| Total Enrolment of HEIs | 98,453 | 108,738 | 123,824 | 138,019 | 142,411 | 150,326 | 161,111 | 164,773 | 170,126 | 172,798 |
| Female | 61,450 | 67,184 | 76,049 | 83,871 | 86,183 | 91,720 | 97,796 | 99,472 | 101,455 | 101,557 |
| Enrolment in Public HEIs | 66,834 | 74,134 | 84,041 | 91,755 | 93,478 | 99,037 | 106,611 | 100,581 | 104,431 | 104,101 |
| Female | 40,601 | 44,539 | 50,094 | 53,650 | 54,752 | 58,624 | 62,414 | 57,284 | 58,871 | 57,981 |
| Enrolment in Private HEIs | 31,197 | 34,134 | 39,405 | 45,784 | 48,552 | 50,878 | 54,114 | 63,835 | 65,306 | 68,302 |
| Female | 20,608 | 22,346 | 25,711 | 29,832 | 31,184 | 32,841 | 35,143 | 41,985 | 42,360 | 43,344 |
| Enrolment in Branches of Foreign Universities | 422 | 470 | 378 | 480 | 381 | 411 | 386 | 357 | 389 | 395 |
| Female | 241 | 299 | 244 | 299 | 247 | 255 | 239 | 203 | 224 | 232 |
| Enrolment in Accredited HEIs | 79,202 | 86,599 | 108,339 | 110,000 | 123,609 | 133,071 | 140,768 | 151,049 | 161,304 | 164,884 |
| New Entrants to HEIs | 31,597 | 34,549 | 42,787 | 42,854 | 39,460 | 43,897 | 46,692 | 43,829 | 44,472 | 44,484 |
| Female | 19,448 | 20,968 | 26,173 | 26,027 | 23,871 | 26,829 | 28,321 | 26,169 | 26,425 | 26,374 |
| Admitted Directly After High School Graduation | 20,658 | 23,558 | 29,791 | 31,380 | 29,331 | 32,232 | 35,338 | 32,569 | 31,334 | 30,536 |
| Total Graduates from HEIs | 18,289 | 21,109 | 22,397 | 23,628 | 25,938 | 29,599 | 33,007 | 34,211 | 35,847 | 37,749 |
| Female | 11,795 | 13,770 | 14,524 | 15,424 | 16,932 | 19,427 | 21,046 | 22,138 | 22,888 | - |
| Graduates Employed Within 1 Year after Graduation | 4,824 | 7,037 | 7,924 | 7,606 | 9,562 | 10,496 | 13,038 | 13,906 | 12,975 | - |
| **Higher Education Staff** | | | | | | | | | | |
| Total Staff Employed by HEIs | 10,674 | 11,046 | 11,555 | 11,676 | 12,175 | 12,492 | 12,555 | 12,849 | 12,824 | 13,021 |
| Female | 5,988 | 6,274 | 6,775 | 6,986 | 7,385 | 7,561 | 7,630 | 7,863 | 7,796 | 7,986 |
| Full-time Faculty Members | 5,642 | 5,990 | 6,337 | 6,517 | 6,818 | 6,892 | 7,020 | 7,219 | 7,183 | 7,295 |
| Female | 2,984 | 3,198 | 3,542 | 3,693 | 3,905 | 4,021 | 4,073 | 4,229 | 4,174 | 4,287 |
| Source: MECS. | | | | | | | | | | |

Source: American University of Mongolia, 2012.

## 1.4    POLICIES ON EQUITY IN ACCESS TO HIGHER EDUCATION[9]

This section will describe policies that aim to provide access to higher education for individuals from lower socio-economic backgrounds. It will specifically examine how these policies were born, how they evolved over the past two decades, and whether they persist. There are two major policies, Student Lending and student grants programs that will be explored in detail.

In the case of Mongolia, the question whether enrollment increase has benefited lower income groups is imperative, because the higher education system went through a paradigm change in financing, with a heavy reliance on the introduction of cost-sharing. Lower income or non-traditional students in higher education now face a double challenge: first, they need to strive hard to get enrolled in a higher education institution, which may not have been a normal practice in their families; second, once they are admitted, they now also need to figure out how to pay for it. The following two sub-sections will describe the Student Lending and Student Grant programs, the government financial assistance programs for specific groups of students, that aim at enabling access to higher education.

### 1.4.1  Student Lending Program

In 1995, a Government resolution was ratified, introducing regulations for financial aid programs in Mongolian higher education, specifically, the Student Lending and Student Grant programs.

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[9] I limited the descriptive information of the government financial assistance programs and policies by the year 2011, because 2011 is the latest year reflected in the household socio-economic survey data I used for the present study. Government policies on financial assistance have changed repeatedly since 2011, but I won't discuss those changes in this dissertation.

The student loan program provides substantial government assistance to students without any bank involvement. The State Training Fund (STF), a quasi-governmental agency is in charge of the implementation of the two programs. The STF is governed by an independent board, however, it is attached to the Ministry of Education (Bat-Erdene et al., 2010). The STF works with individual higher education institutions in allocating the loan and grant money in accordance with documentation submitted by the institutions on behalf of their students that prove compliance with all criteria for the lending and grant programs. The government also has substantial financial aid programs for masters and doctoral students, as well as students pursuing graduate level education abroad (Ministry of Education and Science, 2014), which will not be explored further in the present study.

The undergraduate Student Lending program, financed by direct government funding as part of educational expenditure, only covers tuition. The criteria for the Student Lending program has changed slightly over the years since its inception, however, the lending program is still strictly aimed to provide need-based assistance only. As of 2011, Student Lending eligibility criteria included: a) to be enrolled in an accredited institution; b) to be from a family with a monthly income less than the minimum living standards set by the National Statistics Office; c) to be from a family with a disabled parent or parents/guardians; and d) to be from a family where both parents are retirees or to be orphan and live with a family with a monthly income less than the minimum living standards. The list of criteria also requires a notarized guarantee for the loan from an individual or a company that will be held responsible for the lending (MECS, 2001).

The loan is to be forgiven if the graduate returns the service to the government by working in the job, appointed by the government, for 5-8 years. The duration depends on the

remoteness of the location of the job. However, if the graduate decides otherwise, an annual

interest rate 0.5% more than the annual average commercial credit interest will be charged to

their loans. According to Government Decree No. 96, signed on June 2000, the loan should be

repaid within ten years; the interest however starts accruing from the seventh year of the loan

allocation (Otgonjargal, 2005). Table 11 shows the number of students who received the Student

Lending during the first decade after the collapse of socialist system, specifically, in 1993-2003.

**Table 11.** Undergraduate Student Loan in 1993 – 2002[10].

| Academic year | Number of recipients | Number of graduates | Number of repayments (students) |
|---|---|---|---|
| 1993-1994 | 8035 | 3157 | 448 |
| 1994-1995 | 8115 | 2907 | 244 |
| 1995-1996 | 6064 | 2221 | 170 |
| 1996-1997 | 6872 | 4731 | 250 |
| 1997-1998 | 6128 | 1674 | 120 |
| 1998-1999 | 8050 | 1332 | 186 |
| 1999-2000 | 9441 | 1399 | 197 |
| 2000-2001 | 9908 | 1307 | 178 |
| 2001-2002 | 9236 | 1969 | 208 |
| 2002-2003 | 8409 | 2341 | 83 |

Source: MOSEC, December of 2003.

As Table 11 demonstrates, the repayment rate was very low and it still is. Student loans

tend to get forgiven periodically as well, mainly as a result of populist politics and most often

prior to political elections. Most interestingly, there is no government mechanism for a follow-up

with loan recipients to trace and obligate them to repay the loans. The fact that the student loan

program has no involvement with any commercial bank and it is financed purely by the state

[10] This table includes only the years from 1993 to 2002 because I was able to find the details
demonstrated in the table only for these years. Table 13 shoes more information on Student Lending until
the year of 2011, however they were not included here because the information was restricted by the total
number of recipients only for these additional years.

appropriation to higher education seems to be a contributing factor to such a loose monitoring and accountability arrangement on the repayment. Moreover, low repayment rates may also be contributing to the public view of the loans more as grant money. In addition to the information displayed in the table above, the number of loan recipients from 2002 to 2011 is displayed in Table 13.

## 1.4.2   Student Grant Program

The Government Decree released in 1995 announced the Student Grant program and listed a set of eligibility criteria for the grant. The Student Grant eligibility criteria have been slightly altered a number of times since 1995; the most recent change made was by the Government Decree No. 158 in October 2000[11]. According to Decree No. 158, the undergraduate Student Grant principally aimed to provide a tuition grant to low income, vulnerable segments of the society. The grant is for: a) students from families under the poverty line; b) students from herdsmen families with less than 700 heads of cattle; c) students from a family with more than three children attending higher education institutions at the same time; d) orphaned or disabled students from a poor family; and e) one student from a single parent family with income under the poverty line.

In addition, there are a couple of merit-based categories included in the grant eligibility criteria that target secondary school students who won international competitions, secondary

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[11] As mentioned above, I will discuss policies developed up to the year of 2011 in order to maintain the relevance of the description/discussion with the data I used for the empirical analyses of the present study.

school students who took one of the first three places in national competitions, and students who demonstrated a 3.8 or higher GPA for four consecutive semesters at an accredited higher education institution (Otgonjargal, 2005; Bat-Erdene et al., 2010).

Furthermore, there is a grant program with a very specific target. The largest undergraduate Student Grant is specifically designed to target one student of a family whose parent or parents work for a state budget organization. Thus, the grant has one and only requirement—the student acquiring the grant should come from a family where one or both of the parents are employees of a state budget organization. Table 12 displays the number of recipients of six different categories of eligibility for the undergraduate Student Grant program for three consecutive years, from 2001 to 2003[12].

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[12] I was able to find data disaggregated by all categories only for these three years. The statistics made available by the Ministry of Education for the following years were only showing the aggregate number of recipients, not by the categories shown here, therefore, were not included in this table, but were added in Table 13 later in this section.

**Table 12.** Government Undergraduate Student Grant Recipients. 2001 – 2003.

| | 2001 | | 2002 | | 2003 | |
|---|---|---|---|---|---|---|
| | Student number | Grant value (million MNT) | Student number | Grant value (million MNT) | Student number | Grant value (million MNT) |
| Children SBO employees | 12262 | 3169.1 | 14928 | 3581.3 | 15915 | 4038.1 |
| Children from livestock families | 260 | 67.6 | 1028 | 275.9 | 2480 | 537.0 |
| Children from poor family | 1639 | 532.7 | 3679 | 985.5 | 6939 | 1543.0 |
| Children from families with 3 or more children in HE | 234 | 60.3 | 577 | 154.6 | 825 | 273.1 |
| Disabled or orphan children | 1098 | 285.7 | 1297 | 349.7 | 1391 | 339.2 |
| Grants for distinguished students (merit based) | 182 | 43.8 | 255 | 66.3 | 163 | 41.3 |
| Total | 15675 | 4159.2 | 21764 | 5413.3 | 27709 | 6764.7 |

Source: MOSEC, 2003.

As Table 12 illustrates, students with parents who are employees of state budget organizations are clearly not only the largest group among the government financial aid program recipients, in general, but also make up the most of the total number of students receiving grants. More explicitly, more than 78% of the total grant recipients in 2001 were students from this group and the following two years they made up to 68.5% and 57.4%, respectively, of all grant allocations from the government.

The following Figure 1 presents a summary of the description detailed above in regard with the Student Lending and Student Grant programs sponsored by the government of Mongolia.

**Government Financial Aid of Mongolia**
(Tuition support only)

State Training Fund ← *quasi-governmental org.*

**Student Lending**
- No involvement of commercial bank
- Needs-based
- Can be forgiven for public service
- 0.5% interest from 7$^{th}$ year

**Student Grant**
- Eligibility criteria changes often

Eligibility Criteria

Eligibility Criteria

Needs-based

Merit-based

Pub.Emp.Parent

Enrolled in accredited ins. From poor family With disabled parents. Both parents retired. Orphan & poor.

From poor family. From herdsmen family with less than 70 livestock. From family with >3 college students. 1 child from single parented and poor family.

Top 3 in national competitions. 3.8 GPA for 4 conseq. semesters.

One child of public service emp-loyee.

**Figure 1.** Government Financial Assistance Programs of Mongolia (as of 2011).

Using data available on the total number of recipients of the Student Lending and grant programs for undergraduate education in Mongolia, I drew a comparison between the government financial assistance recipients and the total undergraduate enrollment in Mongolian higher education in pre- and post-transition periods. Table 13 below demonstrates the result of the comparison. It shows that the total undergraduate enrollment in the last two decades of post-socialist Mongolian higher education along with available data on the government grant, loan recipients, and their percentage in the total annual enrollment.

**Table 13.** Bachelor Enrollment Growth and Lending and Grant Recipients. 1980 – 2011

| Academic year | Total Bachelor enrollment (Public and private to those apply) | Grant recipients (those who are PEF) | Number of Loan recipients | Total of Grant and Loan recipients | % of loan&grant in total (% of PEF) |
|---|---|---|---|---|---|
| 1980 – 1981 | 17, 152 | | | | |
| 1981 – 1982 | 17, 731 | | | | |
| 1982 – 1983 | 18,705 | | | | |
| 1983 – 1984 | 19,692 | | | | |
| 1984 – 1985 | 19,152 | | | | |
| 1985 – 1986 | 18,487 | | | | |
| 1986 – 1987 | 17, 358 | Prior inception of grant programs | Prior inception of loan program | Prior financial aid programs | |
| 1987 – 1988 | 16, 482 | | | | |
| 1988 – 1989 | 15, 074 | | | | |
| 1989 – 1990 | 14,101 | | | | |
| 1990 – 1991 | 13,826 | | | | |
| 1991 – 1992 | 13, 223 | | | | |
| 1992 – 1993 | 16, 917 | | | | |
| 1993 – 1994 | 22, 135 | | 8,035 | | |
| 1994 – 1995 | 26, 490 | | 8,115 | | |
| 1995 – 1996 | 31, 973 | | 6,064 | | |
| 1996 – 1997 | 39, 157 | | 6,872 | | |
| 1997 – 1998 | 44, 864 | | 6,128 | | |
| 1998 – 1999 | 59, 444 | | 8,050 | | |
| 1999 – 2000 | 67,554 | | 9,441 | | |
| 2000 – 2001 | 77, 281 | | 9,908 | | |
| 2001 – 2002 | 83, 200 | 15,675 (12,262) | 9,236 | 24,911 | 29.9% (14.9%) |
| 2002 – 2003 | 89,125 | 21,764 (14,928) | 8,409 | 30,173 | 33.8% (16.7%) |
| 2003 – 2004 | 95,504 | 27,709 (15,915) | | | |
| 2004 – 2005 | 111,186 | -- | -- | -- | -- |
| 2005 – 2006 | 125,642 | -- | -- | -- | -- |
| 2006 – 2007 | 129,823 | 35,939 (18523) | 11,021 | 46,960 | 36.1% (14.2%) |
| 2007 – 2008 | 137,075 | 31,676 (17259) | 10,380 | 42,056 | 30.6% (12.5%) |
| 2008 – 2009 | 145,196 | 30,188 (16875) | 9,457 | 39,645 | 27.3% (11.4%) |
| 2009 – 2010 | 147, 586 | 30,104 (16847) | 9,080 | 39,184 | 26.5% (11.4%) |
| 2010 – 2011 | 151,406 | 30,638 (16,631) | 8,076 | 38,714 | 25.5% (10.9%) |
| 2011 – 2012 | 154,481 | 29,445 (16,160) | 7,031 | 36,476 | 23.6% (10.4%) |

Source: Combination of American University of Mongolia, 2012, MES, 2014, and Otgonjargal, 2005.

It should be reiterated that the numbers displayed in Table 13 only incorporates financial assistance (loan and grant) for national undergraduate enrollment and does not include government financial aid recipients for graduate programs at home and abroad. According to Table 13 even in the first decade during the immediate aftermath of the socialist collapse and extreme financial austerity, the government allocation to higher education through providing financial assistance persisted. However, the beginning of significant enrollment increases starting in the early 2000s did not necessarily increase the loan allocation. Unfortunately, data on the student grant program from the early 1990s well into the 2000s are not available. However, the table further demonstrates that the number of grantees increased, not dramatically, but slightly, from the beginning of the 2000s. This slight increase is largely explained by the increased number of students with parents who are state budget organization employees, the category that accounts for a disproportionate amount in the total student grant program in Mongolia. Based on the data available, in the last decade, roughly 30% of bachelor enrollment in Mongolian higher education received either a student loan (which gets forgiven frequently) or a grant. And the percentage of student grant recipients from state budget organizations' employee families (refer to the last column in the Table 13) in total undergraduate enrollment ranges roughly between 10% and 17% from 2001 to 2011.

Then the question that arises is: At what cost does the government provide these financial assistance programs to undergraduate students, the vast majority of which are children of state budget organizations employee families? At a high cost, at a cost of direct public appropriations to individual higher education institutions. Table 14 portrays how the government funding to higher education disappeared 'all of, and got rechanneled to students. From 1997 to 2009, the

share of government direct appropriations to higher education institutions decreased from almost 80% to 21.3%, merely covering the fixed costs, and at certain times, only utility costs of public higher education. Yet, the share of student financial aid in government appropriations to higher education increased from 20.3% to 78.7%. These fluctuations in the government direct appropriations to higher education institutions as well as the share of financial aid in government expenditure on higher education are displayed in Table 14.

**Table 14.** Government Budget for Higher Education, 1997 – 2009, by billion togrog

|  | 1997 | 2000 | 2001 | 2003 | 2004 | 2006 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|
| Share of HE in government education budget, % | 14.0 | 17.1 | 17.3 | 17.8 | 14.4 | 29.6 | 25.8 | 29.0 |
| Government budget for HE, billion togrog | 5.9 | 13.1 | 16.0 | 18.7 | 18.8 | 15.5 | 23.6 | 31.4 |
| Direct appropriations to HE, billion togrog | 4.7 | 5.6 | 6.9 | 7.1 | 4.8 | 0.4 | 6.8 | 6.7 |
| Share of appropriations in HE, % | 79.7 | 42.7 | 43.1 | 38.0 | 25.5 | 2.6 | 28.8 | 21.3 |
| Funding for financial aid, billion togrog | 1.2 | 7.5 | 9.1 | 11.6 | 14.0 | 15.1 | 16.8 | 24.7 |
| Share of financial aid in government HE budget, % | 20.3 | 57.3 | 56.9 | 62.0 | 74.5 | 97.3 | 71.2 | 78.7 |

Source: Bat-Erdene et al. 2010.

The share of financial aid in government expenditures for higher education has increased significantly as Table 14 illustrates. This may also explain the reason behind the government student loan program, which lacks a rigid tracking and monitoring system to obligate loan repayment. The government may well be treating both the loan and grant money as parts of its appropriation to higher education but under a slightly different categorical terminology - more appropriate and time-sensitive, also, easier to manipulate for political campaign purposes - that is student loan and grant schemes. Thus, the student loans may not be expected to be repaid, but

rather, the different cabinets that are formed in the result of each election may be using the student loan money as their populist campaign for the purpose of gaining more sympathy among public.

## 1.5     PROBLEM STATEMENT AND RESEARCH QUESTIONS

From the descriptions presented above, using available national aggregated data on higher education enrollment, one could presume that equity and social justice in access to higher education in Mongolia in the post-socialist era has improved. This statement is made based on the descriptive analyses of the past and present situations of the higher education—the aggregate number of total bachelor enrollment, the number of government financial aid recipients, and government policies and their implementations—presented so far. In other words, it can be claimed that more previously under-represented groups have accessed higher education in the past two decades in Mongolia, based on the following three premises.

*First*, the elite-oriented and small higher education sub-sector expanded itself, following the collapse of the socialist system, into a mass higher education system that is comprised of about more than a half of the age cohort. The enrollment increase and institutional diversification enabled more students from various socio-economic backgrounds to attend higher education than before. From a purely access-oriented perspective, the situation benefited more students from groups that were traditionally not represented in higher education.

*Second*, the set of eligibility criteria for the Student Lending program is purely need-based. Each and every category of the criteria targets students who met the academic requirements to enroll in accredited higher education institutions, but are from lower socio-economic backgrounds—low income level and other social characteristics due to which they are at social margins. Therefore, at least, according to official documents (government decrees, resolutions) and statistics provided by the relevant Ministries, it demonstrates that as long as one has successfully enrolled in an accredited (which should imply a relatively adequate quality of instruction and facilities) institution, he/she is entitled to financial assistance from the government to pay their tuition. According to the data presented above, since the inception of the Student Lending program, each year, approximately from 6,000 to 11,000 students received a loan in the first decade of the post-socialist era (1993 – 2011). As presented in Table 13, based on the data I was able to find, 135,303 individuals were able to receive the government loan, cumulatively, between 1993 and 2011. Another 253,138 individuals, cumulatively, were given the government grant in the duration of the next ten years, namely, in 2001-2011. If these two numbers are added, it equals to 338,441 individuals, which is four times more than the total bachelor enrollment during the final socialist decade in Mongolia, specifically, in 1980 - 1990. If one is willing to believe that all of these loans benefited the poor or socially marginalized individuals, in accordance with the eligibility criteria of the program, the annual loan recipients, on average, equals to roughly a half of the total undergraduate enrollment in pre-transition Mongolia.

*Thirdly*, most of the student **grant** program's eligibility criteria are also need-based. These grants specifically target poor or other marginalized segments of society. Although there

are a few categories that are designed to attract students on merit-basis, the absolute number of these grantees may not be too large. The number of high school students who won domestic and international competitions/olympiads, or students who maintained GPA 3.8 or higher for two consecutive years may not be too big.

However, there are several issues in this panoramic presentation, which beg for further investigation to understand better the current situation of equity in Mongolian higher education system.

*First*, it is not clear whether the rapid enrollment increase reached the poorest and the most disadvantaged segments of the Mongolian population. A specific category of the student grant program targets students whose parent(s) are state budget organization employees. And recipients of this category is the largest among all grant recipients. About 60%, on average, of all grantees come from state budget organization employee families, who are not the most disadvantaged or poorest in the society which can be safely presumed. This leaves only the remaining 40% of the grant program for students from needy backgrounds. Thus, it could be speculated that, after accounting for the student-recipients from state budget organization employee families, only about 13%-22% of the total annual enrollment are grant or loan beneficiaries, who may be representing the marginalized and poor family background groups in the Mongolian higher education system (see Table 13).

*Secondly*, another important aspect that is not addressed by any of the existing policies is the cost of living and how students, especially, those coming from poor or socially marginalized groups, are covering these costs, now that they have finally taken care of the tuition (if they received the government assistance). Living costs are increasing significantly and rapidly due to

the plunging inflation rate and devaluation of the national currency, over the last few years. For a country like Mongolia, where about 90% of its consumption comes from imports, skyrocketing inflation causes severe negative influences on people's livelihood by raising consumer prices. Thus, the increasing living cost is a legitimate factor of prevention from attending college for the poor and marginalized. This further heightens the importance of looking into whether students from poor or marginalized backgrounds indeed have access to higher education, and whether the current higher education enrollment increase is making any contribution to the improvement of equity in Mongolian higher education.

The *third* issue of concern is not directly related with the concept of equity in access to higher education, addressed by the present study, but is still a valid concern. The government's financial assistance programs for students that aim to support their financial needs for higher education may be coming at a high cost, at the cost of higher education quality. Table 14 shows that as the financial assistance going directly to students increased, the government direct appropriation to higher education institutions decreased. The share of funding to higher education in the total government spending on education fluctuated (or increased) only between 14% – 29% in 1997 to 2009. However, the share of financial assistance to students in the higher education budget, provided by the government, grew dramatically from 20% to 79% in the same time period. Meanwhile, the share of direct appropriation to higher education institutions, in the government budget for higher education, decreased from 80% to 21%.

The expansion of financial assistance occurred at the expense of a gradual decrease in direct subsidies to higher education, especially from 2003 through 2008. There are a number of problems arised in relation to decreasing government support to higher education institutions.

Higher education institutions are not able to invest in necessary facility upgrades, technology advancement, instructional material supply—investments that require a substantial financial commitment. Furthermore, the institutions have become highly dependent on tuition revenue. Since they have no autonomy to either increase their tuition to cover these expenses or exceed the government quotas of enrollment by specialties, they come up with more "creative" methods to increase enrollment for additional revenue, such as, adding on new specialties that have lots of overlaps with existing programs in terms of the content. As a result, quality is jeopardized. Therefore, by rechanneling the institutional appropriation to student grant/loan programs, the government is putting the quality of higher education at risk.

*Finally*, the last issue of concern related with equity in access to higher education in Mongolia, based on the descriptions presented above, is with regard to the administration and management of government financial assistance programs. The government financial assistance programs are administered by the State Training Fund (STF). The STF is a symbolically independent organization, which operates in close association with the Ministry of Education. The Governing Board of STF has six individuals who are appointed in accordance with their positions at the Ministry of Finance and Ministry of Education, and does not include any higher education institutional or public representation (Bat-Erdene et al., 2010). The heavy government involvement, the lack of existing mechanisms for civic or public participation in the operation of the STF or evaluations of these programs administered by the STF, raises suspicion concerning whether the implementation of the programs is free of any influence. At present, when there is a high level of corruption involving government organizations and their employees, one may

question whether the grants and loans are fully reaching the targeted students. The section (1.6)

of Problem Statement is summarized as following in Figure 2.

|  | What we know from the document analysis and literature review regarding equity in access to higher education in Mongolia | What we do not know about what we have learned from the descriptions |
|---|---|---|
| 1. | Higher education shifted from elite and small system into mass higher education, and it is assumed that more previously underrepresented groups have now access to higher education, by looking at aggregated data made available by the government authorities. | The existing national data does not include any information on the student background. There is no empirical study that looked at how various social and economic groups are being enabled to access higher education. |
| 2. | Government does offer student financial assistance programs for most needy students who are enrolled in accredited higher education institutions. And these programs only cover tuition. | It is not clear how the students from the poorest background, who actually made to a college and got the tuition covered by the government assistance, is dealing with living expenses. No study on how living cost influences the participation of higher education among poor and vulnerable students. Moreover, vast majority of the government grant program is earmarked, as of 2011, for children of state budget organization employees. |
| 3. | All government financial assistance programs are administered by State Training Fund (STF), a semi-government organization with no civic engagement. | No study is available on whether the loan and grant recipients are actually from the targeted groups. |

**Figure 2.** Summary of Problem Statement.

Based on the concerns and inquiries expressed by the above-mentioned four items, the

present study identifies its overall goal as to explore equity in access to higher education in post-

socialist Mongolia, with a specific focus on students from lower socioeconomic status families.

In order to do so, the study aims to draw answers to the following three umbrella questions:

1. To what extent does socioeconomic status influence access to higher education in post-

   socialist Mongolia?

2. To what extent are government financial assistance programs reaching their target groups in post-socialist Mongolia?

3. How has the role of socioeconomic status in influencing access to higher education changed in the last two decades in Mongolia?

## 1.6  SIGNIFICANCE AND CONTRIBUTION OF THE STUDY

There is a growing emphasis on organizational management, institutional development, and instructional quality in higher education research while equity in student access to higher education is becoming less frequent in studies in higher education, especially in international context. In Europe, too, the emphasis on equity in access to higher education has decreased (Ramirez & Tiplic, 2014), yet the issue itself is still very relevant.

Equity issues in post-socialist and developing countries are largely unexamined. Studies sponsored by World Bank, Asian Development Bank or UN agencies spend only a couple of pages on issues regarding equity in higher education in these countries that are mostly general statements (World Bank, 1994; 2000; 2002; 2010; UNESCO, 2009). There is no study available on equity in higher education in Mongolia. There are only a few empirical studies that used quantitative methods on higher education in Mongolia overall (Pastore, 2009; 2010). Thus this study provides a case on Mongolia exploring equity in access to higher education, which will make an important contribution to the international higher education literature.

This study makes methodological and substantial contributions to the existing literature. The study offers an innovative approach in constructing a composite socioeconomic status variable that reflects more comprehensive picture of the dynamics in the economy in developing and emerging nations. An appropriate measure of socioeconomic status is essential for quantitative research exploring issues of equality and social stratification.

Furthermore, this is the first study on equity in higher education in Mongolia that offers empirical evidence using nationally representative Household Social and Economic Survey data in higher education research in Mongolia. The study contributes to the existing literature on equity in higher education in developing countries' contexts, especially in post-socialist Central Asian countries.

# 2.0    LITERATURE REVIEW


This chapter will consist of two parts: a literature review of the conceptual issues framing this research (2.1) and a literature review of methodology utilized in this study (2.2). In the first part, I will first define equity and equality, two terms often used interchangeably. Then I will briefly discuss the terms of meritocracy and educational quality in relation to equity. Moreover, I will use Human Capital theory in economics to provide evidence for why equity in higher education is important. Finally, I will discuss Stratification theory in sociology to explain how education is used as a means for advancement and the role of education in status attainment and social stratification in societies. The concept of cost-sharing will be addressed, as well, due to its relevance to higher education development in Mongolia. Overall, this section will provide the conceptual background underlying the significance of equity in higher education and its implications for socio-economic development and the prosperity of nations.

In the second part, I will describe statistical procedures used in quantitative studies exploring educational attainment and inequality, including, linear and logistic regressions models, as well as age-cohort analysis. I conclude the Chapter 2 by providing implications of these reviews of literature on the present study and how they inform it.

## 2.1 CONCEPTUAL AND THEORETICAL ISSUES

### 2.1.1 Equity as a Concept

Equity in education in general is defined as the ideal situation where all is respected in schools, taking into consideration the myriad differences between children in regards to their social, economic, and cultural backgrounds (Underhalter, 2009). Discussions on the concept of equity are often explicated in relation to the term of equality. Based on her historical accounts on educational development in the United States, Paula Groves (2002) calls for a distinct differentiation between the terms equality, equal opportunity, and equity.

Groves (2002) contemplates that equality refers to 'sameness,' similar treatment for everyone, and was used especially during the common-school era when schools were "great equalizers". Later, the progressive era pushed in and society became much more diverse as a result of industrialization, urbanization, and immigration, and equal opportunity to education became prominent, which examined issues of 'access.' Equity denotes ideas of 'fairness' and 'social justice'. She claims that while an education system can be accessible for everyone, including those who are poor and marginalized, addressing the genuine issue of equity— economic, social, and cultural forms of capital and resources that are necessary to access education—has not been done adequately.

On a similar note, Elaine Underhalter (2009) states that equity is "thought of as equality turned into an action, a process of making equal and fair" (p. 416). Moreover, James Jacob and Donald Holsinger (2009) defined equality "as the state of being equal in terms of quantity, rank,

status, value or degree" and equity has social justice implications in education related to "fairness, justness, and impartiality of its distribution at all levels of [education]" (p.4). In summarizing these views and expanding on Underhalter's (2009), it could be noted that *equality is the goal, and equity is the outcome of processes and mechanisms through which equality could be realized in practice for individuals from and with numerous different backgrounds and conditions*.

A particular significance of understanding equity of 'what' and 'why' is laid out eloquently by Amartya Sen's (1992) conceptual exploration. Given the vast differences across the human race (e.g., external characteristics such as wealth, living conditions, personal traits, and biological, physical, and mental abilities) makes it a vital exercise to recognize them and take into considerations in the efforts addressing equity. If education is considered as a basic right and need for everyone, all these varying aspects must be taken into account in search for equity in education.

Sen (1992) contends that there are two separate aspects in judging one's social status: his/her actual achievement (what he managed to achieve), and the freedom to achieve (the real opportunity that he has had to accomplish what he values). He reasons that in the assessment of individual wellbeing, these conditions can be seen as "capability to function." This capability approach to equality allows us to focus not only on the means and resources but also the functioning of the human being, i.e., the overall freedom a person enjoys to pursue her well-being. Sen's (1992) concept of capability, and how capability and human diversity is the space within which equality should be discussed, allows Undertalter (2009) to expand her idea of equity. She concludes that "equity works in particular ways to establish conditions for

considerations of equality in the space of capacities" (p.416). Thus, of significance is looking at the individual's "freedom to achieve" when assessing his or her wellbeing. The notion of judging one's social status and standing requires us to carefully examine to what extent equity is or has been ensured for that particular individual.

The issue of meritocracy needs to be addressed when equity is being discussed as a concept. Stuart White (2007) defines it as distribution of economic goods governed by economic merit, which reflects productive talents and efforts of individuals. For White meritocracy is an attractive concept because it serves the two important principals: justice and efficiency. It is just because the best qualified deserves to attain the best. It is efficient because those who are best qualified will do the best job. However, the author continues to explicate that, society is not genuinely meritocratic. Discrimination and unequal backgrounds place some people at a disadvantage, in comparison to others. A meritocratic approach to equality leaves out considerations of numerous aspects of social and economic undertakings that individuals face, yet, have no control over.

Merit requires careful and critical insights when equity is the central topic of analysis. Merit is composed not only of personal attributes such as hard work, discipline, intelligence, and other forms of human capital, but also the "old baggage of social ties and status" (Khan, 2011, p.9). Khan (2011) argues that detaching the notion of meritocracy from its historical factors and influences, and making it an abstract or innate quality that is separate from social conditions is, in some ways, preventing us from considering factors other than performance, and justifies increasing wealth and status advancement for those who are already wealthy and have high

status. The explications of meritocracy in relation to educational equality leads to another vital concept that calls for attention; it is educational quality.

Scholars view educational quality and its relationship to equality differently. Thomas Green (1990) believes that these two concepts are separate challenges, requiring different approaches. Specifically, educational excellence is an ideal that can be perceived in one-on-one or the micro level, whereas equality is a social ideal to be considered at the aggregate level. Thus, the two notions can not be addressed by the same policy, as he argues. Furthermore, Green states "pursuit of excellence is more likely to produce gains in equity than the policies in pursuit of equality are likely to produce excellence" (Green, 1990, p.223).

On the other hand, these seemingly contradicting terms are interpreted as complementary, as argued by Evan Simpson and Karen Wendling (2005). There is a tension between the meritocratic argument for higher education quality that emphasize the idea of merit as the main and only criterion guiding admission policies, and the equity perspective, which accentuate social justice through a fair reflection on the larger population of higher education students. Simpson and Wendling (2005) convincingly argue that equity policies are an essential part of excellence policies, and that even knowledge advancement – a pure meritocratic purpose of higher education – can not be efficiently achieved without acquiring equity in teaching, learning and researching. Equity policies bring excellence in higher education. First, they enhance the *social attributes* in higher education, which refers to learning community diversity. Second, they improve *epistemic attributes*, which refers to academic pluralism through the enrichment of knowledge by learning from the margins. Hence, "there are good merit-based reasons for equity policies" in higher education (p.386).

### 2.1.2   Equity and Human Capital theory

A prominent economics theories that explains the role of education in social equality is the Human Capital theory. After World War II, economists made an assessment on lost capital in war torn countries and its implications on economic recovery. Economies recovered faster than they had predicted, which made them realize that they gave too much weight on the loss of tangible capital and failed to consider human capital contributions to national production (Shultz, 1961). That is how the idea of the human being, as a capital and investment for later improved outcomes, was developed as a major economic theory in education. The Human Capital theory has since grown in scope and substance, despite initial resistance from a few thinkers who struggled with the view that human being can be thought in a form of a capital for an investment for higher productivity in the future. Economists provided ample amount of evidences that the productive capacity of human beings is a vital capital, which can be augmented via proper investment.

Investing in human beings via their health and education yields increased earnings, higher social status, and individual and aggregate levels of happiness (Shultz, 1961; 1980; Becker, 1962; Psacharopoulos, 1981). Thus, future income is dependent on human capital investments through education (Mincer, 1958). But educational costs are rising rapidly. In Shultz's estimation, in the early 1960s in the United States, educational costs rose 3.5 times more than the rise in consumer income rise, which would imply a high demand for education. This would also imply, according to Shultz, that "if we were to treat education as pure investment,

[the] returns to education were relatively more attractive than those to nonhuman capital" (p.11, Shultz, 1961).

Educational investment yields measurable returns. Psacharopoulos's (1981) study comprised of forty different countries assessing private and social returns to education concluded that primary education has the highest private return, followed by secondary and higher education levels. This finding has become one of the key guiding concepts for educational policies for national governments and international agencies. Another significant conclusion from the study was that there was a higher return to education in economically developing countries than developed nations (i.e., the rate of return to education slows down as the national economy grows, but only to a certain point where the rate stabilizes). The higher private return to higher education than social return (Psacharopoulos, 1981; Pastore, 2010b) rationalizes the belief that individuals should take more responsibility in investing in their higher education, thus, the proportion of the cost of higher education expected to be borne by students/their parents is growing worldwide.

The Human Capital perspective into educational equality suggests an important point. Those who invest more in themselves earn more than those who do not. "Abler" persons tend to invest more than others, thus, the distribution of earnings can be very unequal, resulting in a more unequal society. The ability mentioned above characterizes a financial ability, most of all. Therefore, the lack of financial ability, despite a similar range of emotional, physical, and intellectual abilities with others, may become the defining factor for unequal or unjust results.

### 2.1.3   Equity and Stratification Theory

Unequal outcomes in society, the reasons and contributing factors to such inequality, can be explained by sociologists. Education's role in social stratification (i.e., dividing society into categories that are not equal) is explained by two major strands of Social Stratification theory: Functional theory and Conflict theory.

The theoretical framework explained by Kingsley Davis and Wilbert Moore (1944) is helpful in understanding the premise of Functional theory. The Functionalist school of thinking presumes that stratification is present in any society due to "functional necessity" (p.242). Society must somehow distribute its members in social positions that have different orders and duties that need to be executed by different kinds as well as levels of talents (skills) and training (education). Inevitably, different positions have different rewards, which are part of the social order, and thus contributes to social stratification. Therefore, social inequality is an "unconsciously evolved device, by which societies insure that the most important positions are consciously filled by the most qualified persons" (p. 243, Davis & Moore, 1944). Accordingly, individuals compete for scarce and, therefore, important positions based on their training (education) and talent (skills).

However, these views are rebutted by Conflict theorists who criticize the limitations of Functional theory to explain social stratification, and the role of education in it. Randall Collins (1971) asserts that the failure of a Functional theory approach to stratification is centered on the assumption that there is a fixed number of positions (or fixed structure of society) that need to be filled by a selected number of people. Rather, society is defined by behaviors and rewards, and

negotiations between the individual who controls the position and the one who fills it. Thus education is not the primary determinant of whether an individual will fill the position; rather, it largely depends on the individual's social origin and groups of membership or status culture. Accordingly, education is a mark of membership to a particular group or groups, rather than merely an indication of skills and knowledge. Collins (1971) concludes, combining Max Weber's conflict theory with organizational theory, that 'status groups' and 'struggle for advantage' are the essential elements of a society. The struggles take place between status groups, and since the elite groups control the selection of members for an organization, education's role truly rests on which particular status culture the individual is from and familiar with.

Therefore, as individuals strive for a higher ranked position, or struggle to move to a higher status group, the educational requirements of positions will continue to get upgraded as well. The group that controls the higher ranked positions will maintain their interest to keep themselves and those in these positions, separate from the rest of society. Thus, educational requirements will keep growing higher. Educational demand is not driven by societal functioning, but rather by the supply-side growth of educational institutions (Spence, 1974; Collins, 2002). Nonetheless, according to the Conflict school of thinking, higher education attainment is still very important for an individual's wellbeing as it signifies membership to a particular status culture or a group that is appealing and desired.

### 2.1.4 Equity in Higher Education

The essence of equity in higher education is characterized by socioeconomic equity in the growth of participation in higher education. Specifically, equity in higher education is "the pursuit of socially representative participation within nation states" (Gale & Parker, 2012, p.1). Thus, the key question for equity analysis in higher education is whether increases in enrollment reduce social inequality by providing opportunities to those who are disadvantaged, or whether it furthers the social inequality, by extending possibilities to those who are already privileged. This question has become more vital now, when, higher education is experiencing enrollment increase, differentiation by the level and type of institutions, diversification by funding sources, and student diversity, all of which reflect of broader social changes.

Scholars have deliberated on what equity means in higher education and how equity and social justice could be enhanced through higher education. Simon Marginson (2011) suggests two notions of enhancement of equity in higher education. The first involves strategies to advance *fairness* by changing the composition of higher education to reflect a more socially representative higher education system. It focuses on the growth in the absolute number of people from previously under-represented socio-economic groups. Thus, if there is any decrease in the formerly excluded groups to higher education, social equity is viewed as improved. The second suggestion focuses on the proportional distribution of student places between different social groups, and is keen on improving *inclusiveness*. Thus, if there isn't any increase in the proportion of students from lower levels of socioeconomic groups, equity is viewed as not having improved.

Moreover, social inequality and its relations to higher education has been empirically tested by researchers in international and comparative contexts as well (Shavit & Blossfeld, 1993; Shavit, Arum, & Gamoran, 2007). The assumption that, if educational attendance rates increase over time, then inequalities of opportunities will steadily decline, because more individuals from lower socio-economic classes can increase their access, has been tested. Based on their studies of 13 different countries' higher education systems, Shavit and Blossfeld (1993) concluded that inequality of educational opportunity between social strata has been quite stable over time. Despite the uniform trend of increasing educational enrollment among the countries under review, the authors did not find uniform evidence for shrinking educational inequality.

Later Shavit, Arum and Gamoran (2007) conducted another comparative study on 15 countries' higher education systems. While reconfirming the still significant and inverse relationship between socioeconomic inequality and higher education attendance, the authors reached a rather optimistic conclusion, stating that enrollment expansion in higher education allows larger proportions of all social strata to attend higher education, and it is especially true in diversified systems. However, they also noted that in some countries with less diverse higher education systems, expansion was associated with increased inequality of access and more diversion of lower socioeconomic background students into lower-tier institutions, keeping the top-tier for the elite.

### 2.1.5 Cost-sharing As Phenomenon in Higher Education

A review of the literature on cost-sharing in higher education is essential for this study as cost-sharing was introduced in the Mongolia higher education system, to replace government appropriations to higher education that disappeared "all-of-a-sudden". Almost overnight students had to pay tuition to attend a college instead of going to college for free in addition to receiving a monthly stipend.

The proponents of cost-sharing elucidate a number of factors that necessitate it. According to Johnstone and Shroff-Mehta (2000) the need for non-government sources of revenue to fund higher education is the foremost. In transitional and developing countries, both the government and the people started viewing higher education as the engine for national economic growth and social prosperity. Moreover, higher education was facing a looming expansion resulting from high demand because people no longer saw it as a small, elite sub-sector, but a new hope for an individual growth and social mobility and a key tool for a successful career in the newly introduced free market economy where democratic ideals and values were promoted. But the government was not in a place to respond to that anticipated growth. In addition to the economic argument, the proponent of cost-sharing also raised the equity argument in relation to cost-sharing. The status of "free" higher education is enabled by tax money collected from everyone; however, it disproportionately benefits the middle, upper middle, and top income families, who generally are able to pay (Johnstone & Shroff-Mehta, 2000). Financing higher education in circumstances where primary and secondary education resources are insufficient exaggerates social inequalities. And finally, the authors justify cost-

sharing via pure market rules to be played in higher education (i.e., it would support a sense of improved efficiency and responsibility both on students and institutions).

However, the opponents of cost-sharing make several arguments against it. Reducing public resources where more is required is atrocious, as viewed by some scholars (Colclough, 1995). Instead, Colclough (1995) recommends tax system improvement, or efficiency reform within the education sector, or reallocation between publicly funded sectors. Opponents are cautious about a potential reverse effect from the high opportunity cost and the high direct private cost of higher education on students' decision to choose higher education (Colclough, 1995; Buchert & King, 1995).

Furthermore, even cost-sharing proponents acknowledge that imposing of tuition will further discourage the poor from participating in higher education. Therefore, cost-sharing, as a policy intervention, will not be complete, as all agree, without proper mechanisms for introducing student loan and grant programs (Woodhall, 1983; Johnstone & Shroff-Mehta, 2000; Johnstone, 2002; Ziderman, 2002). Providing equity in higher education by improving access to it for students from disadvantaged groups may be facilitated via well-administered and well-managed student loan and grant systems. Loans can contribute to both goals of efficiency and equity (Woodhall, 1983). However, keeping the loan system as a cost-recovery mechanism, with a high repayment rate, is a challenge in many countries.

Private banks are reluctant to participate in student lending unless governments provide guarantees a high subsidy. If they do participate, they may require prerogative to select the clients, which are more affluent clients, leaving poorer students without benefits (Tilak, 1992). There are sociological aspects behind Student Lending as well. The idea of taking a loan

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involves risk to some people, especially in countries where lending is a new financial practice they need to get used to. Despite all these challenges, loans are still favored over grant programs because it helps to truly shift the higher education cost from the government to the individual (Johnstone, 2002; Ziderman, 2002).

## 2.1.6   Summary of Literature Review on Conceptual and Theoretical Issues

Elaine Unterhalter's (2009) definition of equity, as taking consideration of differences in individuals' backgrounds, provides the foundation for grasping equity as economic, social, and cultural forms of capital. Moreover, Amartuya Sen's (1992) capacity approach to equity is fundamental in understanding the equity of 'what' and 'why.' His exploration makes it easy to recognize that if equity is the goal, then it may demand very unequal treatment of others. But most importantly, the capability approach highlights the idea of assessing the freedom one has to achieve what he desires to achieve. The two aspects in education, namely, meritocracy and quality, are raised in educational equity discussions. This review helps understand that meritocracy is beyond personal attributes and qualities; it is a concept that requires critical consideration of many other indications and implications from historical factors and social conditions. Among the literature focusing on how educational quality is affected when equity is taken into consideration, the argument by Evan Simpson and Karen Wendling (2005) that equity and quality are complementary rather than contradictory elements, was convincing.

Human Capital Theory's implications for equity indicate that investing in education yields returns to individuals' productivity. Earning increases as a return to the investment.

However, more financially able persons have greater potential to make that investment. Stratification Theory helps better understand existing inequality in society and how higher education is relevant to that. The Functionalists view societal gaps between strata as an inherent functional necessity, and they justify the existence of the gaps via 'significance' and 'scarcity' of higher positions. Conflict theorists view society as a negotiation between status groups and individuals, and, their behaviors and what society rewards. Thus 'status groups' and 'struggles for advantage' are the two essential elements of a society. As individuals struggle for a higher ranking position, the educational requirements for the positions keep being upgraded.

Simon Marginson's (2011) study provides a clear conceptual framework for an empirical study, looking at equity in higher education in developing countries. Marginson presents two notions of equity in higher education: fairness and inclusiveness. Finally, a review of the literature on the rationale for and counter-arguments on cost-sharing in higher education, especially in the context of transitional countries where the shift took place in extremely short time periods, is useful for the proposed study as well.

## 2.2    LITERATURE REVIEW ON METHODOLOGY

The premise of this study is to determine the level of equity in accessing higher education in Mongolia. In order to do so, I review existing literature on measuring inequality in educational studies.  Despite the long history of sociologists' interest in education and their inquiries into how education plays a role in individuals' wellbeing, it has been only since the middle of the

twentieth century that researchers started conducting empirical studies to show how one's social origin influences his/her status attainment (Sewell & Hauser, 2001). Status attainment studies aim to demonstrate factors that influence three major indicators of people's status, namely, educational attainment, occupational attainment, and income (Sewell & Hauser, 2001; Weis et al., 2011). Thus, status attainment models represent statistical techniques that examine various factors and their effect on outcome variables, such as, schooling, earning, and occupation, with key independent variables representing the socioeconomic status of origin.

In empirical studies that aim to estimate how individuals' socioeconomic origin affect their educational attainment, the key question lies in how we measure formal schooling and how we measure the change in inequality of educational opportunity. In this regard, Shavit and Blossfeld (1993) posed a series of questions that are inherently relevant to this inquiry: Should we measure change in inequality of educational opportunity by the change in the effect of social origin variables on the mean number of school years completed? Or in terms of change in class-specified proportion completing a given level of schooling? Or in terms of change in the ratio between such proportions? (p.2). The answer to these questions conveniently leads to the discussion of specific statistical models that have been developed and utilized in empirical studies on educational attainment.

First, I will review how socioeconomic status is measured. Then, I will analyze the two key statistical models that are used in studies looking at inequality of educational opportunity (i.e., how one's socioeconomic origin influences student educational attainment and whether there has been any change over the years in those influences). The statistical models are a linear regression model of years of education as the dependent variable, and a logistic regression model

as the log odds of an individual in making transitions to various educational levels as the dependent variable.

### 2.2.1    Measuring Socioeconomic Status (SES)

The term socioeconomic status (SES) refers to an individual's relative position within a social hierarchy. Max Weber (cited in Nam & Terrie, 1982) named three, closely related yet distinct aspects of the social hierarchy: class (social and economic life), status (how others see the individual), and party (power to influence one's own and other's affairs). Researchers aim to capture these three aspects behind the concept of socioeconomic status with different ways of operationalizing it.

In studies of attainment and mobility, a number of ways of developing scales and indices of SES have been explored. They differ in concepts and calculations. They can be grouped into the following three categories (Powers, 1982; Nam & Terrie, 1982): a) subjective measure of occupations that implies the prestige based on individuals' subjective assessment of each other's position; b) objective measure through a status score for individuals based on their education and income, calculated by ranking the average educational and income levels of occupations; and c) combining the two categories by accepting valid popular perceptions and adding the objective measures.

Otis Duncan (1961) created the most commonly used socioeconomic index composed from prestige scores with education and income for a wide range of occupation. The development of this index follows a logic that education is a prerequisite for a particular

occupation, and income is the reward given to it; therefore, occupation is a single indicator that can represent the measurement of status. The index was used in Blau and Duncan (1964) where the assigned status scores are grouped into five-point intervals from 0 – 100, and they used the internal midpoints for computing statistics.

Later Featherman and Stevens (1982) revised Duncan's socioeconomic index by incorporating change in the occupational schemes and education and income characteristics in the labor market, the two measurements underlying Duncan's original index. They also integrated both male and female participation in the labor force since Duncan's model was primarily based on males. The authors suggested that a socioeconomic index was preferable to a prestige index in studies of social attainment and mobility.

Later studies, however, privileged multiple-item indicators of SES over single-item indicators. According to Nam and Terrie (1982), the basic assumption underlying this approach is that a family's status level should be determined by the status attributes of the key income maker of the family, in addition to other educational and occupational indicators and other family income. Devised using the U.S Bureau of Census data of 1963, the scores assigned to the categories of component items were calculated by midpoints of cumulative percentage intervals of the key income maker's education, occupation, and family income; the three components' scores were then averaged (Nam & Terrie, 1982).

Several more recent class schemes of occupation have also been developed. For instance, Erikson and Goldthorpe (1992) developed a seven class scheme to represent occupational hierarchy. Taking into consideration the social and economic development of the 20th century—the transformation of property into corporate forms that gave a lot of employment power to

organizations and the employment growth in the population—the authors revised the existing schemes, which is currently known as the EGP class scheme. Similarly, Miller and colleagues (1989) developed a scheme for the educational classification with eight categories that stem from three major levels: elementary, intermediate, and higher educational levels.

Moreover, in recent years, home resources, such as books, computers, a space to study, eligibility for free or reduced lunch, and neighborhood, have been used as indicators of family SES background, in addition to school level SES indicators (Kelly, 2010; NCES, 2012). National Center for Education Statistics (NCES) (2012) suggests that constructing and expanding the SES variable using these home and/or school measures can contribute to the reliability of the expanded SES in educational studies.

Since the beginning of 21$^{st}$ century, SES continues to be used in studies in education referring to student background or social standing, and it is determined by parental income, educational attainment, and occupational prestige (Walpole, 2003; Sirin, 2005). A meta-analytic literature review (Sirin, 2005) states that despite the ongoing disagreement about the conceptual meaning of SES, scholars agree with Duncan's (1961) and Featherman's (1982) definitions of SES components: parental income, parental education and parental occupation.

Recent recommendations by NCES (2012) reaffirm the tripartite nature of these SES variables (family income, parental education and parental occupation) and suggests that home neighborhood and school level SES could be used to expand the measurement of SES. This study analyzes the disadvantages and advantages of using a single variable, several single measured variables, and a composite of several measured variables, and concludes that using a composite variable for SES is more advantageous. When composing an SES variable, researchers should

determine whether and how the weights of the components vary, depending on factors pertinent to a given study. Thus, a thorough review of literature and data must be conducted before deciding the weights of the components of the SES variable (NCES, 2012).

Shavit and colleagues (2007) chose parental education and father's occupational class to represent SES in their studies of stratification in higher education. Father's class was measured using EGP and parental education was measured using the CASMIN educational schema (Muller et al, 1989 cited in Shavit et al., 2007). They contrasted participants whose fathers were in class I and II against those in V and VI. Also, those with parents with a higher education were contrasted with those whose parents have only a secondary education. The average of these two log-odds statistics provides a summary measure of the relative effects of social background on educational attainment, indicating the measure of inequality between strata in the society.

### 2.2.2   Measuring Inequality in Education: Linear Regression Model

The study that pioneered empirical studies with the linear regression of years of education as a dependent variable was conducted by Peter M. Blau and Otis D. Duncan (1967), and since then the model is referred to, simply, as the Blau and Duncan model. Blau and Duncan studied the process of occupational mobility in the US by determining how various factors "condition the influence of origins on occupational success" (Blau & Duncan, 1967, p.10). The basic question of the study was how ascriptive statuses of individuals, such as, social origin, ethnic status, birth place, and parental status affect the status they achieve later in their lives. The Blau and Duncan model introduced an alternative to the traditional approach in mobility studies at that time where

the father-to-son occupational mobility was done by cross-tabulation tables. The Blau and Duncan model of status attainment focuses on "the degree to which the dependence of occupational status of the son on his social origins is explained or interpreted by experiences or characteristics of the son that intervene between origin and destination statuses" (Sewell & Hauser 2001, p. 851).

The study used cross-sectional data from a 1962 national sample survey, and built a causal model with father's educational and occupational status, son's education, son's first job, and son's occupation. The model treated status as a continuous quantitative variable by assigning scores to the occupations based on prestige; findings revealed that educational attainment was the most influential factor in occupational status attainment (Blau & Duncan 1967, p. 125). In summarizing Blau and Duncan's results, Sewell and Hauser (2001) stated "In this basic model, educational attainment accounts for nearly all of the effects of father's occupational status and father's education on son's occupational status. Holding constant social background statuses, education was more influential, than the first job, in determining later occupational status" (p. 852). In other words, education affects occupational attainment, and direct effects of the father's occupation on initial and final occupational attainment of the son are, after education has been taken into account, minor (Haller & Portes, 1973).

Another study, conducted during the same time period as the Blau and Duncan study, was one by William Sewell and his associates at Wisconsin University, known as the Wisconsin model. Sewell and his colleagues looked at social, economic, and psychological factors in educational and occupational aspirations and attainment (Sewell & Hauser, 2001). Adding variables that considered individuals' academic ability to the Blau and Duncan model, they

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developed a model that explained the variance in educational attainment by 28% (an increase from 15% in the initial basic model) (Sewell & Hauser, 2001, p.854).

Further, they added socio-psychological variables such as parental encouragement, significant other's influence, and friend's educational plans to the model. Sewell's and his colleagues' study used longitudinal data for the high school graduating class of 1957, their earnings for the period of 1957 – 1967, and their occupational attainment in 1964. This model enabled them to account for more than 50% of variance in educational attainment in their linear regression of years of education as a dependent variable, and two-fifths of variance of early occupational status. In an analysis of the Blau and Duncan study and the Wisconsin model, Haller and Portes (1973) concluded that "both models came to identical conclusions regarding the causal order of comparable status variables. Early occupational attainment is defined, in both cases, as primarily a function of prior education" (p. 62).

For about two decades since these two studies were conducted, linear regression of years of education as a dependent variable served as the key statistical model in empirical analyses that examined the causal effect of social origin on one's educational attainment. However, the linear regression model's use of years of education as a dependent variable became problematic, later, especially when attempts were made to estimate whether there was any change in the effects of one's social origin on his/her educational attainment over years (between cohorts). In this regard, the model is disadvantaged due to the following specific characteristics.

The linear regression of years of education on social origin, first of all, conflates changes in educational attainment due to educational expansion (i.e., changes in the marginal distribution) with changes in the actual association between social origin and educational

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attainment (Breen & Jonsson, 2005). Yet, the latter is the best way of measuring inequality of opportunity, in other words, looking at whether and how socioeconomic origin affects individuals' educational attainment, and moreover, if there is any change in the effect over the years. Thus, a different statistical model was suggested by Robert Mare. This model could estimate and measure inequality of opportunity in educational attainment, which will be described in the following section.

### 2.2.3   Measuring Inequality in Education: Logistic Regression Model

During the 20th century, average schooling levels increased dramatically over cohorts due to the expansion of educational systems throughout the world. Thus, schooling differentials among various regions, genders, ethnicities, and racial groups have diminished in comparison to earlier time periods. However educational attainment among people from different socioeconomic backgrounds shows little change, according to empirical researchers, over various cohorts. Robert Mare (1980; 1981) provides a detailed description in explaining the phenomenon of educational expansion, its implications on inequality of education, and ways of measuring these aspects. According to Mare (1981), there are two important aspects in educational expansion. One is the dispersion of the formal schooling distribution—that is the variance of the marginal distribution of formal schooling. The other aspect is the extent to which, for a given degree of dispersion of the formal schooling distribution, some socio-demographic groups are allocated more schooling than others—that is the association between formal educational attainment and other social statuses (Mare, 1981, p.73).

By stating so, Mare (1981) distinguished between *distribution of schooling* and *allocation of schooling,* and emphasized the importance of understanding and explaining the change in the way that schooling is allocated to people from different socioeconomic origins, and the importance of separating the change in the allocation of schooling from the distribution of schooling. Thus, he proposed the logistic regression model, also called the continuation odds model, which is more appropriate for the estimation of socioeconomic background effect on school continuation among various cohorts over the years. The logistic regression model proposed by Mare has two advantages from the linear regression of years of education in examining the inequality of education. First, it distinguishes the changes in the associations between social origin (social strata) and school continuation probabilities from the changes in the marginal distribution (or educational expansion) of schooling (Pfeffer, 2008). As education expansion continues throughout the world, it is vital to empirically account for these distinctions. Secondly, the model allows the researcher to treat the educational career as a series of transitions between educational levels, and allows the assessment of socioeconomic origin effects for each of these transitional steps (Breen & Jonsson, 2005; Pfeffer, 2008).

Statistically, the logistic regression model shows the log odds of an individual in the probability of continuing from one schooling level to the next level, based on the value of the social background variable. And the "change effect", as a result, "is invariant under changes in the marginal distributions of the variables in the model" (Mare, 1981, p. 74). Therefore, the model estimates the effects of social origins on school continuation that are unaffected by the overall proportion of persons who continue from one level to the next. On the other hand, the linear regression model of educational attainment presents a statistical model that shows

regression coefficients that depend statistically on both marginal schooling distribution and its association with social background (Mare, 1981, p. 83).

In his study that demonstrated the logistic regression, Mare (1980) built a model with dependent variables that are log odds of continuing from one schooling level to the next, six levels in total, from elementary to post-college in 1973, for American white men 20-65 years old. The independent variables in his model represented the individuals' social and economic backgrounds to see how social background affects school continuation decisions, and how those effects vary from one educational transition to another. The conclusions of the study stated that the overall predictive ability of social origins and parental socioeconomic effects decline over schooling levels (p. 302). However, parental encouragement affects continuation decisions at higher levels of schooling, and annual family income and father's occupation, when the respondent was 16-years-old, had unusually strong effects on the school transitions.

### 2.2.4   Measuring Inequality in Education: The Two Methods Combined

Since Mare (1981), researchers have been operationalizing their studies in educational attainment, particularly studies in inequality of opportunity, to fit the logistic regression model. Moreover, there are many studies that combine both models, linear regressions and logistic regressions, in examining issues of equity in educational attainment (Shavit & Blossfeld, 1993; Shavit, Arum & Gamoran, 2007; Long, Kelly & Gamoran, 2012). For instance, in their study, which challenges the view of virtuous cycle effects of parental education on their children as the major factor for the declining educational gap between blacks and whites in the US, Long, Kelly

and Gamoran (2012) combined linear regressions with logistic regressions to estimate the changing effects of various family background characteristics for whites and blacks over time.

The linear regressions helped the authors estimate the total improvement in educational attainment among blacks in comparison to whites. The logistic regression results separated how much of the improvement in the education gap among blacks is actually the effects from family background, specifically parental education. They concluded that although family background explained a substantial amount of the black-white gap in any given cohort, the changes in family background among blacks and whites do not explain the relative improvement of blacks across cohorts. Instead, there was a noticeable independent effect of race that actually increased from .903 in the 1910s cohort to 3.2 years for the 1970s cohort (p. 25). Most of the total improvements in educational attainment in general were due to improvements in the lower two transitions (from no school to high school; from high school to some college), but these gains are not explained by family background. Instead non-family background effects were positive and statistically significant (p. 26). These findings led the authors to conclude that the virtuous cycle of parental education is not responsible for the gain in educational attainment for blacks, rather, the declining inequality could be due to non-family factors coming from individual, societa,l and policy related factors.

Another study that combined the two models is presented by Shavit and Blossfeld (1993), which analyzed how socioeconomic origin effects on the length of schooling and educational transitions changed over cohorts in 13 countries. The effects of socioeconomic origins are estimated in linear regression models of the highest school grade completed, where all socioeconomic origin is represented by father's education and father's occupation. The effects of

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socioeconomic origin on educational transitions are measured by logistic regressions of educational transitions from one level to another.

The results of the two models were compared. In the linear regressions of highest years of completed education, the changes in inequality of educational opportunity were measured by the cohort differences in the effects of social origin on attainment. The results of these linear regressions revealed mixed patterns. The authors concluded that despite evident expansion in educational systems of these countries, there was no consistent reduction in the association between social origin and educational attainment. The results of logistic regressions revealed a strong social origin effect on grade progression in the first few transitions, and later the effect declined. However, there was virtual stability in the effect across cohorts, which led to the conclusion that the noted expansion in the educational systems brought very little change in inequality of opportunity in educational attainment in these countries.

Shavit and his colleagues (2007) focused on logistic regressions of three educational transitions—eligibility for higher education, entry into higher education, and entry into first-tier higher education—for about 10-15 year cohorts as the dependent variable. The study covered 15 different countries, and used father's education and father's occupation as independent variables that represented background information for the individuals in the study.

## 2.2.5   Age-Period-Cohort Analysis and APC Intrinsic Estimator Model

Age-period-cohort (APC) analysis is used in studies of time-specific phenomena in sociology (Yang et al., 2008). APC analysis provides a useful tool in creating scientific knowledge about

the distinct effects of age, period, and cohort as categories in social research (Yang et al., 2008). Specifically,

> "APC analysis distinguishes three types of time-related variation in the phenomena of interest: *age effects*, or variation associated with different age groups; *period effects*, or variation over time periods that affect all age groups simultaneously; and *cohort effects*, or changes across groups of individuals who experience an initial event such as birth in the same year or years." (Yang et al., 2008, p.1697).

A repeated cross-sectional survey design, which is used by GSS or other national surveys is particularly useful and provides unique opportunities for APC analysis (Yang, 2008; Schwadel, 2012). It allows the researcher to pool data from all survey years and create a rectangular age by period array of respondents. Yang Yang (2008) states that although longitudinal panel study design provides data from true birth cohorts that follow identical individuals over time, pooling data from cross-sectional surveys allows demographic analysis using the synthetic cohort approach.

However, the key issue with APC analysis using repeated cross-sectional data is identified as linear dependency among age, period, and cohort (i.e., period = age + cohort) (Yang et al., 2008; Schwadel, 2012). Researchers reason that because of this linear dependency, age, period, and cohort measures cannot be simultaneously included in a standard regression model, and cohort effects are unreliable without including age in the model. Thus, studies use different methods to escape the linear dependency among age, period, and cohort in APC analysis.

In order to resolve this issue, the APC Intrinsic Estimator model (IE) was developed (Yang et al., 2008). The IE model "adjusts for the linear dependency among age, period, and

cohort through singular value decomposition of matrices" (Schwadel, 2012, p. 238). Thus it allows for the simultaneous modeling of age, period, and cohort effects, giving results of unbiased estimates of regression coefficients for the *age groups*, *time periods,* and *birth cohorts* (Yang, Fu & Land, 2004, cited in Scwadel, 2012).

In a study concerning subjective well-being and happiness of individuals throughout their life course and over time in the United States, and how the self-identified level of happiness varies by sex and race, Yang (2008) demonstrates an effective use of APC analysis. She uses General Social Surveys (GSS) from 1972 to 2004. Happiness is indicated as a single-item scale with three categories, whereas key individual level variables include age, sex, race, and education. Age is coded as a single year at last birthday (grand-mean centered and divided by 10). The analysis adjusts other variables including income, family income, marital status, health status, number of children, and religious involvement. Using hierarchical APC models with fixed effects method, the study estimates the effect of age changes in happiness. It concludes that with age comes happiness, and social disparities in happiness change over life-course, as well as the levels of happiness change over time periods. Most interestingly, cohort changes in happiness were evidenced too.

Another study (Schwadel, 2012), which challenges the simple decline of social capital in the United States over time identified by previous studies, uses APC analysis to narrow down the complexity of the decline. It distinguishes the social capital decline by period effects and cohort effects. Using GSS data from 1972 through 2010, Philip Schwadel (2012) codes independent variables age, period, and birth cohort into five-year intervals. The study concludes that informal association with neighbors declines *across periods*, however, informal association with friends

outside of the neighborhood increased *across birth cohorts*. On the other hand, formal association remained relatively stable. Moreover, trust declined *across both periods and cohorts*.

APC analysis is utilized in educational studies as well. Long, Kelly, and Gamoran (2012) use APC analysis in their study discussed in details earlier. Using GSS data from 1972 to 2006, they coded birth cohorts from 1910s to 1970s from 0 to 6. The birth cohort variable used in the analysis enabled the authors to see the change in *cohort* specific trends in family background (parents' education, father's occupation) and family structure, and consequently, estimate the changing effects of various family background on educational attainment.

In his study of effect of family background and public policy on educational attainment in Hong Kong, David Post (1993) uses Hong Kong census data from four separate years (1971, 1976, 1981, 1986), and creates individual datasets for four separate 5-year birth cohorts of youth aged 16-20 at the time of census. He runs logistic regression model for three school transitions (completion of upper primary; transition to lower secondary; transition to upper secondary) on each cohort. Part of the results indicate that the effect of mother's education stays significant and stable across the four census years. Family income (or father's income) is highly significant in all three transitions for 1971, and in the early transitions for all census years; however, it declines and becomes insignificant in the last two census years as a determinant of primary school completion.

### 2.2.6   Summary of Literature Review on Methodology

In conclusion, equality of opportunity in educational attainment is one of the most salient aspects of educational research. The presence and causes of inequality of educational opportunity among different groups, especially groups of differing socioeconomic backgrounds or groups that represent various social strata, have been a focal point of many studies in education. Preparing an explanatory variable that indicates the socioeconomic status of the participants is crucial. Studies highlight the tripartite nature of SES, and the advantage of using a composite SES over single measured variable. The key point for researchers using composite SES is to decide how the components of the variable should be weighted, which depends on the nature of the data as well as the context of the study.

Moreover, the assessment of change, if there is any in the effect of socioeconomic origin on an individual's destination from one generation to another, is still a very important agenda for empirical researchers. Both linear regressions of years of education over social origin and logistic regressions of log odds of making transitions from one schooling level to the next are utilized by quantitative researchers. Researchers are convinced that logistic regression models better estimate the "pure" social origin effect on educational attainment and the change in the effect from one cohort to another. Thus a true estimation of the "pure" change in inequality in educational attainment could be better captured by logistic regression models, especially if necessary data were available for various years/cohorts. However both models are still legitimate, which leaves it up to researchers to operationalize the best model for their studies

based on the datasets they have available in their search for answers to the questions of equity in education.

### 2.2.7   Implications of the Review Findings the Proposed Study

Mongolia was a nomadic, agrarian, feudalistic nation prior 1921. Until 1921, Mongolia did not have a systemic secular education provision. Home schooling and some type of informal education were available only for a small segment of the society. The only institutionalized education allowed at the time, was through temples where children became disciples of senior *lamas* (monks) at a young age. Students were taught and practiced Lamaism or Tibetan Buddhist teaching in mainly the Tibetan language.

During the socialist period, the financial assistance from the Soviet Union allowed the country to set up a systematic way of providing social services to the population, including education. As a result, by the mid-1980s, the People's Republic of Mongolia (PRM) became a highly literate and aspiring socialist nation with a relatively high level of scientific and cultural developments. Mongolia became an example of a country with an effective public education system, from which people could benefit relatively equally, regardless of their background in terms of gender, ethnicity, social affiliation, and residence (Suprunova, 2007). Particularly, the boarding school structure was set up effectively, which enabled almost all children of nomadic families spread throughout the vast territory of the country to attend schooling.

The Soviet policy in Mongolia during the socialist period and its impact on class struggle has been interpreted a number of ways. Scholars who support free market economic

development, clearly criticize it blaming the Soviets for their intentions to completely eliminate the khulaks (the wealthy feudal herdsmen who owned large amount of livestock) and create a flat society of mainly poor people (Baabar, 1999). However, some scholars argue that the relatively egalitarian ideology of the socialist approach had positive impacts on the development of the nation, by providing them with education, health, and social services. These services helped improve the basic human development indicators of the country. Nonetheless, the social classes of the era can be identified as a vast majority of proletariats, and herders united under the collectivist regime and small groups of intellectuals who were mainly expected to praise and advocate for the Soviets' ideology; and the politicians from a single-party system, who enjoyed limitless power and authority over the nation under direct guidance from Moscow.

Having gone through a peaceful transition from a socialist regime to a free market oriented democracy, after the collapse of the Soviet Union, Mongolia suffered severely from a drastic and abrupt economic recession, and fell into the category of the poorest countries in the world. However, a new Constitution was adopted in 1992, establishing parliamentary democracy with a multi-party political system, and granted freedom of expression, religion, and other human rights, and initiated an open-door policy for external affairs. Privatization and free trade were fully promoted, while, economic liberalization with free floating national currency was encouraged. The economy started growing significantly in 2000s. The economic growth rate was 9% in 2004-2008, and reached 17.5% and 12.3% in 2011 and 2012, respectively, mainly due to the mining sector development and foreign direct investment to mining (Asian Development Bank, 2012). However, single sector driven growth brings challenges. The fluctuations in the economy, due to mineral resource price on international market, and the changes in the interests

of foreign investors, cause instability in the economy that is still struggling to build a sufficient capital accumulation.

Although mining is the major source of the economic growth, the service sector and agriculture are still very influential in the country. Despite the noticeable economic growth, about 30% of the population was poor in 2012 (National Statistics Office, 2012). A high unemployment rate is evident due to the mismatch between skills and needs in the rapidly changing labor market and the slow pace of industrialization to absorb the work force. Moreover, the 2007 Asian economic crisis hit Mongolia hard, effecting government funding to social sectors including education (Postiglione, 2011).

Studies on social attainment or social stratification as a phenomena (or process) in post-socialist Mongolia are scarce. The Annual Statistical Yearbook, produced by the National Statistics Office of Mongolia, provides the following aggregated data on per capita monthly consumption by household deciles and consumption shares by population quintiles for 2007-2008 and 2011-2012, which are illustrated in Table 15 and 16 below.

**Table 15.** Per Capita Monthly Consumption by Household Deciles

| | 2007 – 2008 (MNT)[13] | | | 2011 – 2012 (MNT) | | |
|---|---|---|---|---|---|---|
| Household deciles | National average | Urban | Rural | National average | Urban | Rural |
| I | 30,497 | 32,191 | 29,127 | 65,264 | 66,509 | 63,539 |
| II | 42,854 | 47,787 | 39,070 | 93,282 | 98,184 | 87,227 |
| III | 52,436 | 60,180 | 46,415 | 113,795 | 122,100 | 102,941 |
| IV | 62,272 | 72,445 | 53,427 | 133,971 | 145,322 | 118,192 |
| V | 73,323 | 85,357 | 61,280 | 156,367 | 169,871 | 135,547 |
| VI | 85,847 | 99,571 | 70,471 | 181,910 | 196,605 | 154,794 |
| VII | 101,126 | 118,013 | 81,981 | 211,363 | 230,593 | 180,518 |

[13] Mongolian Togrog (national currency)

**Table 15**. (Continued)

| VIII | 122,475 | 142,174 | 96,921 | 253,368 | 276,610 | 209,999 |
|---|---|---|---|---|---|---|
| IX | 157,957 | 181,093 | 120,558 | 320,605 | 348,550 | 260,685 |
| X | 280,033 | 316,457 | 211,048 | 542,621 | 589,142 | 424,818 |
| Total average: | 100,865 | 115,501 | 81,010 | 207,235 | 224,308 | 173,780 |

Source: National Statistics Office of Mongolia, Annual Statistical Yearbook of 2008 and 2012.

The consumption distribution by household deciles, shown in Table 15, indicates a wide range, the consumption amount for decile X is nine-fold the amount for decile I. The consumption increased for the entire population from 2008 to 2012, much of which, might be explained by the declining inflation rate. As expected, urban household consumption is larger than rural household consumption. Similarly, Table 16 shows a wide range of consumption shares among population quintiles. In both years, the bottom quintile consumption is almost six times less than the top quintile.

I present the per capita consumption by household deciles and the consumption shares by population quintiles to show the variance in income and consumption by various levels among the population and the scope of differences between these levels.

**Table 16.** Consumption Shares by Population Quintiles

| | 2007 – 2008 (%) | | | 2011 – 2012 (%) | | |
|---|---|---|---|---|---|---|
| | National average | Urban | Rural | National average | Urban | Rural |
| I | 7.3 | 6.9 | 8.4 | 7.7 | 7.4 | 8.7 |
| II | 11.4 | 11.5 | 12.3 | 12.0 | 11.9 | 12.7 |
| III | 15.8 | 16.0 | 16.3 | 16.3 | 16.3 | 16.7 |
| IV | 22.1 | 22.5 | 22.1 | 22.4 | 22.6 | 22.5 |
| V | 43.4 | 43.1 | 40.9 | 41.6 | 41.8 | 39.4 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

Source: National Statistics Office of Mongolia, Annual Statistical Yearbook of 2008 and 2012.

Mongolia never had a cast system. The symbolic monarchic governance prior to the Soviet era has not left a significant mark. The seven decades of socialist ideology practiced in the country, at least aimed to build an egalitarian society with little hierarchy. In practice this did not ensure a classless society. Therefore, the fast-paced adoption of a free market economy with democratic values, in the past two decades, following the collapse of the Soviet Union, seems to characterize the current socioeconomic development of this country. Therefore, for the present study I use western models of conceptualization and framing of issues around equity, as well as methodology that are discussed throughout Chapter 2, all of which are developed and practiced predominantly in the United States. These frameworks are specified briefly as follows.

*The underlining conceptual framework utilized in the study* is the notion of equity and how equity is ensured within a social context. The understanding of equity as a concept is tied in with the two key theoretical perspectives, on which the study will leverage, in exploring the research questions proposed in the study: human capital theory and stratification theory.

I use the following definition for equity for the purpose of this study. Equity is the outcome of processes and mechanisms through which equality could be realized in practice for individuals from various different backgrounds and conditions (Underhalter, 2009). This definition of equity will stay in the center of contemplations when social and economic wellbeing of individuals is taken into considerations in the analysis of the study. Amartya Sen's (1992) suggestion to look at an individual's social status from a) the actual achievement he/she has made at any given period of time, and b) the freedom he/she has had to achieve what he/she desired to achieve, in other words, equality of opportunity the individual has had till the moment

of the judgment, will be taken into accounts when I explain the results of the analyses and their implications in the society overall.

The Human Capital theory's insights into an individual's wellbeing are centered on investment of today for the future outcomes in the forms of higher productivity that will entail better social standing and happiness. According to Human Capital theory, investing in an individual's education is one of the most important forms of that investment. Moreover, being able to make that investment has a significant impact on individuals' wellbeing. Human capital theory is one of the theoretical pillars of the present study with equity as the center point of the discussions.

Unequal outcomes in a society are unavoidable to a certain extent. Differences will be observed among individuals in their social, economic and financial wellbeing in any given society in any given period of time. However, to what extent the gaps between social strata exist and which factors play what kind of roles in exacerbating those gaps, is part of the key part of the inquisition. The Conflict theory that addresses issues of social stratification also underpins this study. The idea that education not only provides necessary skills and knowledge for individuals to succeed but also plays a role in determining the individual's group of membership and status culture, indicating the marks and labels for his/her future endeavors throughout the struggle for better positions in society (Collins, 1971; Spence, 1974; Collins, 2002) are explored in analyzing the current situations of equity in access to higher education.

*The rationalization for the methodology and specific methods chosen* for the study is as follows. As purposes of studies in social science vary, so do the methods used in the studies. Researchers try to provide an explanation for a social phenomenon through the results of their

studies and use various data analysis methods to do so. Babbie (2010) defines quantitative analysis as "the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect" (p.422). The present study utilizes quantitative methods. The datasets used in the study are secondary, cross-sectional, and probabilistic (nationally representative) data. Thus the study draws out inferential statistics and suggests generalizations about the populations from which the sample (data) were selected.

In quantitative analysis building the model is important. Treiman (2010) indicates that a "model in a quantitative analysis consists of two component: the choice of statistical procedure and the assumptions we make about how the variables in our analysis are related" (p.8). Theories and procedures used in previous studies of the relevant literature, already proven effective, provided the foundation for the construction of variables for the present study. Sequential model building technique was used in building the models used for the exploration of each research question of the study. The dependent variables of these models are either dichotomous or categorical with more than two options. Consequently, different types of logistic regression analyses were drawn.

This study understands reliability as "a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time" (Babbie, 2010. p.150). Babbie (2010) suggests that using the measures that have proved their reliability in previous research is one way to ensure reliability, which has been the key principal behind the selection of the statistical procedures chosen for each regression analysis in the study. Moreover, validity is understood as "… the extent to which an empirical measure adequately reflects the real meaning

of the concept under consideration" (Babbie, p. 153) and is taken into considerations especially

in the data preparation process of the study and constructing variables.

# 3.0    METHODOLOGY

## 3.1    RESEARCH QUESTIONS AND DATA DESCRIPTIONS

The general thesis of this study is to explore to what extent equity is insured in access to higher education in post-socialist Mongolia. The thesis, then, was divided into three overarching research questions and the sub-questions that are mentioned in the Chapter 1 of this dissertation. Chapter 3 will provide more detailed explanations about the data used in the study, as well as, specific methods and statistic procedures applied for each research questions.

Under the overarching goal of exploring the current situation of equity in access to higher education in Mongolia and how it has changed in the past two decades, the study will specifically delve into the socioeconomic status of the population and the effects of the socioeconomic status on accessing higher education for various socioeconomic status groups within the population. In doing so, the study will attempt to provide answers to the following three research questions:

1. To what extent does socioeconomic status influence access to higher education in post-socialist Mongolia?

2. To what extent are government financial assistance programs reaching their target groups?

3. How has the role of socioeconomic status in influencing access to higher education changed in the past two decades?

In examination of these research questions, I utilized two sets of nationally representative (probabilistic) cross-sectional data from the Household Social and Economic Survey: one from 2007 - 2008 (hereafter referred as HSES2008) and the other from 2010 - 2011 (hereafter referred as HSES2011), conducted jointly by the World Bank and the Statistics Office of Mongolia.

The World Bank has started conducting the Household Social and Economic Survey since early 1990s in Mongolia, shortly after the collapse of socialist regime in the country. The Survey was called Living Standards Measurement Survey, in the beginning, and, then, it was changed into the current title of Household Social and Economic Surveys. During the past few years the World Bank has been collaborating with the national statistics agency in designing and administering the survey on annual basis.

The Household Social and Economic Surveys are a nationally representative survey, which primarily aims at collecting data for the determination of: a) household income levels, b) household expenditure levels, c) update and renewal of the basket for consumer price index and weights, and d) estimation of Gross Domestic Product through consumption method. The datasets compiled from the Household Social and Economic Surveys are the only nationally representative, multi-purpose survey data, which encompass household and individual level information on all sources of income, remittance/assistance, employment, expenditure, education, and health. The Surveys also offer detailed information related with expenditures and revenues on livestock, agriculture production, including cropping and horticulture, and business enterprise. The Survey further incorporates information on all types of consumptions, such as,

consumption on energy, food, housing, durables, as well as, household and individual level loans and credits. In the following, I will describe the two sets of data separately.

### 3.1.1   Household Social and Economic Survey data of 2008 (HSES2008)

The HSES2008 used the 2005 population figures collected from local administrative units (sometimes also called local registration offices) as a sampling frame. This frame is believed to capture the in-country migration that has become more prominent, since the year of 2000. Multi-stage stratified random sampling method was applied in administering the Survey.

The Survey used three strata: a). Ulaanbaatar (capital city); b). Aimag (provincial) Centers; c). Small villages and rural areas/countryside. *Aimag* is the second tier in the administrative organization of the country, after the capital city of Ulaanbaatar. *Soum* is the third tier of the administrative organization and the *soum* centers can be translated as small villages in English. The survey administration followed these three strata, however, in the data, each household was recorded using four geographical locations: Ulaanbaatar, *aimag* centers, *soum* centers, and rural areas/countryside. The last two locations, namely, *soum* centers and rural areas/countryside, are comprised into one stratum in the survey administration. Therefore, it is easy, in the data, to distinguish each household among these four locations.

Two-stage selection strategy was used in urban areas including Ulaanbaatar and *aimag* centers (these are more urbanized areas), and three-stage selection strategy was used in the *soum* centers and countryside (rural areas). In Ulaanbaatar, first 360 *khesegs* (districts) were selected, then 10 households from each of these *khesegs*. In *aimag* capitals, 12 or 24 *bags* were selected,

and then 10 households were selected from each *bag*. In rural areas, 52 *soums* were selected,

then 12 *bags* from each *soum*, and then 10 households were selected from each *bag*.

In total, 11,172 households were selected to participate in the survey, in the result of

which, 45,510 individuals of all ages were surveyed. The following Table 17 displays the

household member status of each individuals interviewed in the HSES2008 data.

**Table 17.** Household member status for all individuals included in the HSES2008.

| Household member status | Frequency | Percentage | Cumulative percentage |
|---|---|---|---|
| head of household | 11,172 | 25.1 | 25.1 |
| wife/husband | 7,855 | 17.65 | 42.75 |
| son/daughter | 21,127 | 47.47 | 90.21 |
| father/mother | 541 | 1.22 | 91.43 |
| brother/sister/younger sibling | 833 | 1.87 | 93.3 |
| father-in-law/mother-in-law | 101 | 0.28 | 93.53 |
| brother-in-law/sister-in-law | 437 | 0.98 | 94.51 |
| grandfather, grandmother | 51 | 0.11 | 94.62 |
| grandchild | 1,992 | 4.48 | 99.1 |
| other relatives | 381 | 0.86 | 99.96 |
| non-relatives | 4 | 0.01 | 99.96 |
| other | 16 | 0.04 | 100 |
| total | 45,510 | | |

The unit of analyses of HSES2008 is a household. The head of household is identified,

first, in all households selected for the Survey, and then, everyone else interviewed for the

Survey is identified as per their relations to the head of household. There are 11,172 heads of

households and 7,855 spouses of the head of households. There are 21,127 sons and daughters in

HSES2008 which takes 47.5% of all individuals in the Survey. Moreover, there are 541 (1.22%)

father and mothers of the heads of households, as well as, 101 (.28%) fathers-in-laws and

mothers-in-laws, who live in their children's home. Many heads of households opened their

homes for their siblings (brothers and sisters), who take about 1.87% of all individuals interviewed in the Survey. There are also almost 2000 grandchildren living in the homes of their grandparents. The age of the individuals included in HSES2008 range from less than 1 year old to 99 with highest concentration at age between 13 to 21 (Figure 3).
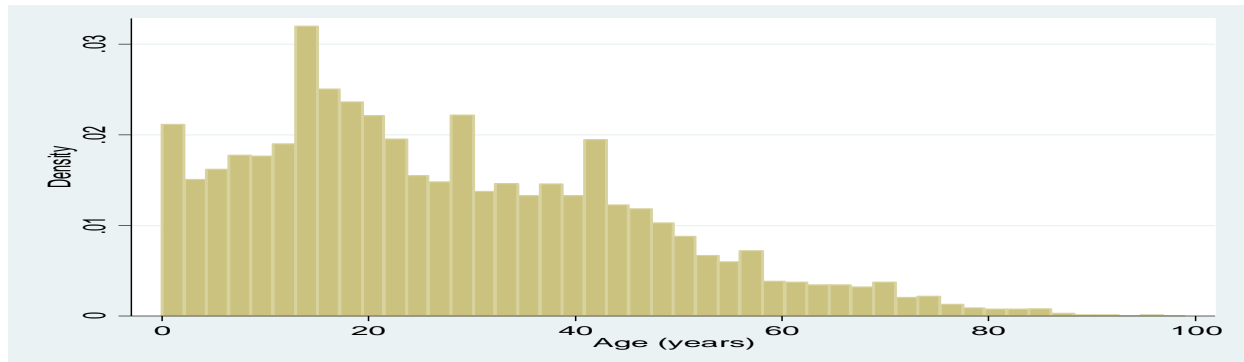


**Figure 3.** Age of all individuals interviewed in HSES2008.

About 88% of all observations in HSES2008 dataset had information indicating the highest educational attainment at the time of the survey administration. About 15% had no official educational attainment, 19% and 18% of the individuals had primary and secondary education respectively, whereas about 27.5% of them had obtained complete secondary education. Another 7.9% had obtained vocational education followed by almost 12% who had higher education diploma or bachelor level education. The remaining .4% of the individuals had a degree higher than bachelor.

### 3.1.2   Household Social and Economic Survey data of 2011 (HSES2011)

The HSES2011 was conducted using the sample frame developed by the National Statistics Office based on the 2005 administrative registration/census data (population figures from local

registration offices). In recent years the geographical distribution of the population of Mongolia has changed dramatically, therefore, the 2005 administrative registration/census based sampling frame provides an important update and significant improvement in sampling of national surveys. A multi-stage stratified random sampling method was utilized for the data collection of HSES2011. And three strata were used for sampling: a). Ulaanbaatar; b). *Aimag* centers/Provincial centers; and c). Country side (or sometimes referred to as rural areas).

In the first stage of sampling, a number of Primary Sampling Units (PSU) were selected from each of the three strata. A two-stage selection strategy was used in urban areas, including, Ulaanbaatar and *aimag* centers, and then three-stage selection strategy was used in rural areas where 10 or 8 households were selected randomly from the list of households identified in each PSU. The following provides more details on the multi-stage random sampling of HSES2011.

In Ulaanbaatar, first 360 *kheseg* (districts) were chosen, and 10 households were chosen from each of them. In *aimag* centers, first 12 or 24 *bag*s (local districts) were chosen, and 10 households from each of them were chosen. In rural areas, 52 *soums* were chosen, and 12 *bags* (soums are divided into bags) were chosen from each *soum*, and then 8 households were chosen from each *bag*. In total, 1248 PSU or clusters (*kheseg, bag or soum*) were chosen in proportional probability with their size, and were randomly distributed for data collection for 12 months of duration. That way, each month data was collected randomly from 104 households from random sub-sampling from the PSUs. This random sampling for the data collection enabled the selection of different households living in different geographical locations.

In order to develop a dataset that is nationally and regionally representative weighted sampling was utilized. The weight was used for each household in reverse relationship with its

probability of being selected. Out of 11,231 households, 3,600 households were allocated for Ulaanbaatar, 2,640 were allocated for *aimag* centers, and 4,992 were allocated for *soum* centers and rural areas. However, in the final stage of data administration, the sample that was used for this survey data was slightly lower than these, i.e., 3,572 for Ulaanbaatar; 2,639 for *aimag* centers, and 4,987 for *soum* centers and rural areas. This difference occurred due to the 34 households that were deleted from the data due to missing information. In the result, 11,198 households participated in the survey which enabled interviews with 42,538 individuals of all age for the HSES2011 survey. Table 18 illustrates the household member status of each individuals included in the HSES2011 dataset.

**Table 18.** Household member status for all individuals included in the HSES2011.

| Household member status | Frequency | Percentage | Cumulative percentage |
|---|---|---|---|
| head of household | 11,211 | 26.36 | 26.36 |
| wife/husband | 7,782 | 18.29 | 44.65 |
| son/daughter | 19,676 | 46.26 | 90.9 |
| father/mother | 510 | 1.2 | 92.1 |
| brother/sister/younger sibling | 753 | 1.77 | 93.87 |
| father-in-law/mother-in-law | 81 | 0.19 | 94.06 |
| brother-in-law/sister-in-law | 410 | 0.96 | 95.03 |
| grandpa, grandma | 38 | 0.09 | 95.12 |
| grandchild | 1,688 | 3.97 | 99.09 |
| other relatives | 355 | 0.83 | 99.92 |
| non-relatives | 34 | 0.08 | 100 |
| Total | 42,538 | | |

Each individual is identified as per his or her relations with the head of the household. There are 11,211 heads of households and 7,782 spouses of the head of households. There are 19,676 sons and daughters in HSES2011 which takes 46.26% of all individuals in the Survey.

Moreover, there are 510 (1.2%) father and mothers of the heads of households, as well as, 81 (.19%) father-in-laws and mother-in-laws who live in their children's home. Many heads of households also invited their siblings (brothers and sisters) to live with them in their household who takes about 1.77% of all individuals interviewed in the Survey. There are also 1,688 grandchildren living in the homes of their grandparents (Table 18). The age of the individuals included in HSES2011 survey data range from less than 1 year old to 99. But age range between 15 and 24 have higher frequencies than other ages (Figure 4).
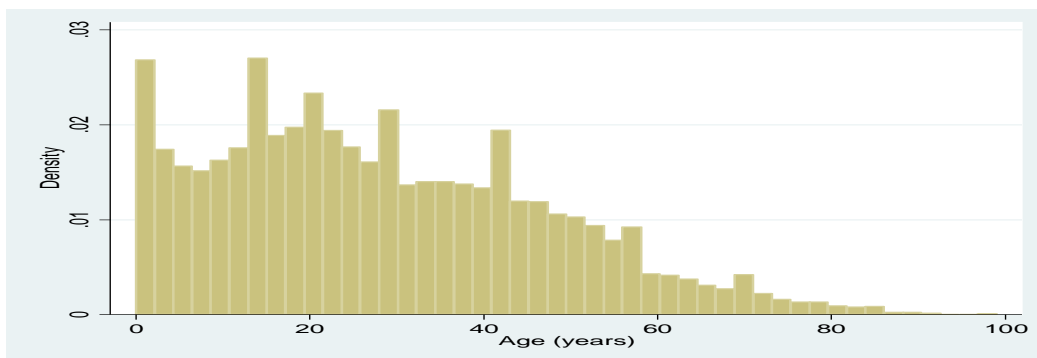


**Figure 4.** Age of all individuals interviewed in HSES2011.

About 12.6% of all individuals included in HSES2011 had no formal educational attainment. 15.6% and 20.14% had obtained primary and basic education, whereas 29% of the individuals had complete secondary education. Another 7% had completed a vocational education level, and almost 15% of them had either higher education diploma or bachelor degree. The remaining, which is about .8% or 306 individuals, had masters or doctoral level education at the time of the Survey administration.

### 3.1.3 Comparative Capacity of HSES2008 and HSES2011

Both samples are nationally representative and used almost the same sampling methods. Although it cannot be sure that the samples were drawn from the same population groups, the similar sampling methods make the two samples comparable. The sampling methods for HSES 2008 and 2011 are summarized in Table 19 below. Moreover, the profiles of the households based on their locations are displayed in Table 20 as well.

**Table 19.** Data Sampling Methods of HSES2008 and HSES2001

|  | *HSES2008* | *HSES2011* |
|---|---|---|
| Sampling method | Multi-stage stratified random sample | Multi-stage stratified random sampling |
| Sample frame | 2005 population registration figures | 2005 population registration figures |
| Number of strata | 3 (Ulaanbaatar, *Aimag* centers/provincial centers, countryside and *soum* centers) | 3 (Ulaanbaatar, *Aimag* centers/provincial centers, and countryside and *soum* centers) |
| Number of enumeration areas (primary sampling units) | 1,248 | 1,248 |
| Sample selection strategy | Two-steps, in urban areas and three-steps in rural areas | Two-steps in urban areas and three-steps in rural areas |
| Number of households | 11,172 | 11,198 (34 were excluded due to missing information) |
| Number of observations | 45,510 | 42,538 |

According to Table 20, more households in Ulaanbaatar are represented in HSES2008 than in HSES2011, but less from *soum* centers.

**Table 20.** The Weighted Distribution of the Sample Households, by strata.

| *Stratum* | *HSES2008* | *HSES2011* |
|---|---|---|
| Ulaanbaatar | 35.51% | 31.96% |
| *Aimag* centers/Provincial centers | 21.93% | 23.50% |
| *Soum* centers (small villages) | 17.31% | 20.87% |
| Countryside | 25.25% | 23.66% |

In addition, when regional representations in the two samples were juxtaposed, again, HSES2008 has more people from Ulaanbaatar, but less from central region, than the sample of HSES2011 (Table 21).

**Table 21.** The Weighted Distribution of the Sample Households, by regions.

| Region | HSES2008 | HSES2011 |
|---|---|---|
| Ulaanbaatar | 35.51% | 31.96% |
| West | 15.76% | 16.48% |
| Highland | 22.96% | 22.90% |
| Central | 17.67% | 19.48% |
| East | 8.103% | 9.18% |

Finally, as demonstrated below in Table 22, in line with the findings above, HSES2008 has slightly more households from urban areas compared to HSES2011.

**Table 22.** Weighted Distribution of the Sample Households, by Urban/Rural divide.

| | HSES 2007 | HSES 2011 |
|---|---|---|
| Urban | 57.44% | 55.46% |
| Rural | 42.56% | 44.54% |

However, as illustrated above, the two samples are fairly comparable in terms of their sampling methods, weighted distributions of sample households by strata, regions, and urban/rural divide.

## 3.2    DATA MANAGEMENT AND PREPARATION

The Household Social and Economic Survey data is made available as a number of separate data files organized by the area of content. HSES2008 consists of 22 separate data files, and HSES2011 consists of 17 data files (see Appendix 1, which illustrates the name of each file of the data files, its content, number of observations, and variables for HSES2011, for an example). Applicable files, among these data files, with the variables and content information relevant for

the analysis of each research question of the dissertation, were merged to create the working data file for each analysis. The HSES2011 data was used for responding to the research question #1 and #2, whereas the HSES2011 and HSES2008 data were combined to provide answers to the research question #3 in this study.

### 3.2.1 Data Preparation and Management of Research Question #1

The first set of research question and its sub-questions examine the effect of socioeconomic status of individuals on accessing higher education in Mongolia as of the year of 2011. The HSES2011 dataset was utilized in the operationalization of the question. The outcome and explanatory variables were created using the HSES2011 dataset for the model built for the analyses of the questions.

First, from the HSES2011 dataset, a target sample of college-age group in age from 17 to 23 was selected. From the selection, everyone who already had obtained a higher education diploma and above, as of 2011, were excluded. Moreover, everyone in the selection, who were still in the secondary school when the survey was administered, were dropped as well. Looking carefully into the *Head of Household* category in the dataset was crucial for the study, because it was used as the proxy in identifying parents, parental educational, and parental occupational information for the college-age sample. Heads of households who are not traditional heads of households or spouses (who were not assigned values of '1' or '2') were recoded into 1 or 2 based on their information on "relationship to the head". There were 32 such observations (out of n=18,993). Moreover, 2 observations from the head of household category and 4 observations

from the spouses category were deleted because they were assigned the value "other" for their highest educational level obtained, and the Code book of the HSES2011 did not provide explanation for what "other" means as a level of educational attainment.

*An outcome variable* "**College Attendance"** with a dichotomous value (0; 1) was created, indicating whether an observation is in a higher education institution (1) and not in a higher education institution (0), based on their current educational status at the time of the survey administration. Everyone, who was enrolled in any higher education institution was assigned the value "1" whereas everybody else who were not enrolled in any higher education institution was assigned the value "0". Those who were attending a vocational and technical training institutions were assigned as "0".

*The key explanatory variable* for this study was **Socio-Economic Status (SES)** of all individuals included in the college-age sample. As mentioned in the literature review section of the dissertation, there are a number of different ways of creating SES variable in empirical studies, especially, the studies that examine the relationship between educational attainment and individuals' socio-economic status. For the present study, in order to take advantage of the richness of the information HSES surveys offer, in terms of the social, economic, and financial background of the population, I chose to create a composite Socio-Economic Status (SES) variable for all observations in the model developed for the first question.

The composite SES explanatory variable was composed out of the following sub-categories:

- Household Income
- Highest parental educational attainment
- Highest parental occupation prestige index

In the following paragraphs, I will describe each of these three sub-categories of the SES, and how they were created for the college-age sample of 2011.

*Household Income* was one of the SES components. However, in order to capture the most accurate and comprehensive picture of the household income sources for households in Mongolia, Household Income itself was created as a sum of four different household income sources, namely:

1. Total annual household salary income
2. Total annual household livestock income
3. Total annual household cropping/horticulture income
4. Total annual household enterprise income

The HSES dataset offers information on all observations' annual salary amount. The total annual salaries of all members of a household were added to express the household salary income for the Household Income sub-category of the composite SES. I decided to take on the total household salary, not only parents' or father's salary, to take into considerations the culture of the Mongolian people and family values. When access to a college of a member in the family is on stake, I would argue that it is a responsibility for all individuals in the family to help and contribute to the need of the member, for the majority of families in Mongolia. Therefore, taking the total household salary into the consideration when exploring the issue of access to higher education would reflect the context better.

HSES dataset also contains information expressed in monetary values for annual revenues and expenditures for household based agriculture and non-agriculture activities. The agriculture activities include livestock, poultry, other types of farming, and horticulture. The non-agriculture activities include all types of trade and services and other household based businesses.

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For the agriculture activities, HSES data contains the total annual expenditure and the total annual revenue amount by the types of activities. As for the non-agriculture activities, HSES offers total annual expenditure for each activity. However, for revenues, the data offers three categories: high sale, average sale, and low sale for each activity, and the number of months of a year for each of these three sale levels. To simplify the calculation of the total revenue for non-agricultural activities, I took the average sale and corresponding number of months for each households to estimate the annual total household revenue from non-agricultural activities.

All expenditure and revenue information are made available in separate data files. They were transposed from long to wide files, in order to sum the grand total for each revenue and expenditure for each activity for all households included in the college-age sample. And as a result, the Household Livestock Income, Cropping/Horticulture Income, and Enterprise Income amounts were identified by the difference between the revenues and expenditures of each of the three categories.

Then the Total Household Income sub-category was created by summing up the four different income amounts from the four different household income sources. For a country like Mongolia—where livestock and agriculture sectors are still one of the most significant sources of the national economy, where unemployment rate is still high, and therefore, official salary income is only a fraction of the total national household income, and, where free market and private sector development is relatively young (since 1992) but still creates a significant part of the national revenue—taking all of these potential sources into the composition of the total

household income was important for the study. Figure 5 illustrates the compositional elements of the Total Household Income.
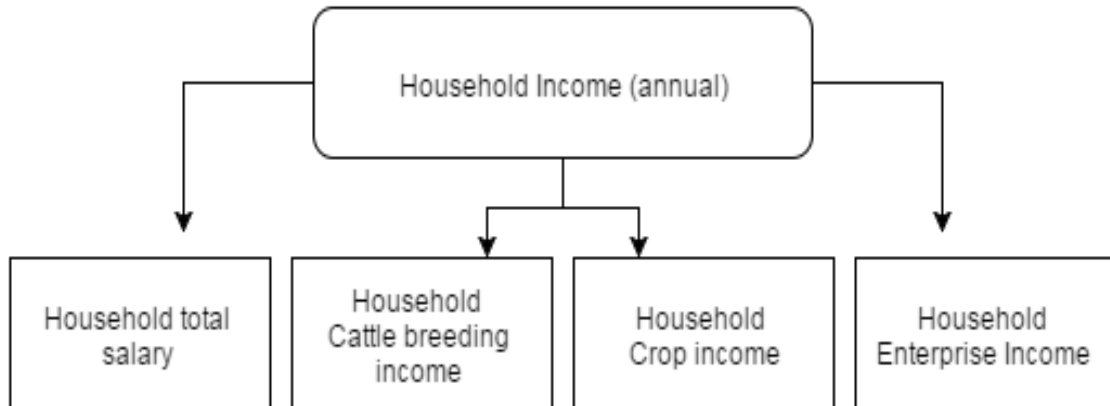


**Figure 5.** Sub-elements of Household Income Composition.

*Highest Parental Education Attainment* was the next sub-category of the composite SES variable. The highest level of educational attainment, among the two parents of each individual, was selected to represent the parental education in the SES composition. The *Head of Household* and *Wife/Husband* of the head of household were identified as a proxy to determine the parents of each individual in the college-age sample. In the original data, highest level of education obtained was indicated from 0 to 9 in ascending order referring to None, Primary, Basic, Complete secondary, Vocational, Higher education diploma, Bachelor, Master, PhD and Other. This educational attainment ranking scheme, similar to SAMIN utilized in Shavit et al.(2007) was kept as it is in the model.

Out of total 5,310 (n=5,310) observations in the college-age sample operationalized for the first question, there were 455 observations who were college-age individuals *and* heads of households or their spouses, at the same time. The parents of these 455 individuals were traced by looking at the *father/mother* and *father-in-law and mother-in-law* categories of the individual

household member status indication. However, in order to qualify for the proxy of the parental information for the college-age individuals in the sample, these parents and in-laws had to be living in the same household as their college-age children, who are *also* the heads of households.

As a result of the exploration into the data, it was found that, only 46 parents were living with their college-age children who are *also* heads of the households. Therefore, the educational attainment and occupational prestige information of these 46 parents were able to be matched with the corresponding college-age individuals in the sample. The parents of the remaining 439 college-age individuals, who are also heads of households, were not living with their children, therefore, it was impossible to identify them. Therefore, 439 observations (which is 8% of the college-age sample of n=5,310) have missing values for the parental education and occupation, which are the two sub-categories of the composite SES of the study.

*Highest Parental Occupation Prestige Index* was the next sub-category of the composite SES. The Head of Household was used as a proxy to determine the parents of the college-age individuals and the information on their occupation (in the same way as it was described under the highest parental educational attainment). In the original data the occupations were classified in a similar job prestige scheme as the EGP class (Erikson & Goldthorpe, 1992) and were assigned values from "111" to "997" which they called "sub-categories" within 9 what they also called "basic categories", in a descending order. I recoded the occupational prestige index from "2" to "10". And then in order to standardize the occupational index with the educational, I reverse-coded the occupational prestige indexes from 2 to 10 in an ascending order.

The value 1 was assigned to those individuals, who were identified as parents of the individuals of the college-age sample, yet did not have any indication under the occupational

prestige index variable in the HSES2011 dataset. The HSES2011 Occupational prestige index does not include any value for unemployed individuals. Therefore, the missing values were coded as 1, and was understood as indicating the lowest occupational prestige or the status of unemployed. And the highest parental occupational prestige index sub-category was created, with values from 1 to 10, in an ascending order.

Similar to the steps I described under the section on creation of the parental education, I traced the individuals who are registered as *father/mother* and *father-in-law* and *mother-in-law* of the heads of households living in their college-age children's households. Out of 455 observations from the college-age sample, who are either heads of households themselves or their spouses, the parents of only 16 of them lived in their children's households. Thus, I was able to extract the occupational information for them, leaving 412 (7.8%) observations with missing values for the parental occupational prestige index sub-category.

The measures of the three sub-categories of SES, *Household Income, Parental Education* and *Parental Occupation Prestige* were standardized into Z scores. And equal weights of these three components were added and averaged to identify the score for the composite SES. Figure 6 below indicates the compositional elements of the SES.
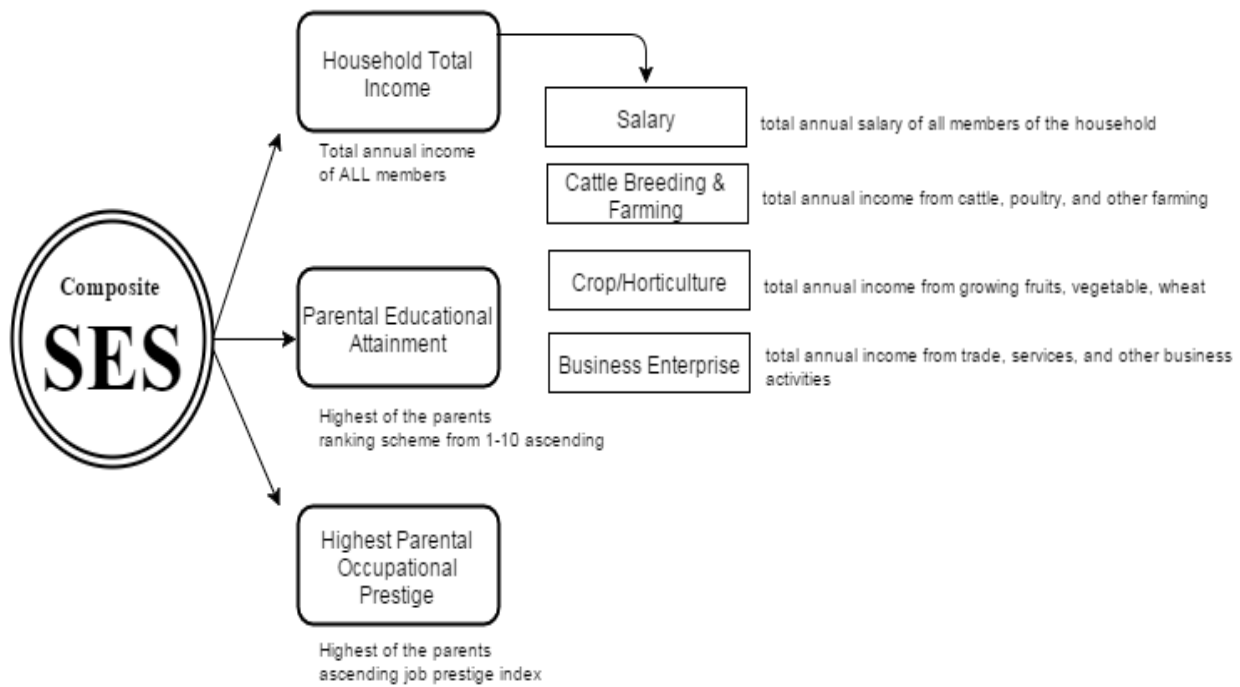
**Figure 6.** Creation of the Composite SES Continuous Variable.

The composite SES explanatory variable of the 2011 college-age sample was examined further. As a result of the examination, I found two extraordinary values on the negative end of the SES distribution. I truncated the SES by replacing the value of the two extreme observations on the negative end of the SES spectrum with the value equal to the 1st percentile value of the variable's distribution. The Appendix D provides the details of the truncation process. Table 23 below shows the SES distribution in the age-cohort sample of 2011, prior and after, the truncation.

As it shows in Table 23, the number of valid observations, median SES, and the four largest SES values did not change in the result of the truncation. The average SES changed slightly from .0291606 to .0323268, and the smallest and second smallest values were replaced by the third and fourth smallest values.

**Table 23.** Prior and Post Truncation of the Composite SES of College-age Sample of 2011.

|  |  | Original values | After truncation |
|---|---|---|---|
| Number of valid observation |  | 4871 | 4871 |
| Average SES |  | .0291606 | .0323268 |
| Median SES |  | - .0934136 | - .0934136 |
| SES level of the first four observations (smallest SES) | Smallest | - 13.53062 | - 2.508008 |
|  | 2nd smallest | - 4.127881 | - 2.072857 |
|  | 3rd smallest | - 2.508008 | - 2.072857 |
|  | 4th smallest | - 2.072857 | - 1.562106 |
| SES level of the last four observations (highest SES) | 4th largest | 3.070307 | 3.070307 |
|  | 3rd largest | 3.082736 | 3.082736 |
|  | 2nd largest | 3.493283 | 3.493283 |
|  | Largest | 3.743009 | 3.743009 |

Once the composite SES continuous variable was created, I drew the percentile distribution of it. Based on the percentile distribution results, 10 categories of SES were created for more in-depth analysis and comparisons between the lowest SES levels and the highest ones. Chapter 4, the Data Analysis and Results chapter of the dissertation, will describe the categorization of SES and what these SES categories entail, in more details.

*Control Variables* were also included in the model. Several control variables were created including, age (continuous variable), gender (dichotomous variable where female is denoted as "1"), educational level (categorical variable assigned by values 1 to 5 depending on the years of education completed as of the survey administration date), part time job (dichotomous variable where value '1' is assigned to observations who answered "yes" to question: Did you work last week?), household size (continuous variable that refers to the number of members in the household), urban (dichotomous variable where urban is assigned value "1" and rural is assigned value "0") and location (categorical variable with 4 categories: Ulaanbaatar, aimag center, soum center and country side). Moreover, marital status of the

college-age group, whether they are a head of a household or not, were included for further control as well.

## 3.2.2 Data Preparation and Management of Research Question #2

The second set of research question and its sub-questions examine whether the government financial assistance schemes, specifically, the government sponsored student loan and grant programs, which aim to reach the most marginalized and vulnerable segments of the population, are benefiting the targeted individuals as of the year of 2011. The HSES2011 dataset was utilized to provide answers to the second set of questions. The same college-age sample, selected for the purpose of exploring the first research question, was used for the analyses of the second research question.

*Outcome variable* – **Collage Access** was created. Collage Access was a categorical variable with three outcomes:

1. "Not in college": All observations from the college-age sample, who were not enrolled in any higher education institution as of 2011. This category was created based on a question in the survey "Which school, grade, year are you in?"
2. "In college": All observations from the sample, who were enrolled in a higher education institution, based on the same question in the survey mentioned above.
3. "In college with assistance": All observations, who were in college, and also received either a grant or a loan provided by the government. This category was created based on the following series of questions in the survey:

- Do you pay tuition? (dichotomous)
- Did you receive any assistance from anyone in the past 12 months? (dichotomous)
- Who or which organization gave you the assistance? (Multiple choice: State Training Fund; Business entity; NGO; Parents/children/siblings/relatives; Others such as friends, neighbors etc.; Foreign or international organization or citizen; Other).

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- What did you spend the assistance on? (Multiple choice: Household expenses; Educational/Tuition fee; Medical treatment; Housing; Holidays/Funeral; Household enterprise/business; Other).

*The key explanatory variable* for the analysis of the second set of research questions is still the composite SES (socioeconomic status). The creation of the SES was the same as described under the first research question. However, here I will describe another important explanatory variable that was created for the analysis of the second research question: **State Budget Organization Status,** which will be referred to as *SBO status* hereafter.

The explanatory dichotomous variable *SBO status* was created indicating whether the observation's parent (or both parents) work at a state budget organization, organization that is funded from the national budget created from tax revenue. SBO status variable is important, because almost 60% of the student grant program sponsored by the government is earmarked for students in higher education, who have a parent or parents working for a state budget organization. The goal of including this variable in the analysis is to identify students in higher education who have a parent(s) working for a state budget organization, and to account for them, in order to explore whether the remaining of the government grant program was reaching the students from poor families and marginalized backgrounds, as of 2011.

The following steps were made in creating the SBO status variable. In addition to the question, which asks the specific occupation of each participant of the survey, HSES also asks a multiple choice question: "What type of organization do you work with?" The answer choices are:

- Cooperative
- Cooperation
- Limited Liability Company

- Shareholding Company
- State Enterprise (large enterprises under government control)
- Local Enterprises
- ***State budget organization***
- Non-governmental organization
- Other

I selected everyone who worked for a state budget organization *and* who are heads of households, their spouses, mothers/fathers and mothers-in-law and fathers-in-laws, *as well as*, who are 38 years old and older. I set the age limit as 38, because I was only interested in parents of college-age individuals, who work for a state budget organization. There were many cases, where both parents of a household were a state budget organization employees.

Only one child is eligible for the earmarked government grant from each household, whether or not either one or both parents are employees of state budget organizations. Therefore, I transposed the data from long into wide data, and created one variable—*SBO*—that refers to a parent who is an employee of a state budget organization (whether it was a father, mother or in-laws) per household. I assigned the value "1" to the SBO status and everybody else was denoted as "0". Then I merged the transposed file to the college-age sample, making sure that only *one* college-aged individual, who is *enrolled* in a higher education institution would be marked as "1" under the SBO status variable[14].

Thus the value "1" under the variable SBO status indicated that the individual enrolled in a higher education institution in the college-age sample received government grant to pay her (or his) tuition because of her (or his) parent (or parents) is working for a state budget organization.

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[14] In order to merge the SBO variable with only ONE college-aged individuals enrolled in higher education institution, Order Y variable in both master and using data files were created. Then the two files were merged on m:1 condition on household ID and Y.

Since there are households in the college-age sample, who have multiple college-age children, as well as, multiple children going to college at the same time, making sure that only one college-aged child enrolled in a higher education institution is marked as "1" under the SBO status per household was extremely important. In order to achieve this task, the following steps were made:

a. I created "Order" and Y" variables in both *master* and *using* data files before merging the two files. The "Order" variable orders and numbers the total list of households in the college-age sample. The "Y" variable assigns the value of "1" to only one member enrolled in a higher education institution per household. All other college-aged individuals attending higher education institution in the same household is assigned a value of "0".

b. Then the two files (master and using) were merged with m:1 condition on *household ID* and the *Y* variable mentioned above.

Several *control variables* were utilized in the model as well, including, age, gender, educational level, part time job, household size, urban vs. rural and locations. Location is a categorical variable with four outcomes that refer to four different locational (administrative) hierarchies in the country. Since about 90% of all higher education institutions in Mongolia are located in the capital city, Ulaanbaatar, taking a location of origin of the college-age sample into the considerations of these analyses, was important.

### 3.2.3   Data Preparation and Management of Research Question #3

The third set of research questions are designed to explore if there has been any change in the effect of socio-economic status of students on accessing higher education in post-socialist Mongolia over the past two decades. If so, how it has changed. In order to address these questions, I used both HSES2008 and HSES2011 datasets. Several age-cohorts were pulled out from the two years of datasets. The age-cohort analysis approach was used in addressing the questions.

Most general surveys, such as the General Social Survey of the USA (GSS), contain information regarding the parental educational and occupational status of each individual interviewed. This makes drawing socio-economic status measurement for each individual included in the survey, who represent different generations, a straight forward process. Unfortunately, Household Socio-Economic Surveys (HSES) conducted in Mongolia, over the past decades, are not structured in such way. HSES offers educational and occupational information for everyone interviewed, but not for their parents.

A household is a unit of analysis in HSES, thus, the individuals interviewed for the survey are identified as per his or her relationship to the Head of the Household (which described earlier in this Chapter). Therefore, the information of the heads of households can be used as parental background information, only for their children – their sons and daughters – indicated in the survey. HSES does not offer information on parental background for the individuals who are heads of households themselves—individuals who represents older generations. Having taken the above-mentioned characteristic of HSES2008 and HSES2011 into a consideration, I took an

alternative way of identifying individuals that represent different generations—who may still have information on their parental education and occupation in the surveys.

I extracted a number of age-cohorts among the "sons/daughters" category whose parental educational and occupational information is available in the data. The result is demonstrated in Table 24 below, which shows the age-classifications among sons/daughters along with their average college entrance years (the years when they were 18 years old).

**Table 24.** Age-Cohorts of Sons and Daughters of Head of Household, 2008 and 2011

| Age-cohorts | 2011 (n) | Average College entrance year (18 yr.) | 2008 (n) | Average College entrance year (18 yr.) |
|---|---|---|---|---|
| 17 - 22 | 4838 | 2010 | 5544 | 2007 |
| 23 - 28 | 2112 | 2004 | 2042 | 2001 |
| 29 - 34 | 674 | 1998 | 673 | 1995 |
| 35 - 40 | 266 | 1992 | 273 | 1989 |
| 41 - 46 | 188 | 1986 | 124 | 1983 |
| 47 - 52 | 44 | 1980 | 39 | 1977 |
| 53 – 58 | 15 | 1974 | 9 | 1971 |
| 59 - 64 | 2 | | 3 | |
| 65 - 71 | 0 | | 2 | |

The information portrayed in Table 24 above helps identifying which specific age groups should be selected for the analyses of the third set of research questions. Since the premise of the study is to find out whether the effect of socio-economic background of students on accessing higher education in post-Socialist Mongolia has changed over the last two decades, going further back than the college-entrance year of pre-transition era would not maintain the relevance of the study. Therefore, four age-cohorts were selected for the analyses within which the college-entrance years span from as early as 1992 to 2010, covering approximately eighteen years. Table 25 and Table 26 illustrates the age-cohorts from the post-socialist era in Mongolia, for the HSES2011 and HSES2008, respectively.

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**Table 25.** Age-Cohorts from the Post-Socialist Era in HSES2011.

| Age cohort | Total number of individuals in the cohort | Mid-point of the cohort age | Average college entrance year (when they were 18 yrs.) |
|---|---|---|---|
| 17 - 21 | 4158 | 19 | 2010 |
| 22 - 26 | 2373 | 24 | 2005 |
| 27 - 31 | 818 | 29 | 2000 |
| 32 – 36 | 381 | 34 | 1995 |

**Table 26.** Age-Cohorts from the Post-Socialist Era in HSES2008.

| Age cohort | Total number of individuals in the cohort | Mid-point of the cohort age | Average college entrance year (when they were 18 yrs.) |
|---|---|---|---|
| 17 - 21 | 4816 | 19 | 2007 |
| 22 - 26 | 2339 | 24 | 2002 |
| 27 - 31 | 841 | 29 | 1997 |
| 32 – 36 | 370 | 34 | 1992 |

The four different age-cohorts from the two survey datasets were combined. I called the combined sample *age-cohorts sample* and the sample will be referred as such hereafter. The age-cohorts sample was utilized in drawing analyses for the third set of research questions of this study. The age-cohorts are illustrated in Table 27.

**Table 27.** Age-Cohorts Combined from HSES2008 and HSES2011.

| Age cohort | Total number of individuals in the cohort | Mid-point of the cohort | Average college entrance year (when they were 18 yrs.) |
|---|---|---|---|
| 17 - 21 | 8974 | 19 | 2007/2010 --- 2008 |
| 22 - 26 | 4712 | 24 | 2002/2005 --- 2003 |
| 27 - 31 | 1659 | 29 | 1997/2000 --- 1998 |
| 32 – 36 | 751 | 34 | 1992/1995 --- 1993 |

*Outcome variable* **College Attendance**, a dichotomous variable, was created for all observations in the sample. The highest education level attained at the time of the survey administration was used to determine whether the individuals have accessed higher education or not. Everybody who obtained a higher education diploma or above (including masters and

doctorate), as well as, everyone who was attending a higher education institution at the time of the survey was coded as "in college". Everybody whose education attainment was lower than a higher education diploma at the time of the survey administration was coded as "out of college".

*The key explanatory variable* was, still, the composite **SES**. A composite SES was created in the similar method as described under the previous research questions. Highest occupational rank, among two parents, was selected to represent the parental occupational information and was reverse-coded to fit with the other elements of the composite SES, from lowest to the highest level.

In HSES2008 dataset, about 22% of the parental occupational measure had missing values, indicating that number of the population did not have a "wage job" (official employment that pays recurring monthly salary) at the time of the survey administration.

The total household income was derived from

- Household salary

- Household income from livestock activity

- Household income from cropping/horticulture activity

- Household income from entrepreneurial activity

The household salary was denoted by the total amount of all salaries in a household. The household income from livestock, cropping/horticulture, and family entrepreneurial activities were calculated from the difference between the total annual expenditure and the revenue for each of these activities per household.

In HSES2008 dataset, the total revenue and expenditure of enterprise was readily calculated per enterprise for each household. However, I estimated the total household income

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from livestock related activities from the difference between the expenditure and revenue information indicated in the following:

- Three types of revenues: revenues from slaughtering and selling livestock (the survey question 9.18); revenues from selling livestock by products such as wool, hides, milk (the survey question 9.29); and revenues from selling livestock by-products as finished good (the survey question 9.31);

- Total expenditure on livestock activity (hay, drug, repairing of equipment, gas etc.)

Then all the four types of household income (salary, livestock, cropping/horticulture, enterprise) were added to create the total household income, separately, for the two years (see Figure 5).

*Household income adjustment* became necessary once the total household income amount was estimated for each household for the two years: 2008 and 2011. Household income is an important sub-category for the composite SES variable. Therefore the 2008 household income level was adjusted to bring the income to the parity of the money value of 2011, using Consumer Price Index (CPI).

The formula of this adjustment is:

**Adjusted 2008 Income = (2008 income/2008 CPI)\*2011 CPI**

Table 28 shows the CPI for Mongolia from 2007 to 2011 (source: WB[15])

**Table 28.** Consumer Price Index of Mongolia 2007 - 2011.

| Years | 2007 | 2008 | 2009 | 2010 | 2011 |
|-------|------|------|------|------|------|
| CPI   | 9    | 25.1 | 6.3  | 10.1 | 9.5  |

---

[15] Source: http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG

The interviews for the survey of HSES2008 were conducted half in 2007 and half in 2008. The last interview was administered in June of 2008. But the survey is still considered as the household socio-economic survey of 2008. However, the CPIs for 2007 and 2008 differ drastically. Therefore, in order to reflect the drastic change in the CPI from 2007 to 2008, and also, to reflect the fact that a half of the survey was done in 2007 and the other half in 2008, the formula of the adjustment was executed as the following.

$$\text{Adjusted 2008 income} = \frac{\text{2008 income}}{(\text{2007 CPI} + \text{2008 CPI})/2} \times \text{2011 CPI}$$

If the CPI indicators shown in the table above is inserted into the formula, it results in:

$$\text{Adjusted 2008 Income} = \frac{\text{2008 Income}}{(9+25.1)/2} \times 9.5$$

After adjusting the household income, the HSES2008 and HSES2011 samples were appended. The total household income, highest parental educational attainment level, and the highest parental occupational prestige index measurements were standardized by converting them into Z scores. Then the composite SES variable was created by averaging these three Z scores (see Figure 6). The combined age-cohorts sample had 16,096 observations in total (N=16,096). 39 missing values (0.24%) were deleted resulting in final sample size of N=16,057.

The composite SES explanatory variable of the combined age-cohorts sample was examined further and truncated by replacing two minimum and two maximum extreme values (four values in total) by the value equal to the 1st percentile and 99th percentile values of the variable distribution, respectively. The Table 29 below describes the SES variable prior and post the truncation.

**Table 29.** Prior and Post Truncation of the Composite SES of Age-Cohorts Sample.

|  |  | Original values | After truncation |
|---|---|---|---|
| Number of valid observation |  | 16,057 | 16,057 |
| Average SES |  | .000852 | .002498 |
| Median SES |  | -.1086295 | -.1083353 |
| SES level of the first four observations (smallest SES) | Smallest | -17.07221 | -3.054378 |
|  | 2nd smallest | -17.07221 | -3.054378 |
|  | 3rd smallest | -5.229503 | -2.410014 |
|  | 4th smallest | -3.054378 | -2.410014 |
| SES level of the last four observations (highest SES) | 4th largest | 4.419808 | 3.557377 |
|  | 3rd largest | 4.419808 | 4.006446 |
|  | 2nd largest | 4.431664 | 4.419808 |
|  | Largest | 11.47546 | 4.419808 |

As it shows in Table 29, the number of valid observations and the median SES values did not change. The average SES changed slightly from .000852 to .002498, and the smallest three values were replaced by the fourth smallest value; and the two largest values were replaced by the third largest value in the composite SES variable distribution.

## 3.3 STATISTICAL PROCEDURES OF THE ANALYSES

The literature review section (Chapter 2) of the dissertation discusses the most appropriate statistical procedures for studies on inequality in education, in particular, measuring the effect of socio-economic background of individuals on their educational attainment in quantitative research. Accordingly, logistic regression models were fit in exploring the research questions addressed in the study. In addition, descriptive statistical analyses were drawn. Moreover, multinomial logit regression models were extrapolated when the outcome variable of the models was a categorical variable with more than two outcomes.

Two and three-way contingency tables were estimated to distinguish the socio-economic status levels among the students, who received government financial assistance, after accounting for the children of employees of state budget organizations. For the questions that explore the change in the effect of socio-economic background on accessing higher education for the past decades, age-cohort analyses were drawn. A number of interaction terms between the chosen age-cohorts and various levels of SES were fit into the models to extrapolate probability of accessing higher education for each age-cohort, as well as, other variables of interest. Table 30 below provides a summary that describes the three overarching research questions, the key variables that were included in the statistical procedures, data sources, and the statistical methods that were drawn.

**Table 30.** Summary of Research Questions, Methods, and Data Sources.

| Research questions | Information needed | Data source | Statistical procedures for the data analysis |
|---|---|---|---|
| Question #1:<br>To what extent does socioeconomic status influence access to higher education in Mongolia? | SES level, age, gender, location of origin, family size, part time job. | HSES2011 | Descriptive analyses<br>Logistic Regressions Model |
| Question #2:<br>To what extent are government financial assistance programs reaching their target groups? | Status of government financial assistance, SES level, age, location, family size, student marital status, gender, parent's state budget organization employee status | HSES2011 | Descriptive analyses<br>Two and Three-way Contingency tables<br>Multinomial Logit Regressions |
| Question #3:<br>Has the role of socioeconomic status in influencing access to higher education changed in the past decades? | SES level, age-cohorts, family size, location, part time job. | Combination of HSES2007 and HSES2011 | Descriptive analyses<br>Logistic regressions<br>Age-cohort analysis |

## 3.4    RESEARCH VALIDITY AND RELIABILITY

This study understands reliability as "a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time" (Babbie, 2010. p.150). Babbie (2010) suggests that using the measures that have proved their reliability in the previous research is one way to ensure reliability. I devoted a significant portion of the literature review section (Chapter 2) of the dissertation to review and discuss the statistical procedures and techniques used in previous studies on educational attainment and access, as well as, the measures and variables chosen for such studies. The use of proven effective measures and methods in previous studies was the key principal behind the selection of the statistical procedures chosen for each regression analysis in the study.

Validity is understood as "… the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration" (Babbie, p. 153) in the study. Validity was taken into considerations especially in the data preparation and management processes of the study, in particular, in constructing key variables. Cronbach's alpha was estimated for the composite socioeconomic status (SES) variable. Homoscedasticity and multicollinearity were checked for all explanatory variables in each model. The Independence of Irrelevant Alternatives Assumptions (IIA) was performed for the multinomial logit regression by performing a Hausman test. Wald tests were run for all dummy variables and interaction terms in each model. The results of each of the above-mentioned tests are reported in the Chapter 4, under the Data analyses and results section of the dissertation.

# 4.0    DATA ANALYSES AND RESULTS

Chapter 4 will present the descriptive and inferential statistical analyses and results on:  the socioeconomic status levels and their effect on access to higher education; the role of government financial assistance programs in access to higher education; and the change in the effect of socioeconomic status on accessing higher education in post-socialist Mongolia. Chapter 4 will consist of three sections, which underline the three overarching research questions raised in the dissertation. The three sections of this chapter are entitled as: 1) Socioeconomic status and access to higher education in post-socialist Mongolia; 2) The role of government financial assistance programs in access to higher education; and 3) Social stratification in access to higher education in post-socialist Mongolia.

## 4.1    SOCIOECONOMIC STATUS AND ACCESS TO HIGHER EDUCATION IN POST-SOCIALIST MONGOLIA

The section 4.1 will address the research question #1: *To what extent does socioeconomic status influence access to higher education in Mongolia?*. And it will contain three sub-sections

entitled: 1) The college-age population and sample description; 2) Socioeconomic status (SES) of college age individuals; and 3) Socioeconomic status and access to higher education.

### 4.1.1 The Collage-Age Population and Sample Description

The HSES 2011 survey sampling used three sampling stratus, 1248 primary sampling units (indicated as clusters in the HSES2011 dataset) and each household was assigned a household sampling weight. Table 31 presents the sets of information.

**Table 31.** HSES2011 Survey Sampling Weights.

| Variables | Total | Mean | SD | Range |
|---|---|---|---|---|
| Strata | 5310 | 2.2 | .87 | 1 – 3 |
| Cluster | 5310 | 637.7 | 367.9 | 1 – 1248 |
| Household Weight | 5310 | 64.07 | 28.3 | 7.9 – 178.9 |

The household weights and strata in HSES2011 were identified and accounted for in all regression analyses (see Appendix B for details of the process). The total college-aged individuals of 2011 sample included 5,310 college-aged individuals; less than half of whom were in college at the time of sample collection; $n = 2,426$; 45.7% (see Table 32). From this point on for the rest of the dissertation the total college-aged individuals of 2011 sample used for the analyses of this study will be referred as *college-age sample*. Table 33 shows the age distribution among the individuals in the college-age sample.

**Table 32.** HSES2011 College-Age Sample.

| College attendance | Total | Percent |
|---|---|---|
| Not in college | 2,884 | 54.3% |
| In college | 2,426 | 45.7% |

**Table 33.** Age Distribution in HSES2011 College-Age Sample.

| | Age distribution | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | *17* | *18* | *19* | *20* | *21* | *22* | *23* | Total |
| Not in college | 198 | 345 | 373 | 501 | 488 | 494 | 485 | 2,884 |
| In college | 154 | 369 | 494 | 573 | 480 | 245 | 111 | 2,426 |

The individuals in the sample came from households with members ranging from 1 to 14 (see Table 34) but the average household size for all individuals was 4.6 people (*std* = 1.8; *range:* 1-14), and the average number of children from the same household in the college-age sample was 1.4 (*range*: 1-5).

**Table 34.** Household Size and College Attendance.

| Household size (number of members in the household) | In college (%) | Not In college (%) | Total (%) |
| --- | --- | --- | --- |
| 1 | 39 (1.61%) | 52 (1.80) | 91 (1.71) |
| 2 | 139 (5.73) | 242 (8.39 ) | 381 (7.18) |
| 3 | 391 ( 16.12) | 594 (20.6) | 985 (18.55) |
| 4 | 665 (27.41) | 615 (21.32) | 1,280 (24.11) |
| 5 | 587 (24.20) | 512 (17.75) | 1,099 (20.7) |
| 6 | 352 (14.51) | 444 (15.4) | 796 7(14.99) |
| 7 | 155 (6.39) | 204 (7.07) | 359 (6.76) |
| 8 | 57 (2.35) | 110 (3.81) | 167 (3.15) |
| 9 | 24 (0.99) | 51 (1.77) | 75 (1.41) |
| 10 | 6 (0.25) | 28 (0.97) | 34 (0.64) |
| 11 | 5 (0.21) | 20 (0.69) | 25 (0.47) |
| 12 | 4 (0.16) | 7 (0.24) | 11(0.21) |
| 13 | 0 (0.00) | 1 (0.03) | 1 (0.02) |
| 14 | 2 (0.08) | 4 (0.14) | 6 (0.11) |
| Total | 2,426 (100.0) | 2,884 (100.0) | 5,310 (1000) |

Table 35 shows the breakdown of demographic variables between individuals in college and not in college. These two groups, in college and not in college, differ significantly from each other on many variables. An independent-samples t-test was conducted to compare the socioeconomic status background and age of the two groups (see Appendix E for an example).

And chi-squared tests were conducted to compare the marital status, gender, work responsibility, and locations of original residence for the individuals in the two groups.

**Table 35.** Description of HSES2011 College-Age Sample.

| Variable | In College (*n* = 2,426) | Not In College (*n* = 2,884) | $P^{16}$ |
|---|---|---|---|
| | *Mean (SD)* | *Mean (SD)* | |
| Family SES | .23 (.74) | -.15 (.57) | <.001 |
| Age | 19.83 (1.54) | 20.44 (1.84) | <.001 |
| | *n (%)* | *n (%)* | |
| Location | | | |
| Ulaanbaatar | 927 (38.21) | 743 (25.76) | <.001 |
| Aimagcenter | 563 (23.21) | 609 (21.12) | .067 |
| Soumcenter | 556 (22.92) | 637 (22.09) | .470 |
| Countryside | 380 (15.66) | 895 (31.03) | <.001 |
| Female | 1359 (56) | 1180 (40) | <.001 |
| Worked Last Week | 33 (1.36) | 1108 (44.8) | <.001 |
| Married | 92 (3.8) | 405 (14) | <.001 |
| Household size | 4.59 (1.50) | 4.65 (1.94) | .225 |

Individuals who were in college came from a higher socioeconomic status background (M=.23, SD=.74), on average, than their college-aged peers who were not in college (M= -.15),

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[16] Independent sample t-tests were conducted to compare the means of continuous variables, and chi square test were conducted to compare frequency among levels of categorical variables.

SD=.57), and the difference was significant (t (4386.1) = -20.02, p<.001)[17]. Those in college were slightly younger than those who were not in college. The mean difference of the household size for the two groups was not significant. Although there were more male individuals in the college age sample (n=2771) than female individuals (n=2539), female individuals were represented significantly higher than their male peers in college and the relation between the gender and college attendance was significant, $\chi2(1) = 120.4$, $p<.001$[18]. Only 1.36% of the individuals attending college reported a part-time job, however, about 45% of individuals who were not attending a college reported working. Individuals who were not in college were significantly more likely to be married than their college aged peers who were attending a college; $\chi2(1) = 163.1$, $p <.001$).

Individuals who come from Ulaanbaatar, the capital city, are more likely to attend college ($\chi2(1) = 94.7$, $p < .001$). However, coming from an aimag center or a soum center as an original location of residence do not make a significant difference for attending a college; $\chi2(1) = 3.3$, $p = .067$; $\chi2(1) = 0.5$, $p = .047$. Yet coming from a remote rural area (countryside) is significantly related with a likelihood of not attending a college; $\chi2(1) = 170.6$, $p < .001$).

As described in Table 35 for those individuals who were in college, only 26% were attending a private school ($n = 631$) and 42% were going to school from home ($n = 1021$). Only about 5% of students indicated they were receiving some type of government financial assistance to pay their tuition ($n = 117$).

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[17] Independent sample t-test was conducted to compare means of SES continuous variable.
[18] Chi-square test was used to compare frequency among male and female categories of the variable "female".

**Table 36.** Key Characteristics of Individuals in College.

| Institutional ownership | Number (%) | Receives government assistance to pay tuition | Number (%) | Going to school from home | Number (%) |
|---|---|---|---|---|---|
| Public | 1,776 (73.2) | Yes | 117 (4.82) | Yes | 1,021 (42.09%) |
| Private | 631 (26.01) | No | 2,309 (95.18) | No | 1,405 (57.91%) |
| Other | 19 (0.78) | | | | |
| *Total* | *2,426 (100%)* | *Total* | *2,426 (100.00%)* | *Total* | *2,426 (100.00%)* |

## 4.1.2 Socioeconomic Status (SES) of College Age Individuals

The Socioeconomic status composite variable (SES) was created as a summation of six items described in Table 37. The Cronbach's alpha coefficient of SES was .65 (α=.65).

**Table 37.** The Compositions of Key Explanatory Variables SES.

| Subscales | Number | Mean | SD | Range |
|---|---|---|---|---|
| Household salary | 3240 | 5,243,564 | 4,597,435 | 50,000 – 5.96e+07[19] |
| Income from livestock | 2120 | 1,184,192 | 1,639,917 | (- 4,695,000) – 2.00e+07 |
| Income from crop | 501 | 542,937 | 1,850,502 | (-5,450,000) – 1.74e+07 |
| Income from enterprise | 835 | 3,535,994 | 1.59e+07 | (-3.54e+08) – 6.69e+07 |
| Highest parental educational level | 4871 | 4.4 | 1.5 | 0 – 8 |
| Highest parental occupational prestige | 4898 | 4.35 | 2.55 | 1 – 10 |

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[19] 5.96e+07 equals to 59,600,000.

*Total household income*: There were total 3240 households that reported annual salary amount. There were 2120 households that reported expenditure and revenue from livestock activity, whereas 501 households reported information related with cropping and horticulture activities. And finally, 835 households reported on their family-based entrepreneurial activity which involved trading, service or other types of business activities. The total annual incomes from livestock, cropping/horticulture and entrepreneurial activities were drawn from the difference between household annual expenditures and household annual revenues on livestock, cropping/horticulture and entrepreneurial activities, respectively. Therefore, there were a number of households which had negative amount of total annual income from livestock, cropping/horticulture and business activities, because these households spent more on above mentioned activities than they made as revenues. The following section describes each of the subscale items of the SES composite variable.

There were 3,240 (n=3,240) households that had reported annual salary amount (>0) in the sample. The average household annual salary[20] was MNT 5,243,564 (M=5,243,564) with SD=4,597,435 and ranged between MNT 50,000 and 5.96e+07 (see Table 37 above). Figure 7 below shows the household salary income distribution in the college-age sample.

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[20] MNT refers to Mongolian togrog, the national currency in Mongolia. In December of 2011, the US dollar and Mongolian togrog rate was, approximately, US$1=MNT1377.
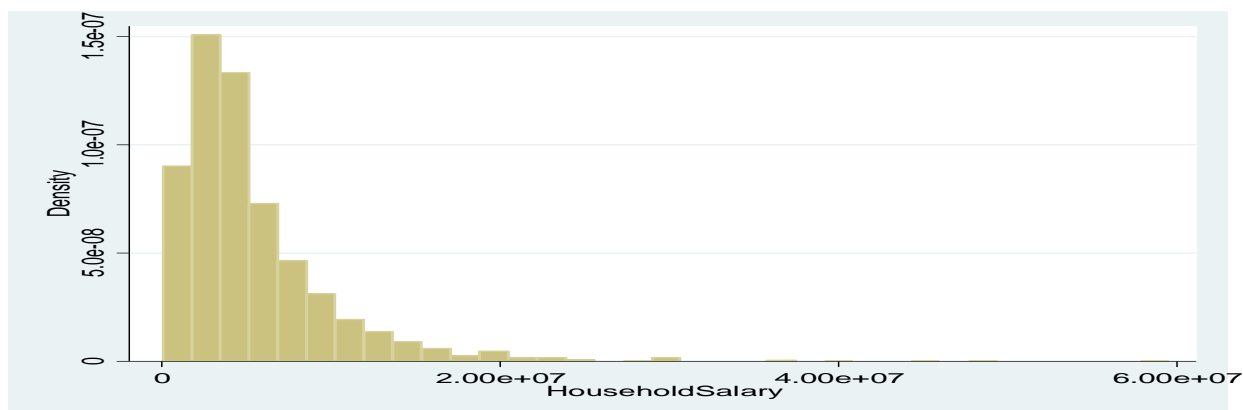
**Figure 7.** Household Salary Income Frequency Distribution.

The average income from livestock activity among the households in the college-age sample of 2011 was MNT 1,184,192 with SD=1,639,917. About 250 of the total 2,120 households had more expenditure on livestock activity than the revenue they made from the activity, which ranged from (– 4,695,000) to (– 1000) Mongolian togrogs. Table 38 shows the distributional attributes (mean, standard deviation and range) of the household income from livestock activity based on the amount of the livestock expenditure and revenue amount. The table breaks down livestock income for those with income higher than 0 and for those with income less than 0. Figure 8 shows the distribution of the household income from livestock activity subscale.

**Table 38.** Household Income from Livestock Activity.

| Total | M | SD | Range |
|-------|---|-----|-------|
| Total household income from livestock | | | |
| Total | M | SD | Range |
| 2120 | 1,184,192 | 1,639,917 | -4,695,000-2.00e+07 |
| Households with revenues higher than expenditures on livestock | | | |
| 1808 | 1,441,565 | 1,625,473 | 2500 – 2.00+07 |
| Households with revenues lower than expenditures on livestock | | | |
| 250 | -383,450 | 643,816 | (-4,695,000) – (-1000) |

125
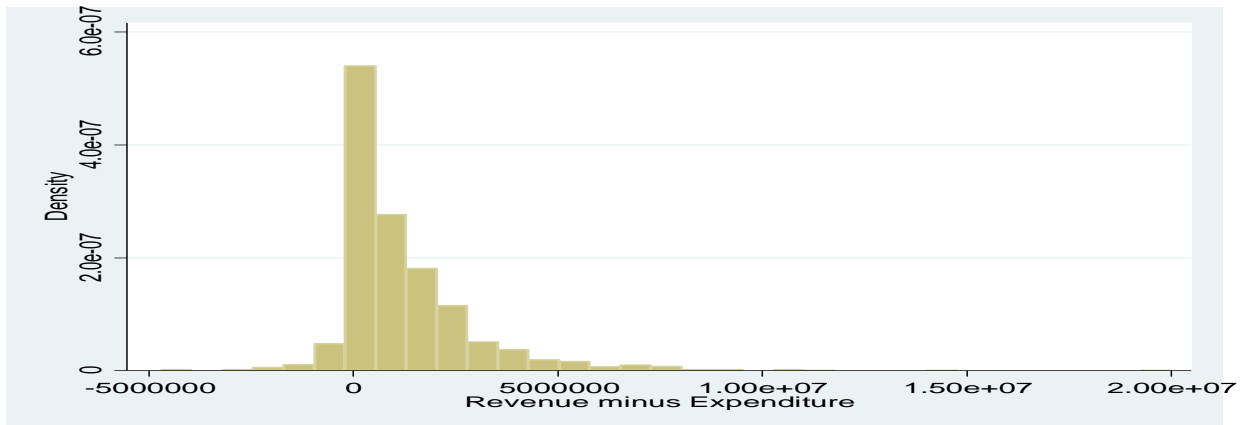
**Figure 8.** A Subscale Frequency Distribution: Household Income from Livestock.

By including the subscale item of household income from livestock, I was able to include 1,288 additional households and their total annual income information onto the total number of households with salary income as illustrated in Figure 9. Such inclusion enriches the substance of the household income variables of the college-age sample.
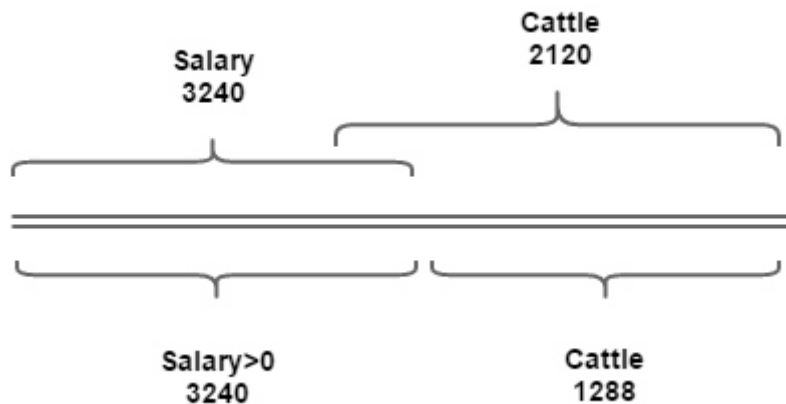


**Figure 9.** Creating Household Income: Households with Salary and Livestock Income.

There were total 501 households in the college-age sample of 2011 that reported information regarding expenditure and revenue amount on cropping and horticulture related activities (see Table 37 above). As illustrated in Table 39, 207 of these households made revenue

from their cropping/horticulture activities higher than the expenditure on the activities, whereas 244 households spent more money on cropping/horticulture activities than the amount they made as revenue from it, and the expenditure on and revenue amounts from the crop related activities balanced for the remaining 50 households in the sample.

**Table 39.** Household Income from crop related activities.

| Total household income from crop activities in the college-age sample | | | |
| --- | --- | --- | --- |
| *Total* | *M* | *SD* | *Range* |
| 501 | 543,936 | 1,850,502 | (-5,450,000) – 1.74e+07 |
| Households with revenues higher than expenditures on cropping | | | |
| 207 | 1,512,166 | 2,514,979 | 16,000 – 1.74e+07 |
| Households with revenues lower than expenditures on cropping | | | |
| 244 | -168,062 | 561,672 | (-5,450,000) – (-2000) |

For all households which either spent money or made money from crop related activities (n=501), average crop income was MNT 543,936 (with SD=1,850,502) and ranged between –5,450,000 and 17,400,000 Mongolian togrogs. The average household income from cropping for the household that made more money than they spent (n=207) was MNT 1,512,166 (with a range between 16,000 – 17,400,000). The households, that spent more on their cropping activities than what they spent, lost between 2,000 to 5,450,000 (M=168,062) togrogs in 2011. The following Figure 10 shows the distribution of household income from cropping related activities, excluding those whose expenditure and revenue balanced to zero.
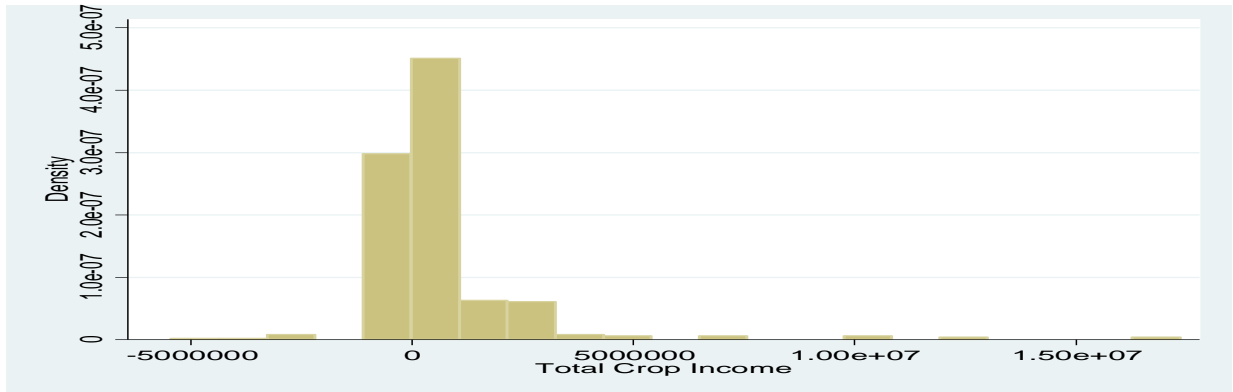
**Figure 10.** A Subscale Frequency Distribution: Household Income from Cropping/Horticulture (excluding zero balance)

By including the households with revenues and expenditures on crop/horticulture related activities into the estimation of total household income variable, I was able to draw in 222 additional households which did not have any information on household annual salary, and 57 households of these 222 did not have any information on both salary and livestock income. The creation of the household income variable is illustrated in the Figure 11below.
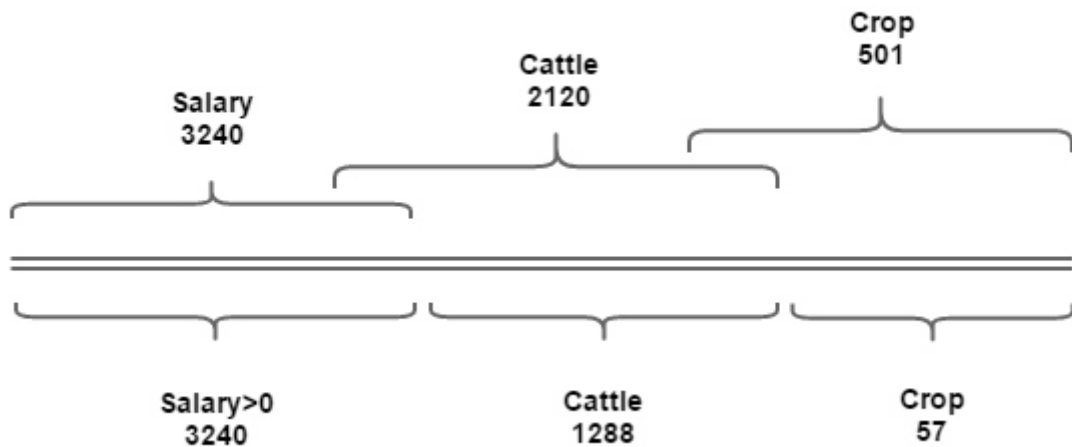


**Figure 11.** Creating Household Income Variable: Households with Salary, Livestock and Crop Income.

The final subscale of the household total annual income component was household income from family entrepreneurial activities such as trading, service, and other businesses. There were 835 (n=835) households that reported information on the amount of expenditure on and revenue from any family-based entrepreneurial activity, including business in trade, service and other types. The total annual household income on the subscale was 3,535,994 in average (M=3,535,994; SD=1.59e+07) and ranged between (-3.5e+08) and 6.69e+07. Table 40 below illustrates the frequencies of household enterprise income based on the expenditure and revenue of the enterprise activities, with a break-down between those with income higher than 0 and income below 0.

**Table 40.** Household Income from Entrepreneurial Activity.

| Total household income from entrepreneurial activities | | | |
|---|---|---|---|
| *Total* | *M* | *SD* | *Range* |
| 835 | 3,535,994 | 1.59e+07 | (-3.54e+07) – 6.69e+07 |
| Households with revenues higher than expenditures on entrepreneurial activity | | | |
| 723 | 5,378,593 | 8,526,397 | 30,000 – 6.69e+07 |
| Households with revenues lower than expenditures on entrepreneurial activity | | | |
| 105 | -8,915,884 | 3.68e+07 | (-3.54e+08) – (-4000) |

As shown in Table 40 above, there were 723 households that had a revenue higher than the expenditure on household entrepreneurial activity and the average income was 5,378,593 (SD=8,526,397) and ranged between 30,000 and 66,900,000 togrogs. Moreover, there were 105 households that lost money on their household enterprises (M = - 8,915,884) and the amount of money they lost ranged from 4000 to 354,000,000 togrogs. Finally, there were seven (n=7) households that had zero balance between the expenditure and revenue on entrepreneurial

activities. The Figure 12 below shows the total annual household enterprise income distribution in the college-age sample of 2011.
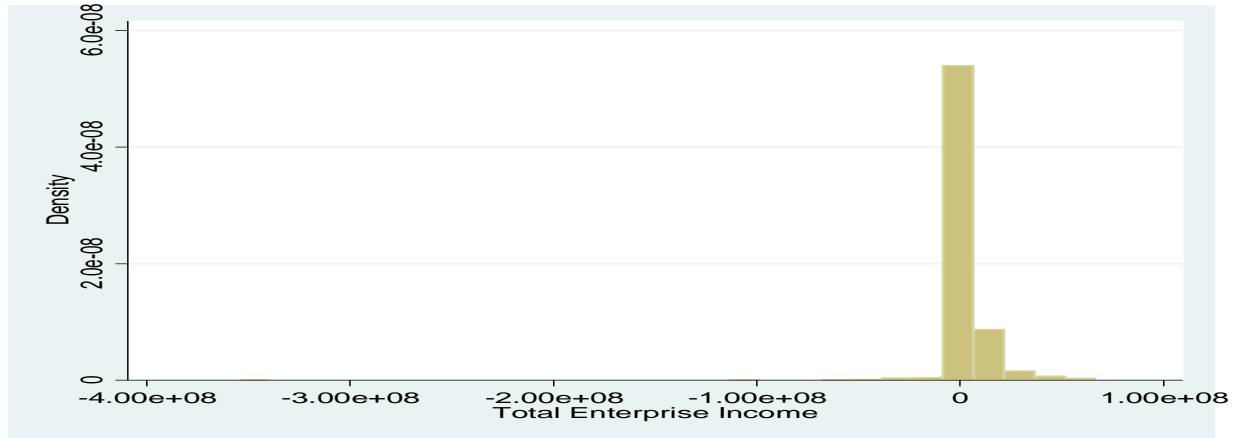


**Figure 12.** A Subscale Frequency Distribution: Household Income from Entrepreneurial Activities.

By drawing information on total annual household enterprise activities, I was able to include 423 additional households to the college-age sample that did not have any information on salary. Moreover, there were 297 households (out of the total 835) that did not have any information both on household salary and household income from livestock activity. Moreover, 277 of the total 835 households had no information on all of the previous subscales that make-up the household income component, including, salary, livestock and cropping. And Figure 13 below illustrates it.
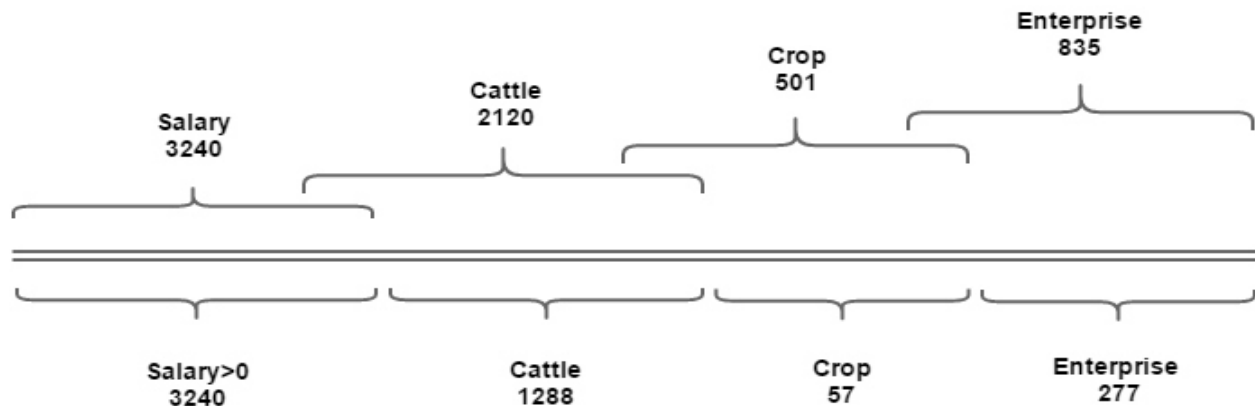
**Figure 13.** Households with Salary, Livestock, Cropping/Horticulture and Enterprise Income.

The total annual amounts of the four subscales, including, household annual salary, household income from livestock, household income from cropping/horticulture activities, and household income from entrepreneurial activity were added to create the total annual household income component of the SES composite explanatory variable. Table 41 describes the distribution of Total Household Annual Income variable in college-age sample of 2011. Out of total 5,310 households, 4714 households had a value more than 0 (M = 5,003,263; SD = 5,478,695), ranging from 2000 to 66,900,000; and 132 households had a value below 0 (M = -6,524,105; SD = 3.24e+07) that ranged between (-3.47e+08) and (-1000). There were 464 households with a value equal to 0 in the sample.

**Table 41**. Total Household Annual Income Variable, HSES2011.

| Total | M | SD | Range |
|---|---|---|---|
| Total Household Annual Income Distribution | | | |
| 5310 | 4,279,511 | 7,583,286 | (-3.47e+08) – 5.59e+07 |
| Household Annual Income level > 0 | | | |
| 4714 | 5,003,263 | 5,478,695 | 2,000 – 6.69e+07 |
| Households with more expenditures than revenues | | | |
| 132 | -6,524,105 | 3.24e+07 | (-3.47e+08) – (-1000) |

The Figure 14 shows the distribution of the total annual household income variable for the observations with a value higher than 0. Figure 15 shows the distribution of the total annual household income variable for the observations with a value less than 0. Observations with a value equal to 0 are not included in the graphs.



**Figure 14.** Frequency Distribution of Total Annual Household Income (>0)



**Figure 15.** Frequency Distribution of Total Household Income Variable Distribution (<0)

*Parental educational attainment*: The highest level of educational attainment of the two parents was selected to represent the parental educational attainment and coded in scale from 0 to 9. Table 42 and Figure 16 describe the distribution of highest parental educational attainment in

the college-age sample of 2011. Total 4,871 individuals in the college-age sample of 2011 had a value assigned for the highest parental educational attainment, 439 (8.27%) individuals of the total sample size (n=5310) had missing value for the variable due to a reason described in the Chapter 3 of the dissertation. Overall, parents of 2011 college-age individuals are well educated (see Table 42). Only 60 of them had no formal educational attainment, and about a third had completed a secondary education level, whereas approximately 16% of the parents in the sample had obtained a post-secondary vocational education. Moreover, about 22% of the parents in the sample had obtained a higher education degree, ranging from a higher education diploma to masters and doctorate levels.

**Table 42.** Highest Parental Educational Attainment in College-age Sample of 2011.

| Educational attainment level | Frequency | Percent | Cumulative percentage |
|---|---|---|---|
| 0 | 2 | 0.04 | 0.04 |
| 1 | 60 | 1.23 | 1.27 |
| 2 | 343 | 7.04 | 8.31 |
| 3 | 934 | 19.17 | 27.49 |
| 4 | 1,631 | 33.48 | 60.97 |
| 5 | 819 | 16.81 | 77.79 |
| 6 | 538 | 11.04 | 88.83 |
| 7 | 472 | 9.69 | 98.52 |
| 8 | 58 | 1.19 | 99.71 |
| 9 | 14 | 0.29 | 100.00 |
| Total | 4,871 | 100.00 | |
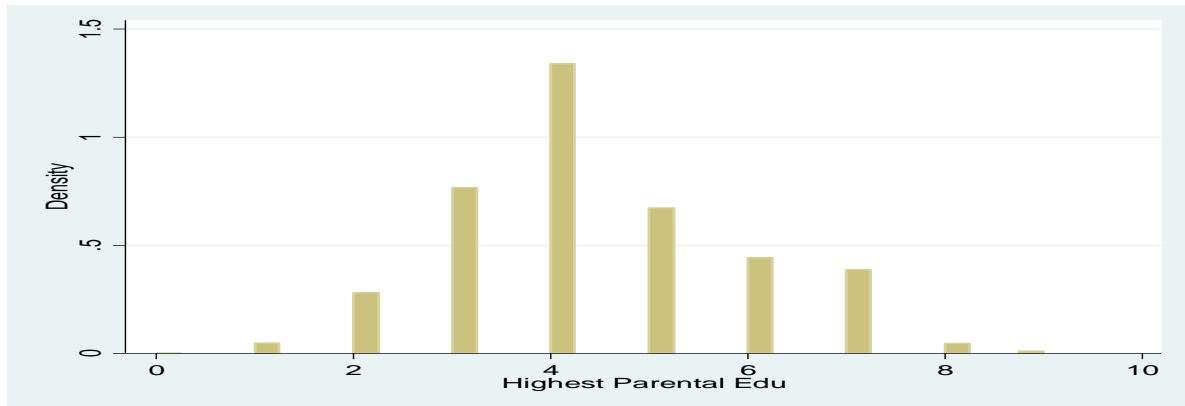
**Figure 16.** Frequency Distribution of Highest Parental Educational Attainment.

*Parental occupational level*: Parental occupational prestige index from 1 to 10 was assigned to each parent in the sample and the highest occupational prestige index among the two parents was selected to present the parental occupation. Table 43 and Figure 17 demonstrate the frequency of the variable. The value 1 was assigned to those individuals who are identified as parents of the individuals of the college-age sample, yet did not have any indication under the occupational prestige index variable in the HSES 2011 dataset. The HSES 2011 Occupational prestige index does not include any value for unemployed individuals. Therefore, the missing values were coded as 1 and understood as indicating the lowest occupational prestige or the status of unemployed. Accordingly, about 20% of the sample were estimated as unemployed.

The level of unemployment identified in the sample was checked by a juxtaposition of the status of unemployment in the original complete data of HSES2011. I went back to the original HSES2011 data, specifically, the dataset titled "individual" (see Appendix A), which contains job and employment related information for all individuals in the HSES2011 survey dataset. Having selected a sub-sample that consists of only "heads of households" and their

"spouses", I created a new binary variable "employed" (yes or no) based on the following questions:

Q# 404: Did you have a job last week? (Yes/No)

Q#405: What kind of work was it that you did last week? (5 categories)

Q#406: Do you have a regular job although you didn't work last week? (Yes/No)

Q#411: What is your job? (occupational prestige scores: 111 – 997[21])

Then I merged this data to the highest parental occupation dataset and found out that 98.1% of all observations assigned a value 1, and therefore indicated as "unemployed" in the college-age sample, was accounted by those who were marked as "no" for the variable "employed". Moreover, 31.65% of all "heads of households" and their "spouses" were unemployed as of 2011, according to HSES 2011 data. However, the level of unemployment among the parents of the college-age sample was lower than the level of unemployment reflected in the raw survey data, prior the data management I conducted. This might be due to the fact that I chose the highest occupational prestige level among the two parents to represent the parental occupational prestige level for the college-age sample.

As shown on Table 43 the occupational prestige index level 5 was the highest among the distribution (23.4%) followed by the level 6 (11%). The lowest two levels (1 and 2) took approximately 31% of the frequency compared to the highest two levels (9 and 10), which took 10% of the distribution. There were 412 (7.76% of college-age sample) observations with

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[21] The occupational prestige scores includes scores for cattle breeding, cropping and other enterprise related activities as well.

missing values due to the same reasons as the missing values for the highest parental educational attainment variable, which was explained in Chapter 3 of the dissertation.

**Table 43.** Highest Parental Occupation Index.

| Highest parental occupational prestige index | Frequency | Percent | Cumulative percentage |
|---|---|---|---|
| 1 | 1,018 | 20.78 | 20.78 |
| 2 | 531 | 10.84 | 31.63 |
| 3 | 449 | 9.17 | 40.79 |
| 4 | 449 | 9.17 | 49.96 |
| 5 | 1,147 | 23.42 | 73.38 |
| 6 | 540 | 11.02 | 84.40 |
| 7 | 101 | 2.06 | 86.46 |
| 8 | 170 | 3.47 | 89.93 |
| 9 | 377 | 7.70 | 97.63 |
| 10 | 116 | 2.37 | 100.00 |
| Total | 4,898 | 100.00 | |
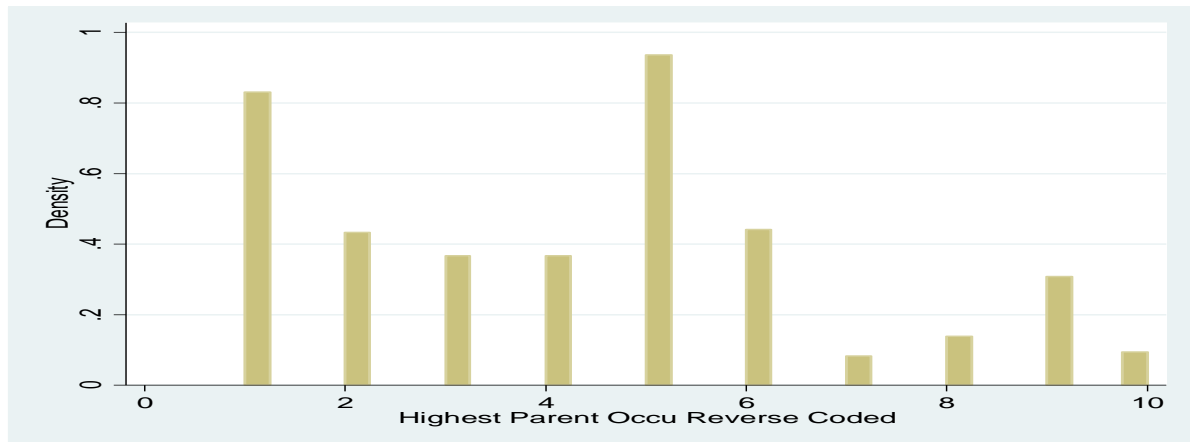


**Figure 17.** Frequency Distribution of Highest Parental Occupation Index.

*Socioeconomic status variable*: Standardized Z Score statistics were calculated from the total household annual income amount, highest parental educational attainment level, and the highest parental occupational prestige index described above. The standardized Z Score statistics are shown in Table 44 below.

**Table 44.** Standardized Z Score Statistics of Household Income, Parental Education and Occupation.

| Variables | Number | M | SD | Range |
|---|---|---|---|---|
| Total Household Annual Income | 5310 | .0589388 | .9425655 | (-43.57854) -7.842361 |
| Highest Parental Educational Attainment | 4871 | -.0196264 | .9884636 | (-2.933333) – 3.066667 |
| Highest Parental Occupational Prestige Index | 4898 | .0201225 | 1.021958 | (-1.28) – 2.32 |

Moreover, frequency distributions of Z score statistics are shown in Figures 18; 19; and 20 for

the three components of SES variabels.
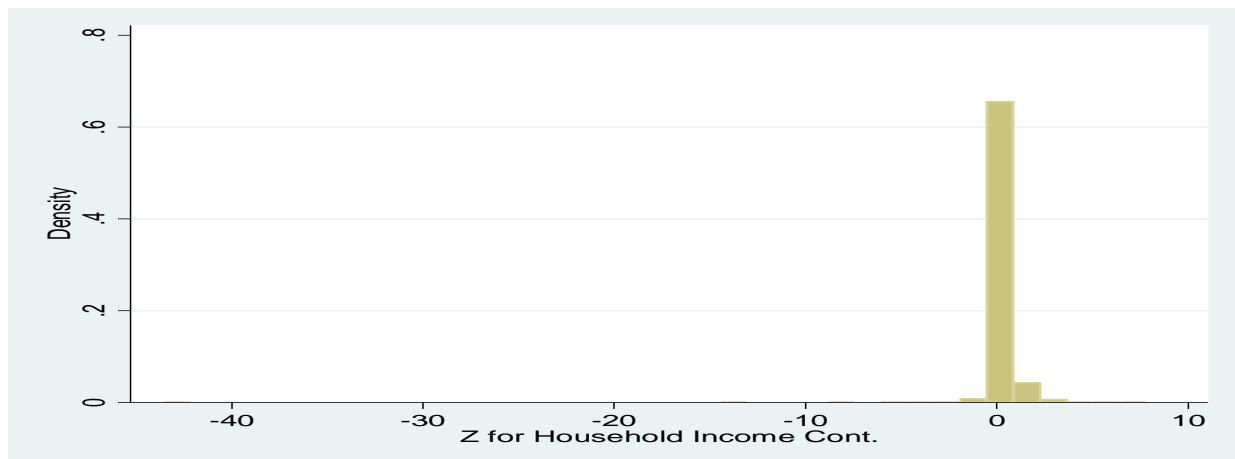


**Figure 18.** Frequency Distribution for Z score Statistics for Household Income.
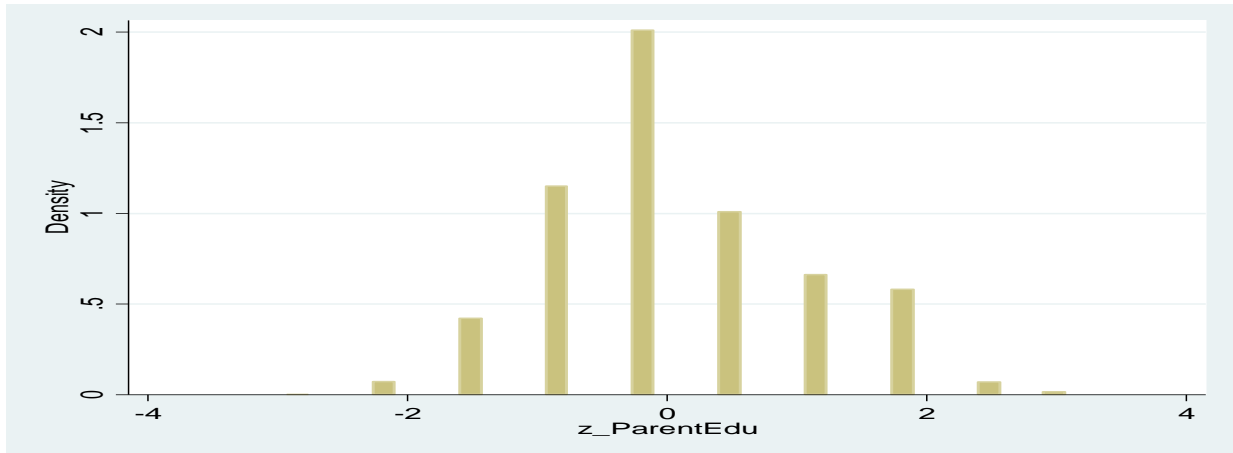
**Figure 19.** Frequency Distribution for Z score Statistics for Parental Education
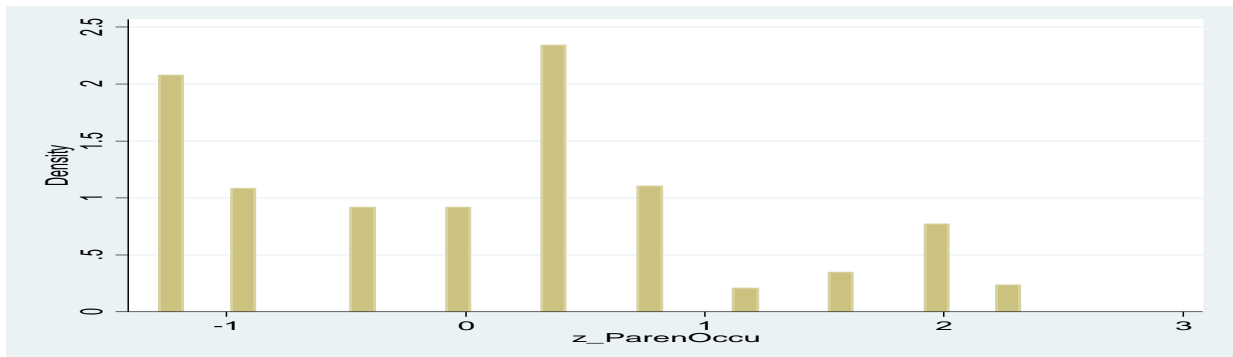


**Figure 20.** Frequency Distribution of Z score Statistics for Parental Occupational Prestige Index.

The standardized Z score statistics of the total annual household income, highest parental educational attainment, and highest parental occupational prestige index were summed and averaged to estimate the value for standardized socioeconomic status – the key explanatory composite variable SES - for all observations in the college-age sample of 2011. There were 4,871 (n = 4871) individuals in the college-age sample with a value assigned for standardized SES variable (M=.0291606, SD=.7139447, the smallest (-13.53062), the highest 3.743009).

Then the smallest two extreme values were truncated by replacing them with the value equal to the first percentile value of SES distribution (see the details of this truncation process

and Stata outputs for each step of the process in Appendix D). Table 45 demonstrates the standardized SES distribution frequencies prior and after the truncation showing the change in the values within the distribution. As shown in the table, the number of valid observation and median SES, as well as the highest four SES values are the same in the original and after truncation distribution. The average SES has changed slightly (from .0291606 to .0323268) and the two smallest values were replaced by the third and fourth smallest values.

After replacing the two extreme values on the negative end of the standardized socioeconomic status variable continuum, the final SES composite key explanatory variable was created for the college-age sample of 2011 in Mongolia (M=.0323268, SD=.6847948, Min:(-2.508008), Max: 3.743009). Table 46 describes the summary of SES composite variable; and Figure 21 describes the frequency distribution of SES.

**Table 45.** Prior and Post Truncation Process of Standardized SES.

|  |  | Original values | After truncation |
|---|---|---|---|
| Number of valid observation |  | 4,871 | 4,871 |
| Average SES |  | .0291606 | .0323268 |
| Median SES |  | - .0934136 | - .0934136 |
| SES values of the first four observations (smallest SES) | Smallest | - 13.53062 | - 2.508008 |
|  | 2nd smallest | - 4.127881 | - 2.072857 |
|  | 3rd smallest | - 2.508008 | - 2.072857 |
|  | 4th smallest | - 2.072857 | - 1.562106 |
| SES values of the last four observations (highest SES) | 4th largest | 3.070307 | 3.070307 |
|  | 3rd largest | 3.082736 | 3.082736 |
|  | 2nd largest | 3.493283 | 3.493283 |
|  | Largest | 3.743009 | 3.743009 |

**Table 46.** Summary of Standardized SES Composite Variable of 2011 College-age Sample.

| | *N* | *M* | *SD* | *Range* |
|---|---|---|---|---|
| Standardized composite SES | 4871 | .0323268 | .6847948 | (-2.508008) – 3.743009 |
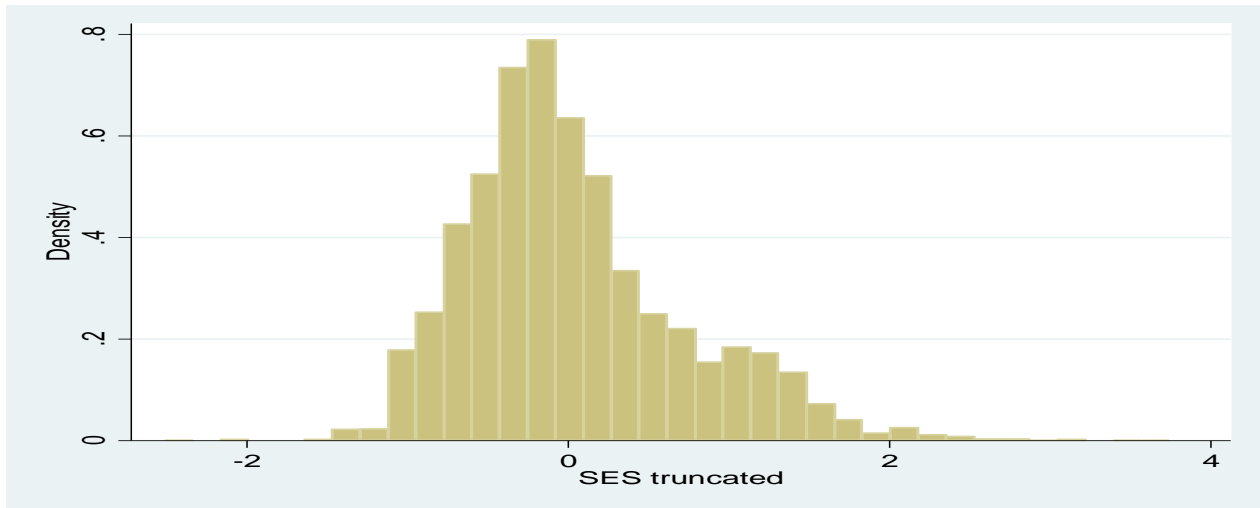


**Figure 21.** Frequency Distribution of Standardized SES for College-age Sample of 2011.

A brief observation on the SES distribution and a few households in the college-age sample reveals the following details. A family ranked among the lowest in the SES distribution lost 400,000 togrogs in livestock activity, and also lost more than 50 million togrogs in a business pursuit, and did not have any cropping activity. The highest parental educational attainment index was six, which is higher than average, and occupational prestige ranking index was two. Another family, which ranked right below the family described above, had 3,000,000 annual salary income, had no activity in either livestock or cropping, however, had some household business activity where they lost about 400,000 togrogs. The family's parental educational attainment was four with occupational prestige index of two.

Two families ranked approximately in the middle level of the SES distribution tell rather different stories. The first family did not have any salary, but 3,300,000 togrogs income from

livestock related activities and had no indication of involvement in household enterprise/business activity. The parental educational attainment was three with occupational prestige index five. One may assume that this family's key income generator is livestock. The second family did not indicate any salary income either, but made at least 1,103,000 togrogs from livestock related activities. The family did not get involved in any crop/horticulture or business activities. The educational attainment score was four whereas the occupational prestige index was five.

Finally, two households, ranked among the highest SES group, present more details as well. The first household earned 10,800,000 togrogs from salary in 2011. The family did not get involved with either livestock, horticulture or enterprise activities. The educational attainment level was five and the occupational prestige index was nine. One may assume that the parents of this family work for an organization and works a high-up ranking position, with a stable salary income. The second family, however, did not earn any income through salary. Rather they made almost 70 million togrogs from the household business activity in 2011. The parental educational attainment level was six and occupational prestige index score was 10 for the family.

### 4.1.3   SES and Access to Higher Education

A logistic regression was run to determine the effect of standardized family SES on college attendance. The reduced-form equation of the logistic regression model is shown below:

**Equation 1. Logistic regression on college attendance**

$$logit(collegeattend) = \beta_0 + \beta_1 SES$$

Survey weights, primary sampling units, and strata were accounted for in the model. 4,871 (four thousand eight hundred seventy-one) individuals had complete data and were used to build this model and subsequent models. Standardized family SES significantly predicted college attendance; $F(1, 1168) = 178.46$, $p < .001$. For every standardized unit increase in family SES, an individual was 2.3 times more likely to attend college ($OR = 2.3$ (95% CI: 2.04-2.61), $SE = .144$, $t = 13.36$, $p < .001$. However, Pearson goodness-of-fit test on the model showed that there was an evidence that the model fit the data poorly; $F(9, 1160) = 2.43$, $p = .010$.

A second logistic regression was run to see if standardized family SES predicted college attendance after accounting for age, gender, marital status, household size, and region of origin (Ulaanbaatar, Aimagcenter, Soumcenter, or the countryside). The reduced-form equation of the logistic regression model is shown below:

**Equation 2. Logistic regression on college attendance full model**

$$logit(collegeattend)$$
$$= \beta_0 + \beta_1 SES + \beta_2 age + \beta_3 female + \beta_4 married + \beta_5 hhsize$$
$$+ \beta_6 aimagcenter + \beta_7 soumcenter + \beta_8 country$$

Overall, the variables significantly predicted college attendance, $F(8, 1161) = 47.93$, $p < .001$, and there was no evidence for lack of fit; $F(9, 1160) = .95$, $p = .478$. The effect of SES remained significant, for every standardized unit increase in family SES, an individual was around 2 times more likely to attend college; $OR = 2.09$ (*95% CI:* 1.84-2.38), $SE = .14$, $t = 11.08$, $p < .001$ (Table 47).

The other variables also significantly predicted college attendance, even after controlling for SES. Younger individuals were more likely to be attending college than older ones; $OR = .85$

(*95% CI:* .81-.88), *SE* = .02, *t* = -7.85, *p* < .001 (Table 47). A one-person increase in household size was associated with a 5% decrease in the odds of attending college; *OR* = .95 (*95% CI*: .91-.99), *SE* = .02, *t* = -2.07, *p* = .039. Females were almost 2 times more likely to attend college than males; *OR* = 1.99 (*95% CI*: 1.75-2.27), *SE* = .13, *t* = 10.31, *p* < .001 (Table 47).

Marital status also had a negative effect on college attendance, married individuals were 50% less likely to be in college; *OR* = .51 (*95% CI*: .33-.78), *SE* = .11, *t* = -3.06, *p* = .002. The location where the individual was living was also significantly related to college attendance; F(3, 1166) = 12.17, p < .001. Living in Aimagcenter, Soumcenter, or the countryside resulted in a decrease in likelihood that the individual would attend college when compared with living in Ulaanbaatar (Table 47).

**Table 47.** Results of a Logistic Regression Predicting College Attendance by Standardized Family SES in College-age Sample.

| Variable | OR (95% CI) | SE | t | p |
|---|---|---|---|---|
| Standardized Family SES | 2.09 (1.84, 2.38) | .14 | 11.09 | <.001 |
| Age | .85 (.81, .88) | .02 | -7.85 | <.001 |
| Female | 1.99 (1.75, 2.27) | .13 | 10.31 | <.001 |
| Married | .51 (.33, .78) | .11 | -3.06 | .002 |
| Household size | .95 (.91, .99) | .02 | -2.07 | .039 |
| Location[22] | | | | |
|   Aimagcenter to Ulaanbaatar | .76 (.60, .97) | .09 | -2.26 | .024 |
|   Soumcenter to Ulaanbaatar | .76 (.61, .96) | .09 | -2.36 | .019 |
|   Countryside to Ulaanbaatar | .51 (.41, .63) | .06 | -6.05 | < .001 |

The functional form of standardized family SES was also examined to determine if the changes in odds were different between each standardized level. To do so, the standardized SES variable was divided into ten (10) equal levels, based on its percentile distribution, in ascending order, from lowest SES level (SES1) to the highest SES level (SES10). Table 48 shows the ten SES levels.

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[22] Overall test of location; $F(3, 1166) = 12.17$, $p < .001$.

**Table 48.** Ten Levels of Standardized SES of 2011 College-age Sample.

| Family SES categorical variable | Frequency | Percent |
|---|---|---|
| SES group 1 | 497 | 10.00 |
| SES group 2 | 486 | 9.98 |
| SES group 3 | 489 | 10.04 |
| SES group 4 | 488 | 10.02 |
| SES group 5 | 484 | 9.94 |
| SES group 6 | 489 | 10.04 |
| SES group 7 | 486 | 9.98 |
| SES group 8 | 487 | 10.00 |
| SES group 9 | 491 | 10.08 |
| SES group 10 | 484 | 9.94 |
| Total | 4,871 | 100.00 |

The ten categories of socioeconomic status groups were explored further in terms of each subscale items of the SES composite variable. The Tables 49 below describe the average value and range of each subscale for all ten SES groups.

**Table 49.** Ten SES Groups by SES Subscale Items.

SES Group 1

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 487 | 804271.5 | 1368553 | 0-7,800,000 |
| Livestock income | 206 | 574721.1 | 836481 | -1,940,000 – 3,750,000 |
| Crop income | 49 | 115069.4 | 454269.6 | -500,000 – 2,517,000 |
| Enterprise income | 46 | -1.50e+07 | 5.54e+07 | -3.54e+08 – 9,868,000 |
| Parental education | 487 | 2.46 | .79 | 0 – 6 |
| Parental occupation | 487 | 1.33 | 1.01 | 1-9 |
| SES | 487 | -.95 | .20 | -2.50 – (-.69) |

SES Group 2

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 486 | 1098578 | 1996311 | 0-14,200,000 |
| Livestock income | 162 | 800107.3 | 998881.3 | -1,782,000 – 5,288,000 |
| Crop income | 41 | 76380.49 | 199974.6 | -100,000 - 740,000 |
| Enterprise income | 38 | 966447.4 | 1447609 | -2,460,000 - 3,975,000 |
| Parental education | 486 | 3.3 | .87 | 1 – 4 |
| Parental occupation | 486 | 2.13 | 1.64 | 1 – 6 |
| SES | 486 | -.61 | .06 | -.69 – (-.51) |

SES Group 3

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 489 | 1642331 | 2129220 | 0 – 10,800,000 |
| Livestock income | 226 | 811364.2 | 1221748 | -1,970,000 – 5,809,500 |
| Crop income | 49 | 136591.8 | 543135.9 | -810,000 – 2,264,200 |
| Enterprise income | 75 | 1318720 | 2097180 | -1.16e+07 – 4,800,000 |
| Parental education | 489 | 3.65 | .87 | 2 – 5 |
| Parental occupation | 489 | 2.84 | 1.60 | 1 – 6 |
| SES | 489 | -.41 | .05 | -.51 – (-.33) |

SES Group 4

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 488 | 1645305 | 2551298 | 0 – 15,000,000 |
| Livestock income | 297 | 1378277 | 1012399 | -1513000 – 7,423,000 |
| Crop income | 52 | 339910.4 | 938671.7 | -2,750,000 – 3,302,000 |
| Enterprise income | 54 | 1541822 | 3964828 | -9,800,000 – 11,600,000 |
| Parental education | 488 | 3.69 | .91 | 2 – 6 |
| Parental occupation | 488 | 3.64 | 1.57 | 1 – 7 |
| SES | 488 | -.29 | .03 | -.33 – (-.23) |

SES Group 5

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 484 | 2240158 | 2413471 | 0 – 10,600,000 |
| Livestock income | 245 | 1211086 | 1485718 | -1,002,000 – 6,119,600 |

**Table 49. (Continued)**

| | | | | |
|---|---|---|---|---|
| Crop income | 59 | 1202146 | 2666602 | -838,000 – 12,100,000 |
| Enterprise income | 82 | 2079184 | 2384936 | -4,420,000 – 9,900,000 |
| Parental education | 484 | 3.99 | .78 | 2 – 6 |
| Parental occupation | 484 | 3.86 | 1.40 | 1 – 6 |
| SES | 484 | -.15 | .04 | -.23 – (-.09) |

SES Group 6

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 489 | 2967266 | 3276418 | 0 – 13,300,000 |
| Livestock income | 205 | 1825540 | 1766554 | -2,200,000 – 8,880,600 |
| Crop income | 48 | 688800 | 1032556 | -345,000 – 3,400,000 |
| Enterprise income | 84 | 2250976 | 2583371 | -8,600,000 – 11,000,000 |
| Parental education | 489 | 4.26 | .83 | 2 – 7 |
| Parental occupation | 489 | 4.15 | 1.41 | 1 – 10 |
| SES | 489 | -.02 | .04 | -.09 – .05 |

SES Group 7

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 486 | 3419077 | 3800735 | 0 – 21,600,000 |
| Livestock income | 205 | 2006385 | 2434964 | -1,284,000 – 10,400,000 |
| Crop income | 52 | 1244131 | 2613767 | -690,000 – 10,300,000 |
| Enterprise income | 86 | 3168074 | 4871718 | -15,300,000 – 16,000,000 |
| Parental education | 486 | 4.66 | .89 | 3 – 8 |
| Parental occupation | 486 | 4.43 | 1.55 | 1 – 10 |
| SES | 486 | .14 | .05 | .06 - .23 |

SES Group 8

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 487 | 4100598 | 3896919 | 0 – 21,700,000 |
| Livestock income | 161 | 1429040 | 2276293 | -2,070,000 – 20,000,000 |
| Crop income | 63 | 289999.2 | 1139192 | -4,150,000 – 2,542,450 |
| Enterprise income | 137 | 3975696 | 4420370 | -6,610,800 – 25,300,000 |
| Parental education | 487 | 5.12 | 1.00 | 3 – 8 |
| Parental occupation | 487 | 5.20 | 1.77 | 1 – 10 |
| SES | 487 | .37 | .09 | .23 - .54 |

SES Group 9

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 491 | 5908570 | 4982319 | 0 – 36,000,000 |
| Livestock income | 142 | 1009809 | 1906897 | -1,646,000 – 11,400,000 |
| Crop income | 55 | 256839.3 | 906251.6 | -2,215,000 – 2,825,000 |
| Enterprise income | 106 | 6033343 | 6968248 | -5,100,000 – 41,400,000 |
| Parental education | 491 | 5.81 | 1.01 | 2 – 8 |
| Parental occupation | 491 | 6.59 | 2.12 | 1 – 10 |
| SES | 491 | .78 | .15 | .54 – 1.06 |

**Table 49. (Continued)**

SES Group 10

| Subscales | N | M | SD | Range |
|---|---|---|---|---|
| Household salary | 484 | 9682190 | 6976844 | 0 – 59,600,000 |
| Livestock income | 107 | 423033.2 | 1873602 | -4,695,000 – 14,200,000 |
| Crop income | 26 | 1454462 | 4871179 | -5,450,000 – 17,400,000 |
| Enterprise income | 65 | 21400000 | 17200000 | -4,485,000 – 66,900,000 |
| Parental education | 484 | 6.74 | .81 | 3 – 9 |
| Parental occupation | 484 | 8.51 | 1.57 | 1 – 10 |
| SES | 484 | 1.46 | .38 | 1.06 – 3.74 |

The number of families that make income from various sources, including, salary, livestock, cropping/horticulture activity, and enterprise are shown in the Figure 22. As shown in the graph, the number of families that have regular salary income increases as the socioeconomic status climbs upwards. The number of families that are involved with livestock (which may mostly be herders) is highest on SES 4 level, slightly below the average of the SES spectrum, and decreases as the SES level goes up. It shows that the number of families that are involved in cropping/horticulture as a source of income is low when compared to the number of families with other means of income sources, but stays consistent throughout the ten SES levels.

The number of families that are involved in a some type of household entrepreneurial activity, including trading, service and other business pursuits, are slightly higher than the number of cropping/horticulture families, however, are well below the number of families that make income from, both, salary and livestock. The entrepreneurial families are found throughout the entire SES spectrum as well.
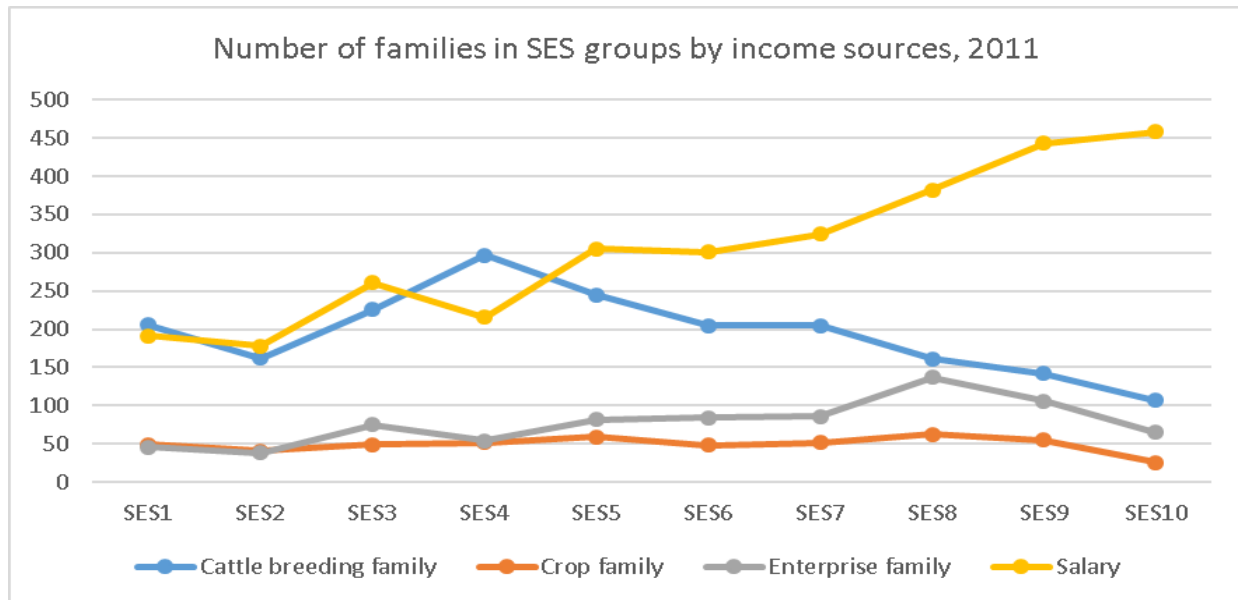
**Figure 22.** Numbers of Families in Ten SES Groups by Income Sources.

Figure 23 shows the average values of the four subscales of household income throughout the ten SES levels. The average annual household salary increases consistently throughout the SES levels. Income from livestock activity is highest on SES level 6 and 7, above the average of the socioeconomic status spectrum, moreover, the households from the lowest and highest SES levels made the least, on average, from livestock activity. The amount of average income made from cropping/horticulture is higher on SES level 5 and 7, and the highest on SES level 10. It is the lowest among the poorest three levels of SES.

Families of all SES groups have tried some type of family enterprise. The average amount of income from such enterprises increased steadily from SES level 2 through SES level 9, except a notably high surge on SES level 10, as well as, a drastic loss on enterprise among families from SES level 1. These extreme dynamics of household business enterprise activities may have influenced these families to be places in those particular SES groups as well.
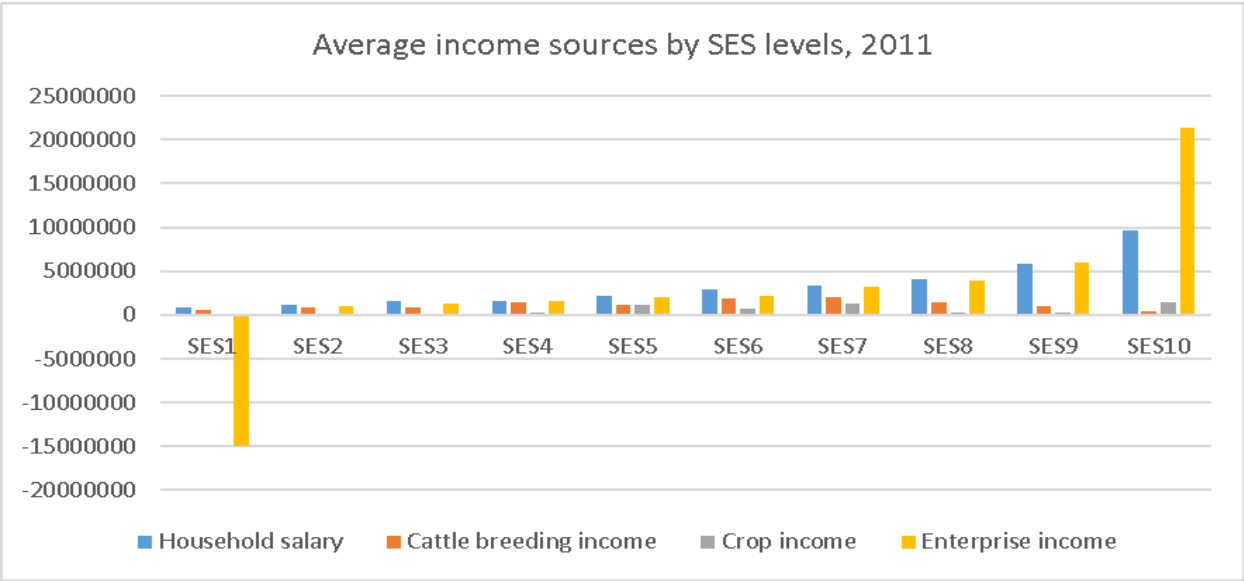
**Figure 23.** Household Average Income Sources by SES Levels.

The next Figure 24 demonstrates the percentage compositions of household income by the four subscales throughout all SES levels. Household salary is an important contributor to the household annual income throughout the entire socioeconomic status levels. The second most consistent contributor is the income from enterprise. The enterprise activity has the most impact on the highest and the lowest SES levels. Moreover, the percentage of income made from livestock is highest on SES level 2, and it gradually decreases as the SES levels go upwards. The percentage is the least on SES level 10 and 9, the two wealthiest groups in the country.

Finally, making money from cropping/horticulture takes the least percentage in the total annual household income in comparison to the other three sources for all SES groups. The percentage is slightly higher for the mid-levels, including SES level 5, 6 and 7, but is very little for the rest of the groups.

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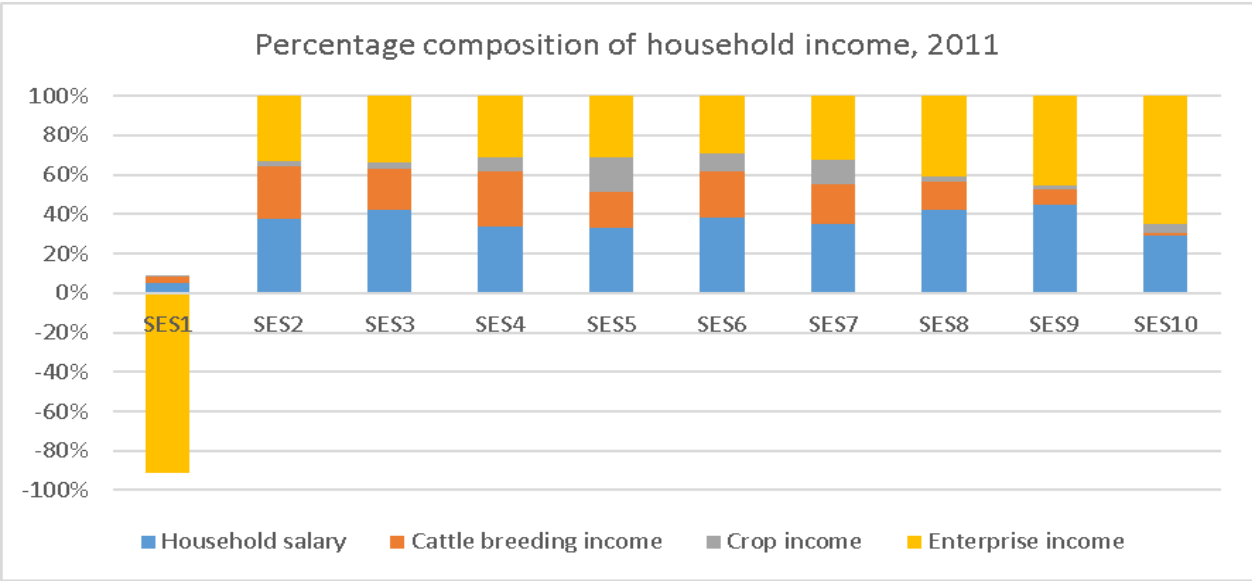
**Figure 24.** Percentage Composition of Total Annual Household Income.

The remaining two elements of the SES composite explanatory variable were the highest parental educational attainment score and highest parental occupational prestige index. Figure 25 shows the average scores of these two elements of all households in the college-age sample of 2011. As the Figure 25 demonstrates, both parental educational and occupational index average scores gradually increase throughout the levels. In lowest three levels of the SES, parents scored higher in education than their occupational prestige scores, and in the highest two levels, parents scored higher in occupational prestige than their educational attainment. The parental educational and occupational scores are almost equal for those in the five consecutive levels in the middle of the SES spectrum.

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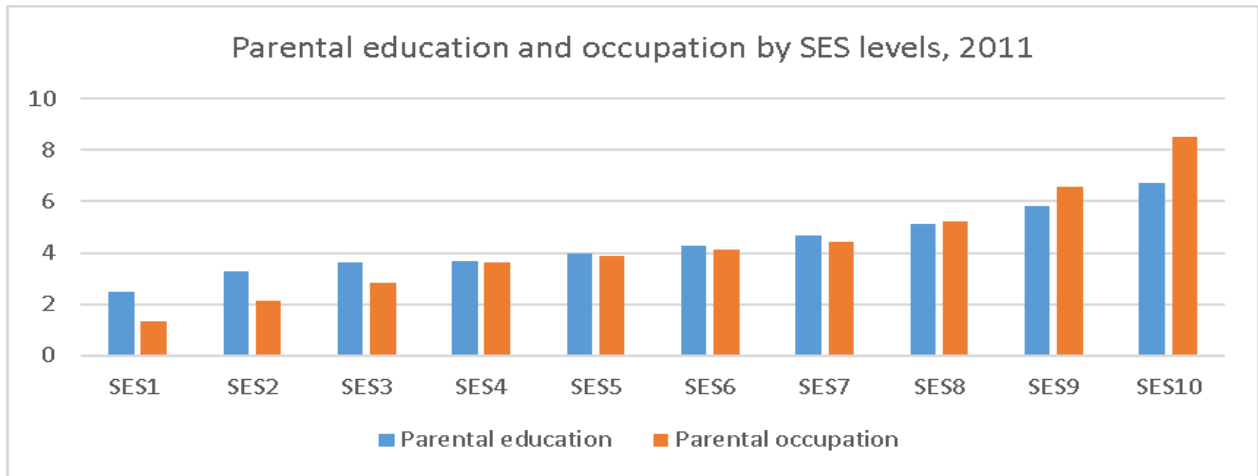
**Figure 25.** Highest Parental Educational Attainment and Occupational Prestige Index by SES Levels.

A logistic regression was run predicting college attendance by standardized family SES (with SES treated as categorical with 10 levels) after controlling for age, gender, marital status, household size, and geographic location. The reduced-form equation of the logistic regression model is shown below:

**Equation 3. Logistic regression on college attendance by family SES**

$$logit(collegeattend)$$

$$= \beta_0 + \beta_1 SES_2 + \beta_2 SES_3 + \beta_3 SES_4 + \beta_4 SES_5 + \beta_5 SES_6 + \beta_6 SES_7 + \beta_7 SES_8$$

$$+ \beta_8 SES_9 + \beta_9 SES_{10} + \beta_{11} age + \beta_{12} female + \beta_{13} married + \beta_{14} hhsize$$

$$+ \beta_{15} aimagcenter + \beta_{16} soumcenter + \beta_{17} country$$

Overall, the variables significantly predicted college attendance, $F(16, 1153) = 25.95$, $p < .001$, and the model seemed to fit the data well, $F(9, 1160) = .22$, $p = .991$. The effect of categorical standardized SES was overall significant; $F(9, 1160) = 17.04$, $p < .001$, with individuals having higher odds of attending college when reaching the highest levels of standardized SES (Table 50).

In particular, individuals in the top two highest SES levels (well above average) were about 3 times and 5 times more likely to attend college than those in the lowest level, $OR = 3.07$ (*95% CI:* 2.18-4.32), $SE = .54$, $t = 6.41$, $p < .001$, $OR = 4.98$ (*95% CI*: 3.45-7.19), $SE = .93$, $t = 8.60$, $p < .001$, respectively. Furthermore, even individuals with 'average' SES (group 5) were 50% more likely to attend college than those in the lowest group; $OR = 1.49$ (*95% CI*: 1.07-2.09), $SE = .25$, $t = 2.35$, $p = .019$. The effects of the other predictors on college attendance were very similar to the results of the second model and are shown in Table 50.

**Table 50.** Results of a Logistic Regression Predicting College Attendance by Standardized Family SES Group in College-age Sample.

| Variable | OR (95% CI) | SE | t | p |
|---|---|---|---|---|
| Standardized Family SES[23] | | | | |
|    Group 2 | .87 (.61, 1.23) | .15 | -.80 | .421 |
|    Group 3 | 1.13 (.81, 1.59) | .20 | .73 | .467 |
|    Group 4 | 1.35 (.95, 1.91) | .24 | 1.69 | .091 |
|    Group 5 | 1.49 (1.07, 2.09) | .25 | 2.35 | .019 |
|    Group 6 | 1.49 (1.06, 2.09) | .26 | 2.32 | .021 |
|    Group 7 | 1.89 (1.35, 2.66) | .33 | 3.70 | <.001 |
|    Group 8 | 2.49 (1.78, 3.49) | .43 | 5.30 | <.001 |
|    Group 9 | 3.07 (2.18, 4.32) | .54 | 6.41 | <.001 |
|    Group 10 | 4.98 (3.45, 7.19) | .93 | 8.60 | <.001 |
| Age | .85 (.81, .88) | .02 | -7.78 | <.001 |
| Female | 1.98 (1.74, 2.26) | .13 | 10.19 | <.001 |
| Married | .50 (.32, .78) | .11 | -3.10 | .002 |
| Household size | .96 (.91, 1.00) | .02 | -1.90 | .057 |
| Location[24] | | | | |
|    Aimagcenter to Ulaanbaatar | .75 (.59, .95) | .09 | -2.38 | .018 |
|    Soumcenter to Ulaanbaatar | .74 (.59, .93) | .09 | -2.58 | .010 |
|    Countryside to Ulaanbaatar | .51 (.41, .64) | .06 | -5.93 | <.001 |

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[23] Overall test of SES; $F(9, 1160) = 17.04$, $p < .001$
[24] Overall test of location; $F(3, 1166) = 11.69$, $p < .001$.

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**4.2     THE ROLE OF GOVERNMENT FINANCIAL ASSISTANCE PROGRAMS IN ACCESS TO HIGHER EDUCATION**

The section 4.2 will address the research question #2. To what extent are government financial assistance programs reaching their target groups? It will encompass three sub-sections entitled: 4.2.1) The college-age population and government financial assistance recipients: 4.2.2) Government financial assistance and state budget organization (SBO) employee status; and 4.2.3) government financial assistance and socioeconomic status level.

**4.2.1     The College-age Population and Government Financial Assistance Recipients**

Table 4.2.1.1 below presents the descriptive statistics of the college-age sample of 2011. The college-age sample was on average 20 years old (SD = 1.7) and the sample size was (N=5310). 2,884 (54.3%) of the sample were not in college, and 2,309 (43.5%) were in college with no government financial assistance. Only 2.2% (117) of the college-aged sample were attending college with government financial assistance.

Male individuals were represented slightly higher (52.2%) than female (47.8%) in the sample. About 72% of the sample have complete secondary education, whereas 18% have primary or basic education. Only 3% of the sample indicated "none" to the educational attainment question. The question "Did you work last week?" was answered "no" by 77% of the sample where the response was "yes" for the remaining individuals in the sample.

The urban and rural divide of the sample is 53.5% and 46.5% indicating there were more people from urban areas. Most individuals of the sample came from households with 3-6 members (mean = 4.6; STD = 1.8). As described in the data management and preparation section (Chapter 3) of the dissertation, one college student per household who has a parent(s) working for SBO was identified. There were 818 of them in the sample. The SES was evenly divided into ten standardized levels from 1 to 10 in ascending order.

**Table 51.** College-age Sample Descriptive Statistics. 2011.

| Variable | *N* | *M* | *SD* | Range |
|---|---|---|---|---|
| Collage Access | 5310 | 0.48 | 0.54 | 0 - 2 |
| SES | 4871 | 0.03 | 0.71 | (-13.53) - 3.74 |
| Age | 5310 | 20.17 | 1.74 | 17 - 23 |
| Gender | 5310 | 0.48 | 0.50 | 0 - 1 |
| Marital status | 5310 | 0.09 | 0.29 | 0 - 1 |
| Household size | 5310 | 4.63 | 1.80 | 1 - 14 |
| Urban or rural | 5310 | 0.54 | 0.50 | 0 - 1 |

The rate of government assistance for students in college was examined for each level of SES by running contingency table between the SES levels and the categorical variable College Access (Table 52). There was a low to moderate relationship between the two variables; $\varphi_c =$ .21, $\chi^2$ (18) = 421.4, $p < .001$.

**Table 52.** The rate of government assistance for tuition for each standardized level of SES.

| Standardized Family SES | Not in college $n$ (%)* | In college with no assistance $n$ (%)* | In college with assistance $n$ (%)* |
|---|---|---|---|
| 1 | 332 (68.2) | 145 (29.8) | 10 (2.1) |
| 2 | 336 (69.1) | 140 (28.8) | 10 (2.1) |
| 3 | 314 (64.2) | 169 (34.6) | 6 (1.2) |
| 4 | 297 (60.9) | 183 (37.5) | 8 (1.6) |
| 5 | 271 (56.0) | 200 (41.3) | 13 (2.7) |
| 6 | 283 (57.9) | 196 (40.1) | 10 (2.0) |
| 7 | 237 (48.8) | 234 (48.2) | 15 (3.1) |
| 8 | 194 (39.8) | 280 (57.5) | 13 (2.7) |
| 9 | 167 (34.0) | 307 (62.5) | 17 (3.5) |
| 10 | 115 (23.8) | 359 (74.2) | 10 (2.1) |

*The percentage shown is out of the total college-age individuals at each standardized level of SES (row percentage); including those not in college.

The rate of college attendance increased as the standardized level of SES increased, with 76% of the highest SES level and 31% of the lowest level attending college (Table 52). However, the total rate of students receiving government grants to assist with tuition remained relatively stable over SES level (~2-3%). Ten students in the lowest SES level received tuition assistance from the government, but so did 10 in the highest SES level. More concerning, in the second highest SES level, 17 students received government tuition assistance despite their family having income and occupation prestige that was well above average. In an ideal world, the students receiving government assistance would be clustered more highly at the lower levels of SES with the highest not receiving any assistance.

### 4.2.2 Government Financial Assistance and State Budget Organization Employee Status

The almost even distribution of the government financial assistance throughout the SES spectrum, mentioned in the previous sub-section, could possibly be explained by a government policy. Currently, a significant portion of the government grant program is earmarked for students who have a parent working for a state budget organization (SBO). Thus, SES status and parental employment at a SBO were examined for college-aged individuals. About 15% of the sample had at least one parent who worked for a SBO ($n = 818$). Having a parent(s) working for a SBO had statistically significant relationship with SES status levels, and the likelihood that a parent worked for an SBO was higher as standardized SES level increased (Table 53; $\varphi_c = .36$, $\chi^2$ (9) = 622.6, $p < .001$).

**Table 53.** Frequency of Parents Working for SBO in the College-age Sample.

| Standardized Family SES level | Parent(s) do not work for SBO $n$ (%) | Parent(s) do work for SBO $n$ (%) |
|---|---|---|
| 1 | 475 (97.5) | 12 (2.5) |
| 2 | 468 (96.3) | 18 (3.7) |
| 3 | 437 (89.4) | 52 (10.6) |
| 4 | 453 (92.8) | 35 (7.2) |
| 5 | 430 (88.8) | 54 (11.2) |
| 6 | 442 (90.4) | 47 (9.6) |
| 7 | 410 (84.4) | 47 (9.6) |
| 8 | 356 (73.1) | 131 (26.9) |
| 9 | 298 (60.7) | 193 (39.3) |
| 10 | 286 (59.1) | 198 (40.9) |

Furthermore, individuals with parents who worked for a SBO were also more likely to be attending college and were slightly more likely to have a government grant (Table 54; $\varphi_c = .18$, $\chi^2 (2) = 180.3$; $p < .001$). Sixty-seven percent of all college-aged individuals who have at least one parent working for a SBO were attending college while only 42% of all college-aged individuals whose parent is not an employee of SBO were attending college. 3.8% of all individuals who have at least one parent working for a SBO was attending college with government grant whereas twice less (1.9%) number of individuals who do not have a parent(s) working for a SBO was attending college with government grant (Table 54).

**Table 54.** College Access for College-aged Individuals with and without Parents Working for SBOs.

|  | Not in college<br>*n* (%) | College with no government assistance<br>*n* (%) | College with government assistance<br>*n* (%) |
|---|---|---|---|
| Parent(s) do not work for SBO | 2615 (58.2) | 1791 (39.9) | 86 (1.9) |
| Parent(s) do work for SBO | 269 (32.9) | 518 (63.3) | 31 (3.8) |

College access, grant status, and standardized SES level were examined for college-aged individuals whose parents were and were not employed by an SBO (Table 55). For families where no parents worked for an SBO, the number of subjects who were in college with government grants was relatively the same for all standardized levels of SES. In fact, the number of students in college with government grants whose families fall into the highest three SES levels (*n* = 22) was almost the same as the lowest three SES groups (*n* = 24). This is alarming because the grant and loan programs were set up to specifically target the poor and

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marginalized segments of Mongolian society. For individuals whose parents do work for SBOs, the majority (77.4%) of students with government assistance have families that fall into the highest four SES levels (Table 55).

**Table 55.** Tabulation of College Access, Family SES Level, and Parental SBO Status in the College-age Sample.

| | Parent(s) do not work for a SBO | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Standardized SES Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Not in college | 325 | 327 | 285 | 281 | 250 | 265 | 213 | 152 | 108 | 72 |
| In college with no government assistance | 140 | 131 | 148 | 165 | 168 | 170 | 188 | 195 | 181 | 210 |
| In college with government assistance | 10 | 10 | 4 | 7 | 12 | 7 | 9 | 9 | 9 | 4 |
| | Parent(s) work for a SBO | | | | | | | | | |
| Standardized SES Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Not in college | 7 | 9 | 29 | 16 | 21 | 18 | 24 | 41 | 59 | 43 |
| In college with no government assistance | 5 | 9 | 21 | 18 | 31 | 26 | 46 | 85 | 126 | 149 |
| In college with government assistance | 0 | 0 | 2 | 1 | 1 | 3 | 6 | 4 | 8 | 6 |

### 4.2.3 Government Financial Assistance and Socioeconomic Status Levels

The following section describes the inferential statistical procedures that were run on the college-age sample of 2011 in Mongolia. A multinomial logistic regression was run to determine if access to college and governmental assistance (a dependent variable with three categories: no college, college with no governmental assistance, and college with governmental assistance) was

related to standardized family SES (Table 56). 'Not attending college' was used as a reference group. The reduced-form equation for the multinomial regression model is shown below:

**Equation 4. Multinomial logistic regression on college access and government assistance**

$$ln\frac{\Pr(Y_i = collegeNogrant)}{\Pr(Y_i = notInCollege)} = \beta_0 + \beta_1 SES$$

$$ln\frac{\Pr(Y_i = collegeGrant)}{\Pr(Y_i = notInCollege)} = \beta_0 + \beta_1 SES$$

Survey weights, primary sampling units, and stratification were accounted for in the model. Independence of Irrelevant Assumption was tested by Hausman test and no evidence of violation found (see Appendix C). Four thousand eight hundred and seventy one (N=4871) college-aged individuals had complete data and were included in analysis.

The overall effect of SES was significant ($F(2, 1167) = 84.06$, $p < .001$). For each increase in standardized SES level, individuals were 2.3 times more likely to be in college without assistance ($RRR^{25} = 2.3$ (*95% CI*: 2.03-2.61), $SE = .148$, $t = 12.95$, $p < .001$) and 1.89 times more likely to be in college with assistance ($RRR = 1.89$ (*95% CI*: 1.28-2.81), $SE = .379$, $t = 3.19$, $p = .001$) when compared to individuals who were not in college. The effect of standardized family SES in predicting college attendance without government assistance, compared to not attending college, was statistically equivalent to the effect of standardized SES in predicting college attendance with a grant, compared to not attending college ($F(1, 1168) = 0.96$, $p = .327$).

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[25] relative risk ratio

**Table 56.** Multinomial Logistic Regression Predicting College and Government Assistance Access by Standardized Family SES Level.

| Outcome | Variable | Relative Risk Ratio (95% CI) | SE | t | p |
|---|---|---|---|---|---|
| Not in college (reference group) | | | | | |
| In college, no gov. assistance | Intercept | .824 (.76, .90) | .035 | -4.52 | <.001 |
| | SES | 2.30 (2.03, 2.61) | .148 | 12.95 | <.001 |
| In college with gov. assistance | Intercept | .042 (.03, .06) | .006 | -23.53 | <.001 |
| | SES | 1.89 (1.27, 2.81) | .379 | 3.19 | .001 |

A larger multinomial regression was run to determine if the effect of standardized family SES was still related to college access and governmental assistance after controlling for a number of interpersonal factors. Gender (male/female), marital status (married/not married), age, household size, and living in an urban or rural area were added to the model as predictors. 'Not attending college' was again used as the reference group. The reduced-form equation of the multinomial regression model is shown below:

**Equation 5. Multinomial regression on college access, government assistance by SES**

$$ln \frac{\Pr(Y_i = collegeNogrant)}{\Pr(Y_i = notIncollege)}$$

$$= \beta_0 + \beta_1 SES + \beta_2 age + \beta_3 female + \beta_4 married + \beta_5 hhsize + \beta_6 urban$$

$$ln \frac{\Pr(Y_i = collegeGrant)}{\Pr(Y_i = notIncollege)}$$

$$= \beta_0 + \beta_1 SES + \beta_2 age + \beta_3 female + \beta_4 married + \beta_5 hhize + \beta_6 urban$$

After controlling for the interpersonal variables, the relative risk ratios of standardized SES on group prediction remained fairly stable when compared with the original model (Table 57).

For each increase in standardized SES level, individuals were about 2.2 times more likely to be in college without assistance ($RRR$ = 2.2 (*95% CI*: 1.90 -2.47), $SE$ = .146, $t$ = 11.47, $p$ <.001) and 1.69 times more likely to be in college with a grant ($RRR$ = 1.69 (*95% CI*: 1.15-2.47), $SE$ = .328, $t$ = 2.69, $p$ = .007) when compared to individuals who were not in college. The effect of standardized family SES in predicting college attendance without government assistance, compared to not attending college, was still statistically equivalent to the effect of standardized SES in predicting college attendance with a grant, compared to not attending college ($F(1, 1168)$ = 1.7, $p$ = .182).

**Table 57.** Multinomial Logistic Regression Predicting College and Government Assistance Access by Standardized Family SES Level.

| Outcome | Variable | Relative Risk Ratio (95% CI) | Standard Error | t | p |
|---|---|---|---|---|---|
| Not in college (reference group) | | | | | |
| In college, no gov. assistance | Intercept | 14.75 (6.1 - 35.60) | 6.63 | 5.99 | <.001 |
| | SES | 2.17 (1.90 – 2.47) | 0.15 | 11.47 | <.001 |
| | age | 0.85 (0.82- 0.89) | 0.02 | -7.49 | <.001 |
| | female | 1.97 (1.73 – 2.25) | 0.13 | 10.14 | <.001 |
| | married | 0.51 (0.33 - 0.80) | 0.12 | -2.96 | .003 |
| | house hold size | .957 (0.91 – 1.00) | 0.02 | -1.88 | .060 |
| | urban | 1.49 (1.26 – 1.77) | 0.13 | 4.61 | <.001 |
| In college with gov. assistance | Intercept | 3.67 (0.36 – 37.76) | 4.37 | 1.10 | .272 |
| | SES | 1.69 (1.15 – 2.47) | 0.33 | 2.69 | .007 |
| | age | 0.79 (0.71 - 0.88) | 0.04 | -4.31 | <.001 |
| | female | 2.59 (1.53 – 4.37) | 0.69 | 3.55 | <.001 |
| | married | 0.64 (0.18 – 2.33) | 0.42 | -0.68 | .498 |
| | house hold size | 0.85 (0.74 - 0.98) | 0.06 | -2.23 | .026 |
| | urban | 2.29 (1.29 – 4.04) | 0.66 | 2.85 | .004 |

The government financial assistance programs were set up to support access to higher education for individuals with low family resources who otherwise would not attend. Currently, as standardized family SES increases, students are more likely to be in college with and without government financial assistance than not attending college. If the grant program was reaching the

low-income individuals it was set up to assist, the probability of receiving a grant would have the opposite relationship with SES; it would decrease as family SES increased.

## 4.3 SOCIAL STRATIFICATION IN ACCESS TO HIGHER EDUCATION IN POST-SOCIALIST MONGOLIA

The section 4.3 will address the research question #3: *How has the role of socioeconomic status in influencing access to higher education changed in the past decades?* It will consist of three sub-sections: 4.3.1) Age-cohorts sample and access to higher education; 4.3.2) Socioeconomic status levels of individuals in the age-cohorts sample; and 4.3.3) Access to higher education and change in the effect of socioeconomic status on accessing higher education in the past decades.

### 4.3.1 Age-Cohorts Sample and Access to Higher Education

HSES 2008 and HSES 2011 datasets were combined to create a bigger sample of age-cohorts. The HSES2011 used three sampling stratus, 1248 primary sampling units (indicated as clusters in the dataset) and each household was assigned a household sampling weight. The HSES2008 dataset also used three stratus, 1248 primary sampling units and each household was assigned a value for household sampling weight. Although administered at different time points, both surveys were completed using the same sampling procedures, stratification, and primary sampling units.

The two datasets were combined and it will be referred as the **age-cohorts sample** from this point on. After the combination, I was still able to account for the sampling strata and household sampling weights. Table 58 describes the survey sampling strata and weight for each year's dataset, whereas Table 59 shows the information of the combined dataset.

**Table 58.** Survey Sampling Strata and Household Sampling Weights for HSES2008 and HSES2011.

| | HSES2008 | | | | HSES2011 | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Total | Mean | SD | Range | Total | Mean | SD | Range |
| Strata | 8366 | 2.1 | 0.86 | 1 - - 3 | 5310 | 2.2 | 0.87 | 1 – 3 |
| Cluster | 8366 | 656.3 | 370 | 1 - 1248 | 5310 | 637.7 | 367.9 | 1 – 1248 |
| Household weight | 8366 | 53.7 | 20.4 | 2.15 - 300.7 | 5310 | 64.07 | 28.3 | 7.9 – 178.9 |

**Table 59.** Survey Sampling Strata and Household Weight for the Age-Cohorts Sample.

| Variables | Total | Mean | SD | Range |
|---|---|---|---|---|
| Strata | 16057 | 2.09 | .86 | 1 – 3 |
| Cluster | 16057 | 652.7 | 368.3 | 1 – 1248 |
| Household Weight | 16057 | 58.8 | 25.1 | 2.1 – 300.7 |

Since an earlier chapter of the dissertation (Chapter 3) describes the process of extracting the four different age-cohorts from the combined dataset in details, I will not discuss the data management of the age-cohorts sample here. Instead, this sub-section describes the age-cohorts sample, created in the result of the combination of HSES2008 and HSES2011 datasets. And the next two sub-sections (4.3.2 and 4.3.3) will present the results of the empirical analyses relevant to the research question.

Table 60 below describes the age-cohorts sample of the four age-cohorts. The *age-cohort 1* refers to individuals in age between 32 and 36 years, the oldest age-cohorts in the sample. The

*age-cohort 2* encompasses individuals in age between 27 and 31, the second oldest age-cohort in the sample. The *age-cohort 3* consists of individuals in age between 22 and 26, and finally the *age-cohort 4* includes individuals in age between 17 – 21 years old, the youngest age-cohort in the sample, who were enrolled, if they were enrolled, in higher education institutions at the time of the survey administration. The table breaks down the number of observations in the each age-cohort group by the two survey years separately, as well as, in the combined data of the age-cohorts sample. The average college entrance year for each age-cohort, the year when the age-group's average age was 18, is indicated in the table as well. As indicated in Table 60, the age-cohorts sample is comprised of individuals whose college entrance years cover a spectrum from as early as 1992, shortly after the collapse of the socialist era in Mongolia, to 2010 – a lifespan of eighteen years.

**Table 60.** Breakdown of the Age-Cohorts sample.

| | Combined 2008/2011 | | 2008 Survey | | 2011 Survey | |
|---|---|---|---|---|---|---|
| Age Cohorts | n (%) | Average College entrance year[1] | n (%) | Average College entrance year | n (%) | Average College entrance year |
| (4) 17-21 yrs. old | 8974 (56) | 2008 | 4816 (58) | 2007 | 4158 (54) | 2010 |
| (3) 22-26 yrs. old | 4712 (29) | 2003 | 2339 (28) | 2002 | 2373 (31) | 2005 |
| (2) 27-31 yrs. old | 1659 (10) | 1998 | 841 (10) | 1997 | 818 (11) | 2000 |
| (1) 32-36 yrs. old | 751 (5) | 1993 | 370 (4) | 1992 | 381 (5) | 1995 |

[1]average year for cohort when subjects were 18 years old

There were 8,974 individuals in age-cohort 4; 4,712 in age-cohort 3; 1,659 individuals in age-cohort 2; and 751 individuals in age-cohort 1. Table 61 demonstrates the dependent variable

College Attendance (CollAttend), which indicates whether the individual was enrolled in a higher education institution at the time of the survey or has already completed a higher education degree, by the four age-cohorts. In total, 7.8% of the total age-cohorts sample had a missing value for the dependent variable of college attendance.

**Table 61.** College Attendance of All Age-Cohorts

| College attendance | Age-cohort 4 (17 – 21) | Age-cohort 3 (22 – 26) | Age-cohort 2 (27 – 31) | Age-cohort 1 (32 – 36) | Total |
|---|---|---|---|---|---|
| No degree | 6,418 | 2,540 | 1,023 | 521 | 10,502 |
| Has degree | 1,989 | 1,661 | 474 | 174 | 4,298 |
| Missing (% of column total) | *549 (6.1)* | *497(10.5)* | *157 (9.4)* | *54 (7.2)* | *1,257 (7.8)* |
| Total | 8,956 | 4,698 | 1,654 | 749 | 16,057 |

The demographic characteristics of the age-cohorts sample are similar to those of the college-age sample of 2011, discussed in the previous two sections of this chapter. For instance, the household composition of the age-cohorts sample was similar to the household composition of the collage-age sample of 2011. The highest percentage of the age-cohorts sample (23.15%) came from a household with 5 members, followed by 23.01% that came from a household with 4 members. Most of the individuals in the sample came from a household with members ranging from 3 to 6, which takes about 77.2% of the sample, and the rest of the sample came from families with 1 to 17 members in it.

The following two scatterplots (Figure 26, Figure 27) depict the frequencies of the household size for individuals with and without a higher education degree. The individuals with a higher education degree came from a slightly smaller households (with less number of members). And the difference in the household size for the "in college" (that refers to those with

a higher education degree) and "not in college" (those who do not have a higher education degree) was statistically significant (Table 62).
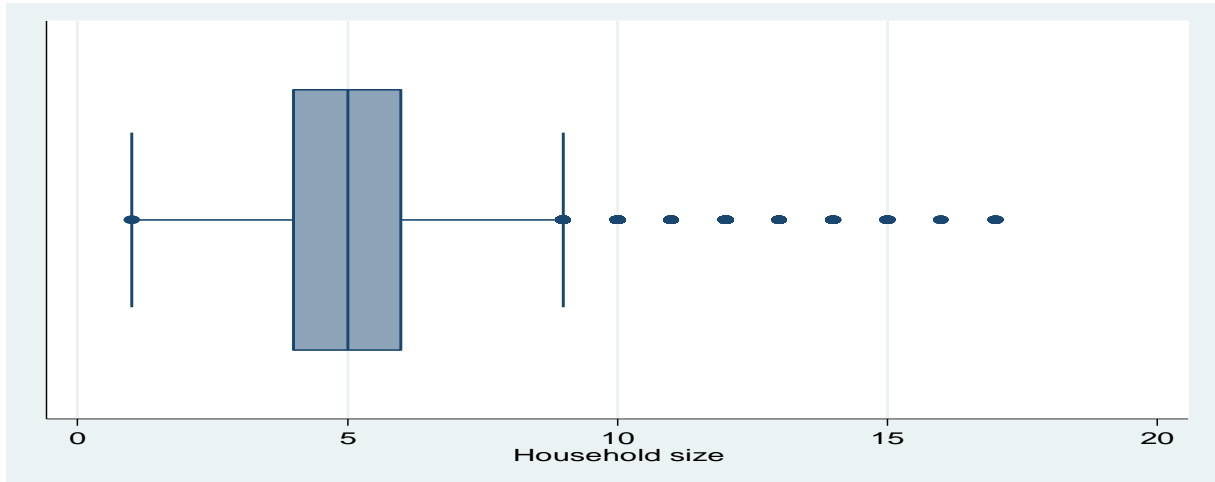


**Figure 26.** Household Size for Individuals without a Degree.
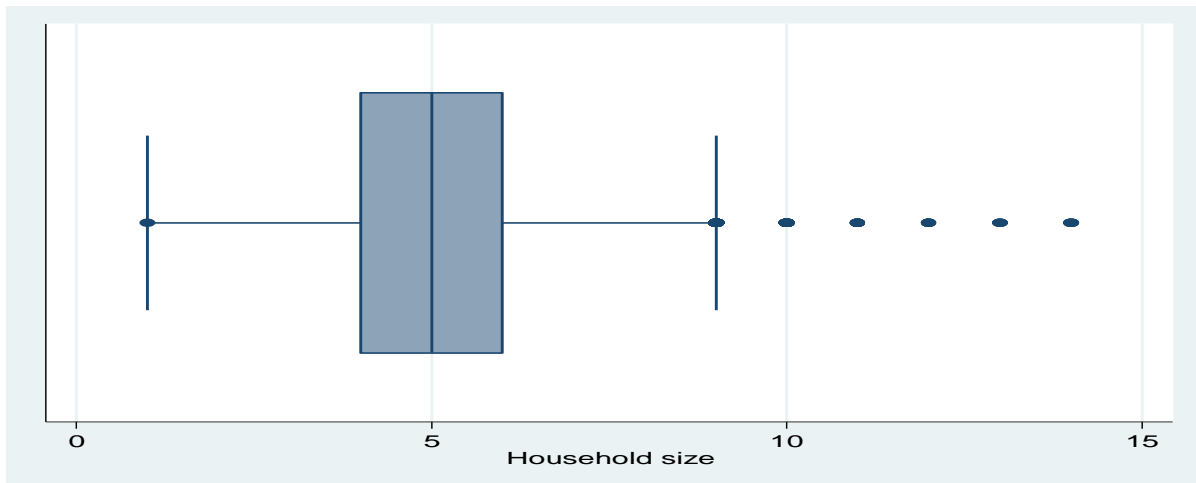


**Figure 27.** Household Size for Individuals with a Degree.

The group with a higher education degree and without a higher education degree in the age-cohorts sample differ significantly from each other on several other variables as well (Table 62). An independent-samples t-test was conducted to compare the socioeconomic status background, age and household size of the two groups, and chi-squared tests were conducted to

compare the gender, work responsibility and locations of original residence for the individuals in the two groups.

Individuals who have accessed higher education came from higher family socioeconomic status levels (M=.31, SD=.75) than their peers (M= -.13, SD=.55) who have not accessed higher education, on average, and the difference was significant ($t$(6327.5)= -35.41, p<.001)[26]. The age of the individuals with higher education degree, on average, was higher (M=22.6, SD=3.90) than their counterparts (M=21.6, SD=4.48) who do not have a higher education degree, and the difference was significant (t(9103.2)= - 13.96, p<.001). Individuals who have not accessed higher education came from a slightly bigger families (M=5.23, SD=.1.92) than their peers (M=4.8, SD=1.60) who have accessed higher education, on average, and the difference was statistically significant as well (t(9503.13)=13.30, p<.001).

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[26] Calculated using Welch's degrees of freedom.

**Table 62.** Descriptions of the Age-Cohorts Sample.

| Variable | In College (n = 4,298) | Not In College (n = 10,502) | $P^{27}$ |
|---|---|---|---|
| | *Mean (SD)* | *Mean (SD)* | |
| Family standardized SES | .31 (.75) | -.13 (.55) | <.001 |
| Age | 22.6 (3.90) | 21.6 (4.48) | <.001 |
| Household size | 4.82 (1.60) | 5.23 (1.92) | <.001 |
| | *n (%)* | *n (%)* | |
| Location | | | |
| Ulaanbaatar | 1,796 (41.79) | 3,298 (31.40) | <.001 |
| Aimagcenter | 1,042 (24.24) | 2,491 (23.72) | .497 |
| Soumcenter | 903 (21.01) | 2,058 (19.60) | .051 |
| Countryside | 557 (12.96) | 2,655 (25.28) | <.001 |
| Female | 2,530 (58.86) | 4,726 (45.00) | <.001 |
| Worked Last Week | 1,261 (29.34) | 3,904 (37.18) | <.001 |

The locations of origin, including Ulaanbaatar, aimag center, soum center and countryside, as a whole has statistically significant relation with college attendance ($\chi^2$ (3) = 312.2, $p$ < .001). Looked separately, each location differed in their relations with college attendance. For instance, being from Ulaanbaatar gives someone higher chance of attending

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[27] Independent sample t-tests were conducted to compare the means of continuous variables, and chi square test were conducted to compare frequency among levels of categorical variables.

college and the relation was significant, $\chi^2$ (1) = 145.7, $p < .001$. Also individuals from a family in rural areas (countryside) were more likely to not attend college ($\chi^2$ (1) = 271.5, $p < .001$), whereas, coming from aimag center or soum center was not significantly related with whether an individual will attend or not attend college. Female students are more likely to attend college ($\chi^2$ (1) = 234.6, $p < .001$) and having to work made individuals less likely to attend college and the relation was significant, $\chi^2$ (1) = 82.5, $p < .001$.

**4.3.2   Socioeconomic Status (SES) Levels of Individuals in the Age-Cohorts Sample**

The socioeconomic status (SES) composite variable was created in the same way as the SES created for the analyses of the questions discussed in the previous two sections of the chapter. The components of SES for the age-cohorts sample is described in Table 63 below.

SES consisted of six subscale items, including household salary, livestock income, cropping/horticulture income, enterprise income, highest parental educational attainment and highest parental occupational prestige index. The table shows the total number of households with income from each sources, the average value of each income source, standard deviation, and the range of the income from each source type.

**Table 63.** The Compositions of Key Explanatory Variable SES of the Age-Cohorts Sample.

| Subscales | Number | Mean | SD | Range |
|---|---|---|---|---|
| Household salary | 10,086 | 4,137,516 | 3,986,056 | 24,000 – 5.96e+07[28] |
| Income from livestock | 5,866 | 1,674,413 | 2,645,583 | - 1.22e+07 – (4.03e+07) |
| Income from crop | 1,378 | 497903 | 1702742 | -5,450,000 – (2.03e+07) |
| Income from enterprise | 2,984 | 3190637 | 1.46e+07 | -3.54e+08 – (4.00e+08) |
| Highest parental educational level | 16,057 | 4.10 | 2.61 | 0 – 8 |
| Highest parental occupational prestige | 16,057 | 4.29 | 1.47 | 1 – 10 |

In the age-cohorts sample of total 16,057 (n=16,057), there were 10,086 households that reported annual salary amount. There were 5,866 households that had information on expenditures and revenues from livestock activity, whereas 1,378 families, in total, reported on cropping/horticulture activities. And finally, there were 2,984 families that conducted any type of family-based trading, service or other kind of business activity. The total annual incomes from the livestock, cropping/horticulture and business activities were drawn from the difference between household annual expenditure on a particular activity and household annual revenue on the activity. Therefore, there were a number of families that had negative values on some of these income categories due to the higher expenditures incurred than revenues generated from the categories. The following section describes each of the subscales of the composite SES in the age-cohort sample.

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[28] 5.96e+07 equals to 59,600,000.

*Household annual total salary:* The average annual salary per household was MNT 4,137,516 (SD=3,986,056) among the total 10,086 families, and the salary amount ranged between MNT 24,000 to MNT 59,600,000 a year. Figure 28 shows the salary frequency distribution in the age-cohorts sample.



**Figure 28.** Household Annual Total Salary Frequency Distribution in Age-Cohorts Sample.

*Household livestock income:* There were 5,866 households that spent money on and made money from livestock activity in the sample. Their average annual income from livestock was MNT 1,674,413 (SD=2,645,583). 5,205 of them had revenues higher than the expenditures, thus made income between MNT 1000 and MNT 40,300,000.

However, 661 households spent more money than they made. The amount of money they lost ranged between MNT 12,000,000 and MNT 1000. Table 64 shows the distributional attributes of the household income from livestock activity, whereas Figure 29 demonstrates the frequency of the distribution of household income from livestock.

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**Table 64.** Household Income from Livestock Activity in Age-Cohorts Sample.

| | Total household income from livestock in age-cohort sample ($\neq 0$) | | |
|---|---|---|---|
| *Total* | *M* | *SD* | *Range* |
| 5866 | 1,674,413 | 2,645,583 | -1.22e+07 – (4.03e+07) |
| | Households with revenues higher than expenditures on livestock | | |
| 5205 | 1,928,033 | 2,689,608 | 1,000 – (4.03e+07) |
| | Households with revenues lower than expenditures on livestock | | |
| 661 | -322,701 | 809,897 | (-1.22e+07) – (-1000) |
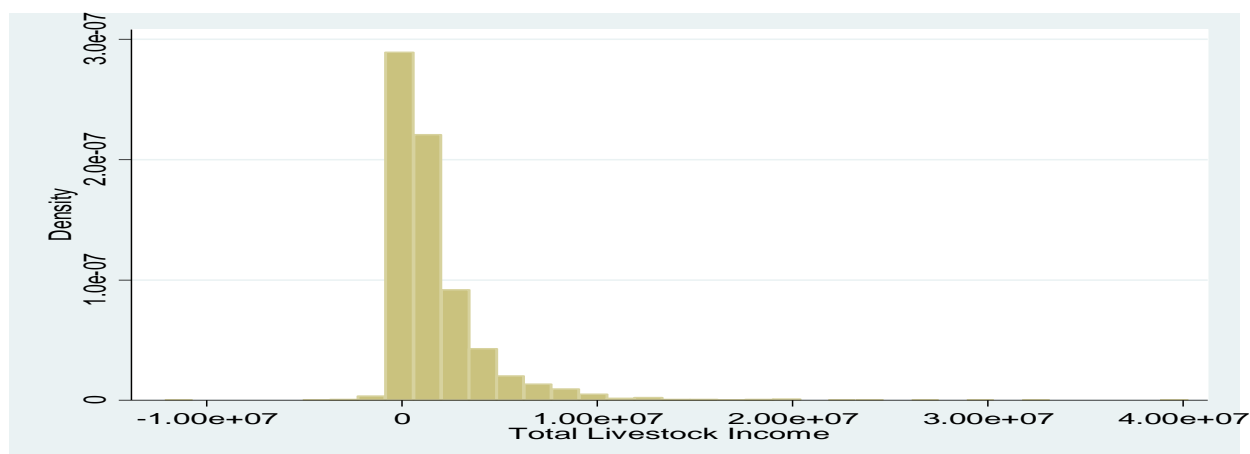


**Figure 29.** Subscale Frequency Distribution: Household Income from Livestock in Age-Cohorts Sample.

By including the subscale of livestock income into the household income estimation, I was able to add 2251 households to the age-cohort sample, which is illustrated in the Figure 30 below.
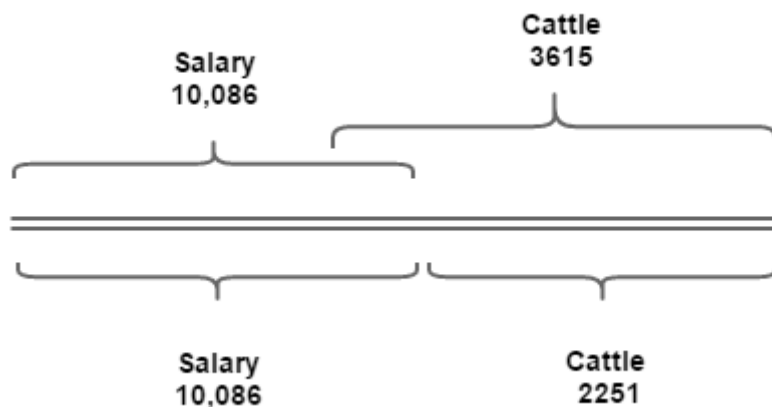
**Figure 30.** Creating Household Income: Households with Salary and Livestock Income in the Age-Cohorts Sample.

*Household crop/horticulture income*: There were total 1,378 families in the sample that reported information on expenditure and revenue amount on cropping/horticulture related activities, which are demonstrated in Table 65 below.

**Table 65.** Household Income from Crop Related Activities.

| Total | M | SD | Range |
|---|---|---|---|
| Total household income from crop activities in the college-age sample | | | |
| 1378 | 497,902 | 1,702,742 | (-5,450,000) – (2.03e+07) |
| Households with revenues higher than expenditures on cropping | | | |
| 609 | 1,327,658 | 2,237,137 | 2 – 2.03e+07 |
| Households with revenues lower than expenditures on cropping | | | |
| 769 | -159,211 | 507,912 | (-5,450,000) – (-1000) |

For all households that either spent money or made money from crop related activities (n=1378), the average income level was MNT 497,902. However, for the families that made money (n=609), the average income was MNT 1,327,658 (SD=2,237,137). Moreover, there were

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769 families that lost money on crop related activities and the amount of money they lost ranged from MNT 1000 to over five million togrogs (see Table 65 above). The Figure 31 shows the distribution of frequency of household income on crop related activities.
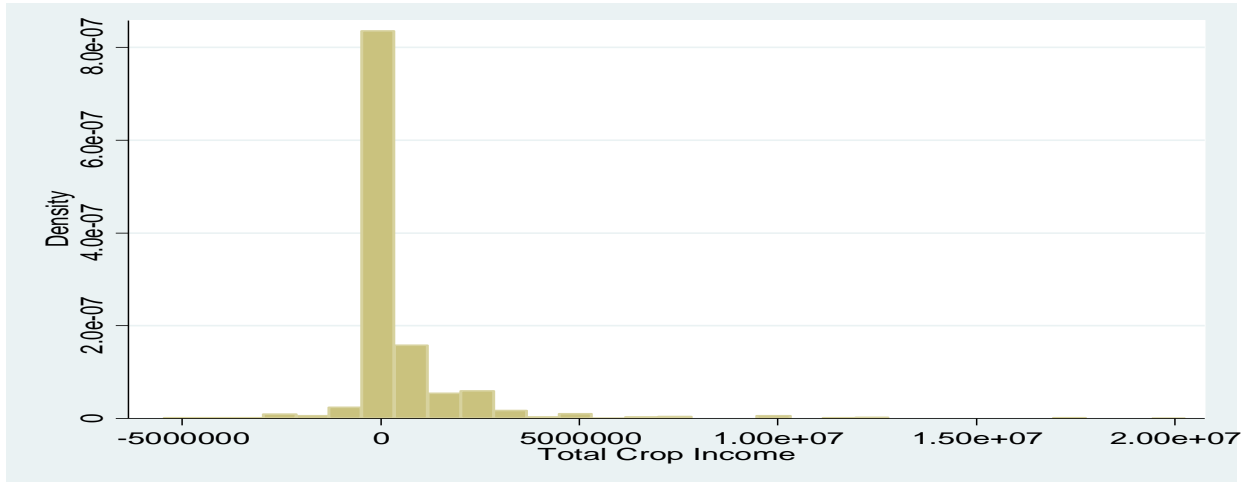


**Figure 31.** Subscale Frequency Distribution: Household Income from Crop Related Activities (excluding zero)

By including households that conducted cropping activities, I was able to draw in 583 families that did not have any annual salary information, as well as, 222 families that had information neither on annual salary nor livestock activity, into the age-cohorts sample, which is illustrated in the Figure 32 below.
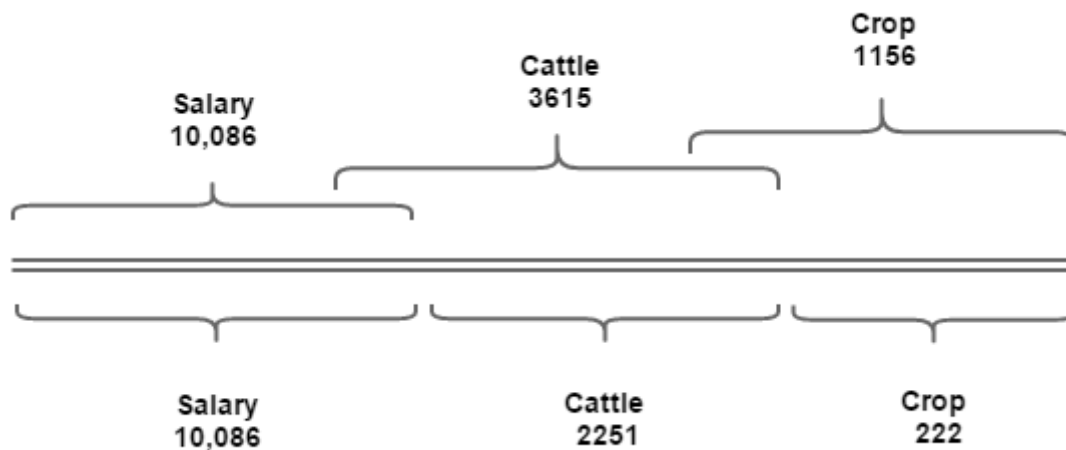
**Figure 32.** Creating Household income: Households with Annual Salary, Livestock and Cropping Income in the Age-Cohorts Sample.

*Household business entrepreneurial activity income:* The final subscale of the household annual total income was the household income on family entrepreneurial activities on trading, services or other businesses. There were 2,984 families that conducted a family-based business. Vast majority of them, more specifically, 2,700 families made money from their family-based business activity. The average income they made was MNT 4,210,870, ranging from MNT 400 to MNT 400,000,000. However, there were 284 households that lost money on family-based business. They lost from 4,000 togrogs to 354,000,000 togrogs (see Table 66 below).

**Table 66.** Creating Household Income: Household Income from Entrepreneurial Activity in the Age-Cohort Sample.

Total household income from entrepreneurial activities in the college-age sample

| Total | M | SD | Range |
|---|---|---|---|
| 2,984 | 3,190,637 | 1.46e+07 | (-3.54e+08) – (4.00e+08) |

Households with revenues higher than expenditures on entrepreneurial activity

| | | | |
|---|---|---|---|
| 2,700 | 4,210,870 | 1.11e+07 | 400 – 4.00e+08 |

Households with revenues lower than expenditures on entrepreneurial activity

| | | | |
|---|---|---|---|
| 284 | -6,508,767 | 3.10e+07 | (-3.54e+08) – (-4000) |

Figure 33 shows the frequency of the distribution in the total annual household entrepreneurial income in the age-cohorts sample.
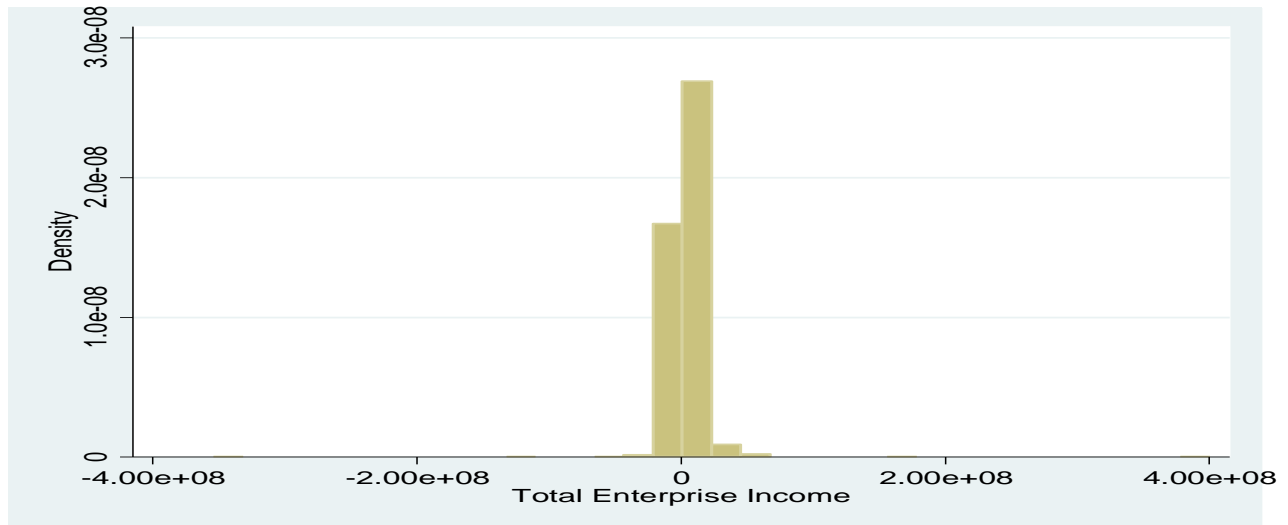


**Figure 33.** Subscale Frequency Distribution: Household Income from Entrepreneurial Activity in the Age-Cohorts Sample.

By including households that had information on family-based business activity, I was able to add 1432 households into the sample, which did have any information on household annual salary. Moreover, 1032 families that did not have information on either annual salary or

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livestock activity income were added to the sample as a result of this inclusion. Also, 950 families were added, which had no information on any of the preceding subscales (annual salary, livestock income and cropping income) to the age-cohorts sample. These steps are illustrated in the Figure 34 below.
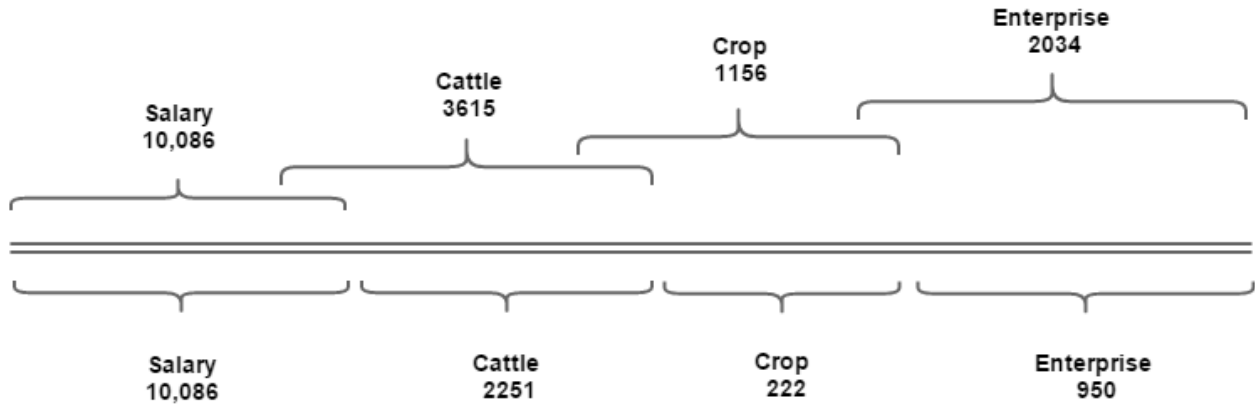


**Figure 34.** Creating Household Income: Households with Salary, Livestock, Cropping and Business Income in the Age-Cohorts Sample.

*Household Total Annual Income*: The total annual income amounts of the four subscales, including, household annual salary, household income from livestock, income from cropping/horticulture activities and income from entrepreneurial activities were added to create the total annual household income component of the composite SES variable. Table 67 describes the distributional attributes of the household total annual income variable in the age-cohorts sample in four forms: a) household total annual income for all subjects in the sample; b) household total annual income amount not equal to 0; c) household total annual income more than 0; and d) household total annual income amount below 0.

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**Table 67.** Household Total Annual Income Variable Distribution in the Age-Cohorts Sample.

| | Household Total Annual Income Distribution in the sample | | |
|---|---|---|---|
| *Total* | *M* | *SD* | *Range* |
| 16,057 | 3,201,334 | 6,435,943 | (-3.47e+08) – 2.23e+08 |
| | Household Total Annual Income amount not equal to 0 | | |
| 14,873 | 3,456,183 | 6,621,039 | (-3.47e+08) – 2.23e+08 |
| | Household Total Annual Income higher than 0 | | |
| 14510 | 3,647,699 | 5,032,038 | 557 – 2.23e+08 |
| | Household Total Annual Income lower than 0 | | |
| 363 | -4,199,170 | 2.69e+07 | (-3.47e+08) – (-1000) |

Of 16,057 individuals in the age-cohort sample, 14,873 individuals came from households with a total annual income amount not equal to 0. And 14,510 of them had household total annual income amount higher than 0, while 363 of them had household total annual income amount lower than 0.

*Highest parental educational attainment*: The highest level of educational attainment among the two parents was selected to represent the parental educational attainment level and was coded in scale from 0 to 9 (Table 68). Only 1.51% or 243 parents of the age-cohorts sample did not have formal education, about 19% of the parents completed primary education, and another 30% of the parents had secondary education. Approximately 20% of the parents had completed a post-secondary vocational and technical education. The remaining 21.5% of the parents had obtained a higher education degree, ranging from higher education diploma to masters and doctorate levels.

**Table 68.** Highest Parental Educational Attainments in the Age-Cohorts Sample.

| Educational attainment level | Frequency | Percent | Cumulative percentage |
|---|---|---|---|
| 0 | 21 | 0.13 | 0.13 |
| 1 | 243 | 1.51 | 1.64 |
| 2 | 1,490 | 9.28 | 10.92 |
| 3 | 2,988 | 18.61 | 29.53 |
| 4 | 4,772 | 29.72 | 59.25 |
| 5 | 3,097 | 19.29 | 78.54 |
| 6 | 2,151 | 13.40 | 91.93 |
| 7 | 1,125 | 7.01 | 98.94 |
| 8 | 149 | 0.93 | 99.87 |
| 9 | 21 | 0.13 | 100.00 |
| Total | 16,057 | 100.00 | |
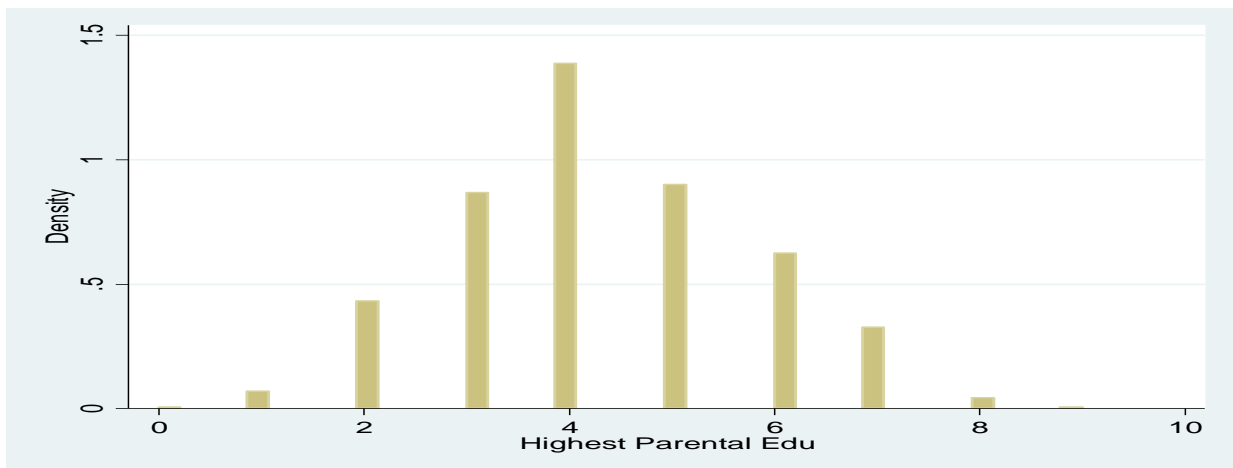


**Figure 35.** Frequency Distribution of Highest Parental Educational Attainment in Age-Cohorts Sample.

*Highest parental occupational prestige:* Parental occupational prestige index from 1 to 10 were assigned to each parent based on their "wage job". Value 1 was assigned to those individuals who were identified as parents of the subjects of the age-cohorts selected for the sample, yet did not have any indication under the occupational prestige index in the HSES datasets of the two years. Moreover, HSES occupational prestige index variable does not include any value for the status of "unemployed". Therefore, the missing values were coded as 1 and

understood as indicating the lowest occupational prestige or the status of unemployment. About

23% of the sample were unemployed. Under the data management of the research question #1 of

the dissertation, the above-mentioned unemployment level was double checked by a

juxtaposition between this variable with the status of unemployment in the original dataset of

HSES2011. And it was found that almost all of the observations assigned as "unemployed"

under the parental occupational prestige index was accounted by those who were "not working"

in the original dataset.

**Table 69.** Highest Parental Occupation Index in Age-Cohorts Sample.

| Highest parental occupational prestige index | Frequency | Percent | Cumulative percentage |
|---|---|---|---|
| 1 | 3,783 | 23.56 | 23.56 |
| 2 | 1,829 | 11.39 | 34.95 |
| 3 | 1,421 | 8.85 | 43.80 |
| 4 | 1,495 | 9.31 | 53.11 |
| 5 | 3,645 | 22.70 | 75.81 |
| 6 | 1,608 | 10.01 | 85.83 |
| 7 | 279 | 1.74 | 87.56 |
| 8 | 559 | 3.48 | 91.04 |
| 9 | 579 | 3.61 | 94.65 |
| 10 | 859 | 5.35 | 100.00 |
| Total | 16,057 | 100.00 | |

The occupational prestige index level 5 was the highest occupational level followed by

level 2 and 6. Level 3 and 4 are almost equally represented in the sample, and about 14% of all

parents in the sample had the highest four occupational prestige levels from 7 to 10 (see Figure

36).

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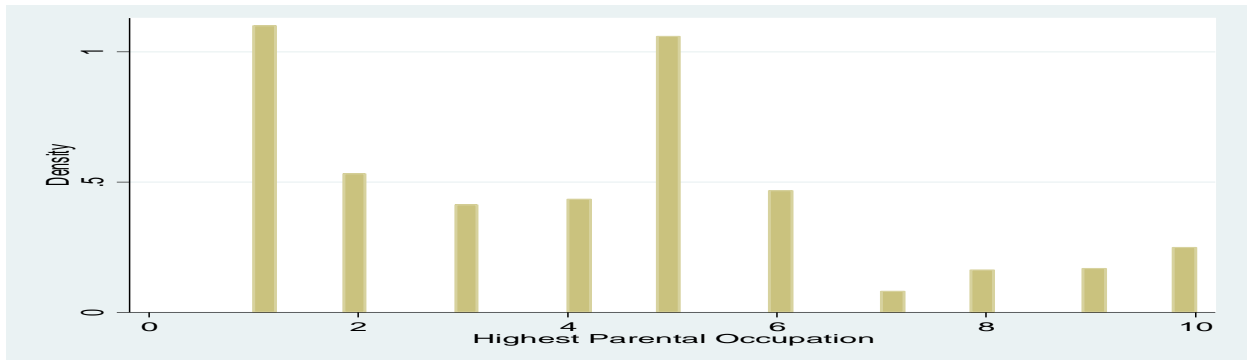
**Figure 36.** Frequency of Distribution of Highest Parental Occupation Prestige Index.

*Socioeconomic status variable*: Standardized Z score statistics were calculated from: a). household total annual income amount; b). highest parental occupational prestige index; and c). highest parental educational attainment level. The Z scores were summed and averaged to estimate the value of for Standardized Socioeconomic Status (SES) variable.

**Table 70.** Standardized Z Score Statistics of Household Income, Parental Education and Occupation.

| Variables | Number | M | SD | Range |
|---|---|---|---|---|
| Total Household Annual Income | 16057 | .0001607 | .9976562 | (-54.25467) - 34.06699 |
| Highest Parental Edu Attainment | 16057 | -.3.04e-07 | 1 | (-2.91415) – 3.196128 |
| Highest Parental Occu Prestige | 16057 | .0023957 | .9996204 | (-1.182658) – 2.261329 |

The composite SES was examined further and two extreme values on the negative end of the continuum was truncated by replacing them with the value equal to the first percentile value of the SES distribution. Table 71 demonstrates the standardized SES values in the age-cohorts sample prior and after the truncation showing the change in values within the distribution. As

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shown in the table, the number of valid observation and median SES, as well as the highest four SES values are the same in the prior- and post-truncation distribution. The average SES has changed slightly (from .000852 to .002498) and the two smallest values were replaced by the third and fourth smallest values.

**Table 71.** Prior and Post Truncation of the Standardized SES in Age-Cohorts Sample.

|  |  | Original values | After truncation |
|---|---|---|---|
| Number of valid observation |  | 16,057 | 16,057 |
| Average SES |  | .000852 | .002498 |
| Median SES |  | -.1086295 | -.1083353 |
| SES level of the first four observations (smallest SES) | Smallest | -17.07221 | -3.054378 |
|  | 2nd smallest | -17.07221 | -3.054378 |
|  | 3rd smallest | -5.229503 | -2.410014 |
|  | 4th smallest | -3.054378 | -2.410014 |
| SES level of the last four observations (highest SES) | 4th largest | 4.419808 | 3.557377 |
|  | 3rd largest | 4.419808 | 4.006446 |
|  | 2nd largest | 4.431664 | 4.419808 |
|  | Largest | 11.47546 | 4.419808 |

After replacing the two extreme negative values with the value of first percentile in the distribution, the key explanatory composite variable SES was created (M=.002498; SD=.6550983; min = -3.054378; max = 4.419808). The frequency distribution of SES is shown in Figure 37 below.
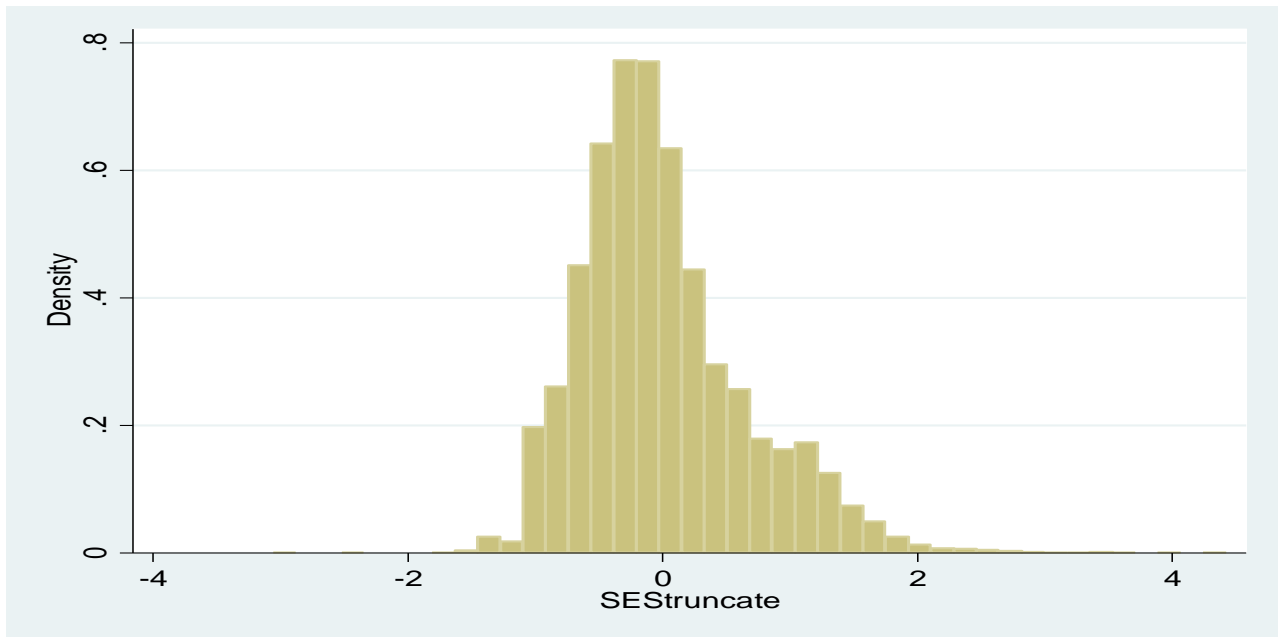
**Figure 37.** Frequency Distribution of Standardized SES of Age-Cohorts Sample.

A brief observation on the SES distribution and a number of households in the age-cohorts sample reveals the following descriptions. One of the lowest SES level (the lowest 560 households) households has two children in age between 17 – 36, one has a higher education degree, the other has not. The household size of the family is 9. They live in an aimag center and the major income for the household is salary, MNT 920,000 a year, and they also made MNT 12,000 from livestock. The family does not have any cropping or enterprise income. A parent has primary education and the parental occupational prestige index is 1 for the household. Another family in the same SES level lives in Ulaanbaatar, the capital city, and has two children in the 17 – 36 age range, both have no higher education degree. The family has 4 members, and has an annual salary of MNT 1,370,000, and the salary is the only income source for the family. Parental education level is also primary education and occupational prestige is 1.

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A family from the mid-range of the SES continuum lives in a rural area, has 7 members and four of them are in age of 17 – 36 years old. None of the children obtained higher education. Their main income source is cropping/horticulture. The highest parental education level is a secondary education and the occupational prestige index is 5. Another family in the same SES level lives in Ulaanbaatar and has made MNT 1,200,000 from salary which is the only income source for the family. The parent had obtained a higher education degree but the occupational index was 1.

Finally, a household in the highest range of SES continuum, lives in a soum center and has 4 members, two of which are in age between 17 – 36. They both have a higher education degree. This family does not have a salary income, however, they made MNT 1,730,400 from livestock, and about MNT 40,000,000 from family entrepreneurial activity. The parental educational attainment is high indicated by score 7, and the occupational prestige index is 6. Another family in the same SES level lives in Ulaanbaatar, has 4 members. One of them is in 17 – 36 years range with a higher education degree. The family has high salary income (MNT 11,000,000) as well as family enterprise income (MNT 34,300,000). A parent in the family has a high level of educational attainment (7) and the parental occupational prestige is the highest among the occupational prestige index levels (10).

### 4.3.3 Access to Higher Education and Change in Effect of Socioeconomic Status in the Past Decades

Logistic regression was run to determine if the relationship between standardized SES and college attendance (outcome variable) was different for each age cohort. The reduced-form equation of the logistic regression is shown below:

**Equation 6. Logistic regression on college attendance by age-cohorts**

$$logit(collegeattend) = \beta_0 + \beta_1 SES + \beta_2 agecohort_1 + \beta_3 agecohort_2 + \beta_4 agecohort_3$$

Out of the total 16,096 subjects, 14,798 (92%) had complete data and were used to build the model. Models with and without survey weights were run and the results were compared. Results were almost identical, because, although the two surveys were administered in different time points (2008 and 2011), they were completed using the same sampling procedure, stratification and primary sampling units. Since the results of the models with and without survey weights were almost identical, here the models using the survey weights are reported.

A sequential model building technique was implemented by first examining a baseline model, then including other covariates of interest, and finally including the supplementary interaction terms. Family SES, age cohorts, and the interaction between the two were included in the initial model. The second model controlled for the effects of the following covariates: gender, work responsibility, household size, and location of origin. The final two models included additional interaction terms for location and gender, to determine their patterns of prediction on college attendance between levels of family SES. The reduced-form equation for the final full model is shown below:

**Equation 7. Logistic regression on college attendance by age-cohorts full model**

$$logit(collegeattend)$$

$$= \beta_0 + \beta_1 SES + \beta_2 agecohort_1 + \beta_3 agecohort_2 + \beta_4 agecohort_3$$

$$+ \beta_5 female + \beta_6 worklastweek + \beta_7 housesize + \beta_8 aimagcenter$$

$$+ \beta_9 soumcenter + \beta_{10} country + \beta_{11} SESagecohort_1 + \beta_{12} SESagecohort_2$$

$$+ \beta_{13} SESagecohort_3 + \beta_{14} SESaimagcenter + \beta_{15} SESsoumcenter$$

$$+ \beta_{16} SEScountry + \beta_{17} FemaleAimagcenter + \beta_{18} FemaleSoumcenter$$

$$+ \beta_{19} FemaleCountry$$

The main and interaction effects of standardized family SES and age-cohorts on college attendance remained relatively stable for all four models (Table 73). For the final extended model, Model 4 (see comprehensive results of Model 4 is presented in Table 72), all included variables significantly predicted college attendance; $F(19, 1227) = 74.49$, $p<.001$ (Table 73). The interaction between age-cohorts and family SES on college attendance was overall significant, $F(3, 1243) = 11.8$, p<.001, indicating that the relationship between SES and college attendance was different at each age-cohort.

Specifically, as SES increased, age cohorts 3, 2, and 1 all had significantly higher rates of college attendance than the youngest cohort (age-cohort 4); $OR = 1.49$ (*95% CI*: 1.27 – 1.76), 1.59 (*95% CI*: 1.25 – 2.03), 1.76 (*95% CI*: 1.28 – 2.43), respectively (Table 73). From an observation from the coefficients of odd ratios, age-cohort 2 (second oldest generation) has lightly higher chance of attending college than age-cohort 1 (the oldest generation), and age-cohort 3 has slightly higher chance than age-cohort 2, in comparison to chances of attending college for age-cohort 4 (the youngest generation).

Regarding the other covariates, females were more likely to attend college than their male counterparts (Table 73; $OR = 1.66$, t = 7.44, p<.001). Subjects were less likely to be in college if they had worked in the past week ($OR = .61$, t = -8.95, p<.001) and if their household size was larger ($OR = .86$, t = -10.14, p<.001). The location of origin also significantly predicted college attendance, $F(3,1243) = 11.77$, p<.001 with subjects from Ulaanbaatar being more likely to attend college than subjects from aimag center, soum center and countryside (Table 73).

**Table 72.** Results of a Logistic Regression Predicting College Attendance by Family SES.

| Variable | OR (95% CI) | SE | t | p |
|---|---|---|---|---|
| Standardized Family SES | 2.13 (1.87-2.43) | .14 | 11.43 | <.001 |
| Age Cohort[29] | | | | |
|   Age cohort 3 to 4 | 2.65 (2.39-2.93) | .14 | 18.40 | <.001 |
|   Age cohort 2 to 4 | 2.35 (2.02-2.73) | .18 | 11.03 | <.001 |
|   Age cohort 1 to 4 | 1.81 (1.45-2.26) | .20 | 5.30 | <.001 |
| Interaction 1 [30](age-cohort*SES) | | | | |
|   Age cohort 3 * SES | 1.49 (1.27-1.76) | .12 | 4.80 | <.001 |
|   Age cohort 2 * SES | 1.59 (1.25-2.03) | .20 | 3.75 | <.001 |
|   Age cohort 1 * SES | 1.76 (1.28-2.43) | .29 | 3.48 | .001 |
| Female | 1.66 (1.45-1.90) | .11 | 7.44 | <.001 |
| Work last week | .51 (.55-.68) | .03 | -8.95 | <.001 |
| Household size | .86 (.84-.89) | .01 | -10.14 | <.001 |
| Location[31] | | | | |
|   Aimagcenter to Ulaanbaatar | .81 (.68-.98) | .08 | -2.17 | .030 |
|   Soumcenter to Ulaanbaatar | .61 (.50-75) | .06 | -4.76 | <.001 |
|   Countryside to Ulaanbaatar | .60 (.49-74) | .06 | -4.76 | <.001 |
| Interaction 2 [32] (location*SES) | | | | |
|   Aimagcenter *SES | 1.06 (.88-1.28) | .10 | .61 | .542 |
|   Soumcenter * SES | 1.28 (1.04-1.59) | .14 | 2.31 | .021 |
|   Countryside *SES | 2.35 (1.69-3.27) | .40 | 5.07 | <.001 |
| Interaction 3 [33] (location*gender) | | | | |
|   Aimagcenter * female | 1.01 (.80-1.26) | .12 | .04 | .965 |
|   Soumcenter * female | 1.38 (1.07-1.78) | .18 | 2.47 | .014 |
|   Countryside *female | 1.41 (1.09-1.82) | .18 | 2.66 | .008 |

[29] Overall test of age-cohorts, $F(3, 1243) = 117.6$, p<.001
[30] Overall test of age-cohorts and SES interaction, $F(3, 1243) = 11.8$, p<.001
[31] Overall test of location; $F(3, 1166) = 11.7$, $p < .001$.
[32] Overall test of location and SES interaction, $F(3, 1243) = 9.35$, p<.001
[33] Overall test of location and gender interaction, $F(3, 1243) = 4.00$, p<.01

**Table 73.** Results of Logistic Regressions Predicting College Attendance by Family SES.

| Variable | *Model 1* | *Model 2* | *Model 3* | *Model 4* |
|---|---|---|---|---|
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Family SES | 2.70 (2.44-2.99)*** | 2.83 (2.14-2.65)*** | 2.14 (1.89-2.44)*** | 2.13 (1.87-2.43)*** |
| Age Cohort | | | | |
|   Age cohort 3 to 4 | 2.22 (2.02-2.45)*** | 2.63 (2.37-2.91)*** | 2.64 (2.38-2.93)*** | 2.65 (2.39-2.94)*** |
|   Age cohort 2 to 4 | 1.94 (1.67-2.24)*** | 2.33 (2.00-2.71)*** | 2.33 (2.01-2.72)*** | 2.35 (2.02-2.73)*** |
|   Age cohort 1 to 4 | 1.53 (1.24-1.90)*** | 1.83 (1.47-2.28)*** | 1.81 (1.46-2.26)*** | 1.81 (1.45-2.26)*** |
| Interaction 1 (age-cohort*SES) | | | | |
|   Age cohort 3*SES | 1.39 (1.18-1.63)*** | 1.51 (1.28-1.78)*** | 1.50 (1.27-1.77)*** | 1.49 (1.27-1.76)*** |
|   Age cohort 2*SES | 1.33 (1.05-1.70)** | 1.57 (1.23-2.01)*** | 1.49 (1.25-2.03)*** | 1.59 (1.25-2.03)*** |
|   Age cohort 1*SES | 1.32 (.96-1.82)√ | 1.72 (1.25-2.37)** | 1.78 (1.29-2.45)*** | 1.76 (1.28-2.43)** |
| Female | | 1.83 (1.67-2.00)*** | 1.83 (1.67-2.00)*** | 1.66 (1.45-1.90)*** |
| Worked last week | | .60 (.54-.67)*** | .61 (.55-.67)*** | .61 (.55-.68)*** |
| Household size | | .86 (.84-.89)*** | .86 (.84-.89)*** | .86 (.84-.89)*** |
| Location | | | | |
|   Aimag cntr. to UB | | .83 (.72-.95)** | .81 (.71-.94)** | .81 (.68-.98)* |
|   Soumcenter to UB | | .76 (.66-.88)*** | .73 (.63-.85)* | .61 (.50-.75)*** |
|   Countryside to UB | | .68 (.59-.79)*** | .72 (.62-.84)* | .59 (.49-.74)*** |
| Interaction 2 (location*SES) | | | | |
|   Aimagcenter*SES | | | 1.06 (.87-1.28) √ | 1.06 (.88-1.29) √ |
|   Soumcenter*SES | | | 1.25 (1.02-1.54)* | 1.28 (1.04-1.59)* |
|   Countryside*SES | | | 2.27 (1.64-3.15)*** | 2.35 (1.69-3.27)*** |
| Interaction 3 (location*gender) | | | | |
| Aimagcenter*female | | | | 1.01 (.80-1.26) √ |
| Soumcenter*female | | | | 1.38 (1.07-1.78)* |
| Countryside*female | | | | 1.41 (1.09-1.82)** |

*significant at $\alpha = .05$.
**significant at $\alpha = .01$
***significant at $\alpha = .001$
√Not significant

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Predicted probabilities over the range of SES values were examined for the four age-cohorts. As expected, the probability of attending college increased as standardized family SES increased for all cohorts (Table 74; Figure 38). In Table 74 each age-cohort is coded as a dummy variable: 0 indicates the individual does not belong to the age-cohort, 1 indicates the individual does belong to the age-cohort. However, age-cohort 3 (22 – 26 years old) had the highest probability of attending college over the range of SES, followed by age cohort 2 and 1. The youngest age cohort (17 – 21 years old) had the lowest probability of attending college.

Furthermore, the differences in the probability of attending college between the cohorts were smaller at the low end of SES, indicating that for the lowest SES levels, subjects were less likely to attend college regardless of when they were born. However, the age-cohort of the subject had more of a difference in their college attendance when they were from average or slightly above average SES levels.

**Table 74.** Predicted Probabilities of Accessing Higher Education for Different Age-Cohorts Over SES Levels.

| ES levels | Probability of age-cohort 4 | | Probability of age-cohort 3 | | Probability of age-cohort 2 | | Probability of age-cohort 1 | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| -2 | .105217 | .055267 | .060562 | .116983 | .07122 | .094199 | .073483 | .069375 |
| -1 | .200587 | .110976 | .120925 | .22039 | .140617 | .181609 | .144742 | .13724 |
| -.5 | .26822 | .154223 | .167321 | .29226 | .192909 | .244803 | .198214 | .188552 |
| 0 | .348711 | .210337 | .226922 | .376255 | .258792 | .321352 | .265313 | .253414 |
| 1 | .533253 | .362398 | .385124 | .562779 | .426942 | .502588 | .435213 | .42005 |
| 2 | .709123 | .548088 | .572012 | .733092 | .613864 | .683147 | .621826 | .607151 |
| 3 | .838763 | .72129 | .740388 | .854245 | .772328 | .821449 | .778204 | .767326 |
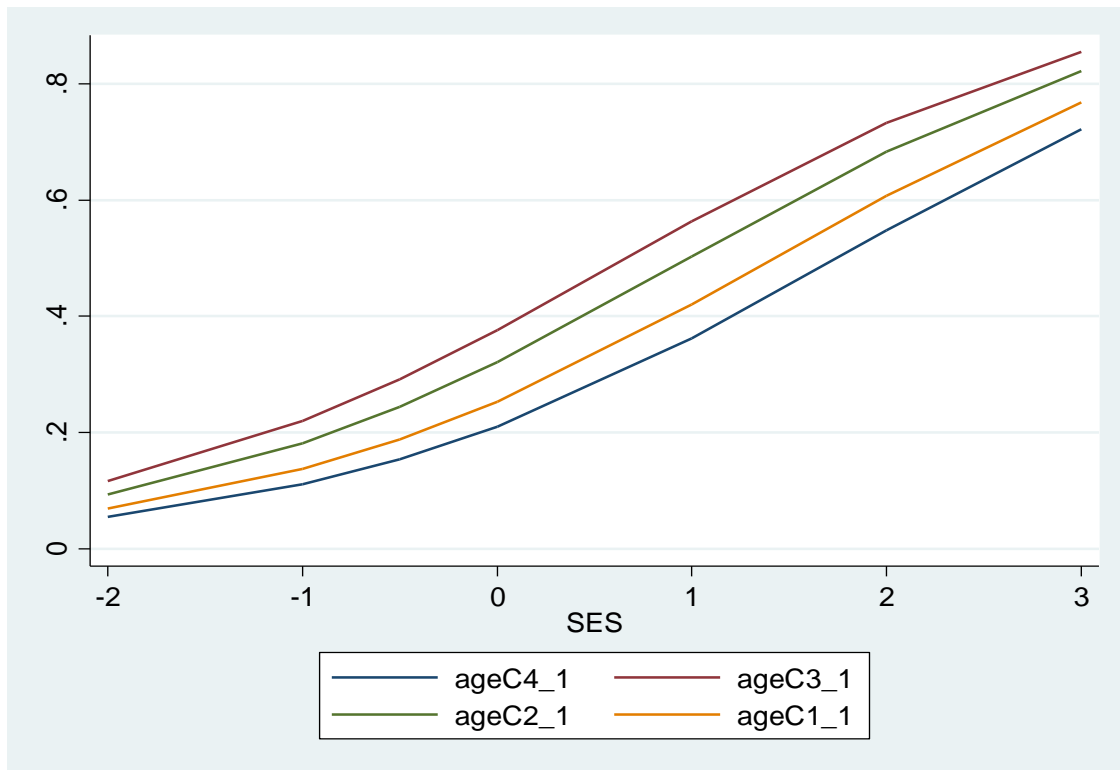
**Figure 38.** Predicted Probabilities of College Attendance over the Range of Family SES for Each Age-Cohort[34].

ageC4_1 = age cohort 4 (17-21 years old);
ageC3_1 = age cohort 3 (22-26 years old);
ageC2_1 = age cohort 2 (27-31 years old);
ageC1_1 = age cohort 1 (32-36 years old).

The interactions between location and family SES and location and gender were both significant ($F(3, 1243) = 9.36$, p<.001; $F(3,1243) = 4.00$, p = .008, respectively). Predicted probabilities over the range of SES levels were examined for different locations of origin. Probabilities of accessing higher education increased as SES levels increased for individuals from all four locations: Ulaanbaatar (capital city), provincial centers (aimag centers), small town

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[34] Predicted probabilities when all other variables in the model set to 0/reference group.

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centers (soum centers), and countryside. Individuals from Ulaanbaatar had the highest probability to access higher education, followed by the provincial centers, small town centers and countryside, respectively. Individuals from countryside, the rural areas had the least probability to attend college (Table 75 and Figure 39).

**Table 75.** Predicted probabilities of Accessing Higher Education for Different Locations Over SES Levels.

| SES | location1 = UB | location2= aimagcenter | location3= soumcenter | location4= countryside |
|------|---------------|------------------------|----------------------|------------------------|
| -2 | 0.101408 | 0.080022 | 0.065548 | 0.043292 |
| -1 | 0.194073 | 0.156549 | 0.130193 | 0.088056 |
| -0.5 | 0.260225 | 0.213296 | 0.179418 | 0.123613 |
| 0 | 0.339429 | 0.283694 | 0.242075 | 0.17084 |
| 1 | 0.523004 | 0.458026 | 0.405304 | 0.305389 |
| 2 | 0.700567 | 0.64328 | 0.592547 | 0.484044 |
| 3 | 0.833123 | 0.793729 | 0.756287 | 0.666873 |
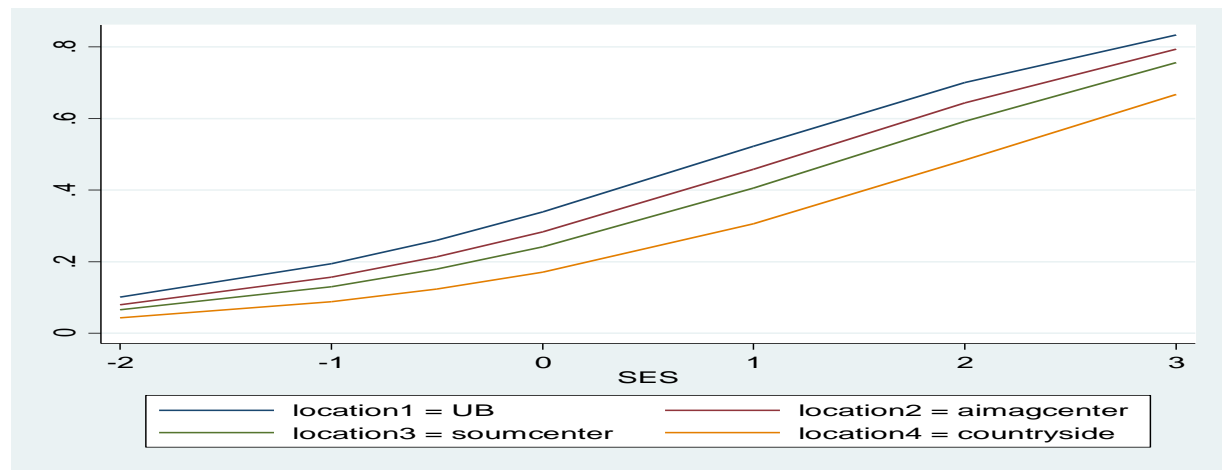


**Figure 39.** Predicted Probabilities for Locations over SES.

Moreover, predicted probability over the four locations were examined for gender as well. All other variables in the model were maintained as they were, including SES. As

mentioned earlier, the further an individual's location of origins distances from the capital city, the less the probability of accessing higher education became for both male and female individuals. However, females had higher chance of attending college than their male counterparts throughout all four locations (Figure 40).
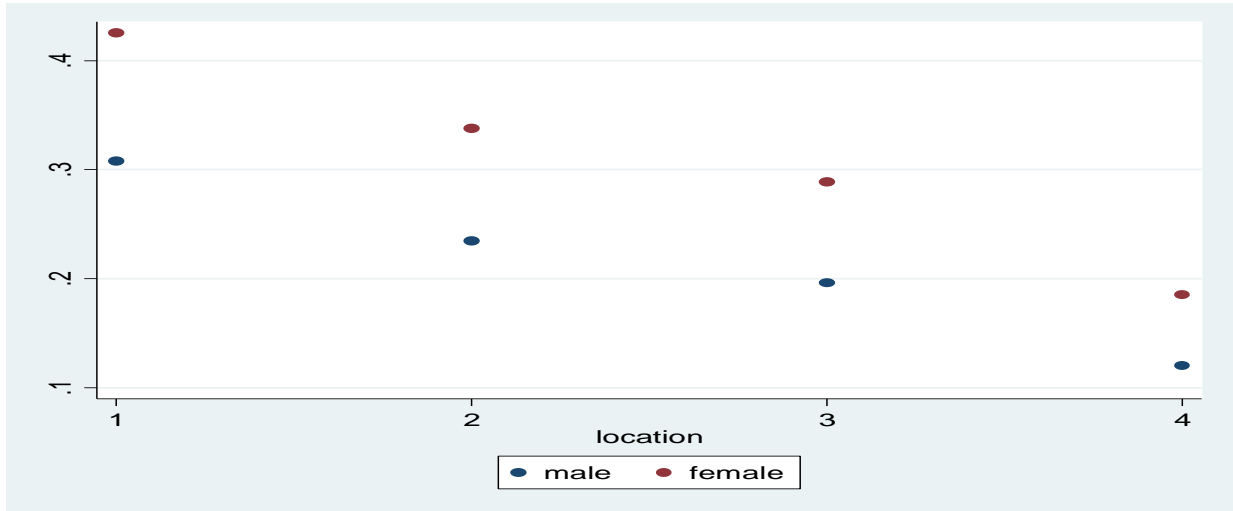


**Figure 40.** Predicted Probabilities of Accessing Higher Education Over Four Locations for Genders.

## 4.4    SUMMARY OF THE CHAPTER

This section will summarize the key findings and results of the analyses as response for the three research questions presented in Chapter 4.

- Research question #1: *To what extent does socioeconomic status influence access to higher education in post-socialist Mongolia?*

Socioeconomic status (SES) significantly predicts access to higher education in Mongolia. After controlling for gender, age, marital status, household size, location of origin, for every

standardized unit increase in SES, an individual is around two times more likely to attend higher education; *OR* = 2.09 (*95% CI:* 1.84-2.38), *SE* = .14, *t* = 11.08, *p* < .001 (Table 47). Gender, household size, and location of origin have statistically significant relations with access to higher education. Females are almost twice more likely to attend higher education than males; *OR* = 1.99 (*95% CI*: 1.75-2.27), *SE* = .13, *t* = 10.31, *p* < .001 (Table 47). One person increase in the household was associated with a 5% decrease in the odds of attending higher education; *OR* = .95 (*95% CI*: .91-.99), *SE* = .02, *t* = -2.07, *p* = .039. Moreover, married individuals were 50% less likely to attend college than then unmarried peers. Locations of origin was significantly related with access to higher education as a whole, especially, coming from rural areas or the countryside (further from aimag or soum center) decreases the odds of attending college more than 50% compared with individuals that came from Ulaanbaatar.

Ten different socioeconomic status (SES) levels were examined further in regard with their influence on access to higher education. In overall, categorized SES levels significantly predicted access to higher education. Especially, individuals in the top two highest SES levels (well above average) were about 3 times and 5 times more likely to attend college than those in the lowest level, *OR* = 3.07 (*95% CI:* 2.18-4.32), *SE* = .54, *t* = 6.41, *p* < .001, *OR* = 4.98 (*95% CI*: 3.45-7.19), *SE* = .93, *t* = 8.60, *p* < .001, respectively. Furthermore, even individuals with 'average' SES (group 5) were 50% more likely to attend college than those in the lowest group; *OR* = 1.49 (*95% CI*: 1.07-2.09), *SE* = .25, *t* = 2.35, *p* = .019.

- Research question #2: *To what extent are government financial assistance programs reaching their target groups?*

When rates of government assistance for students in higher education institutions was examined for the ten levels of SES and collage attendance, the rate of college attendance increased as the standardized level of SES increased, with 76% of the highest SES level and 31% of the lowest level attending college (Table 52). However, the total rate of students receiving government grants to assist with tuition remained relatively stable over SES levels (~2-3%). Ten students in the lowest SES level received tuition assistance from the government, but so did 10 in the highest SES level. More concerning, in the second highest SES level, 17 students received government tuition assistance despite their family having income and occupation prestige that was well above average. Having a parent (parents) working for a SBO had statistically significant relations with SES levels, and the likelihood that a parent worked for an SBO was higher as standardized SES level increased (Table 53; $\varphi_c = .36$, $\chi^2 (9) = 622.6$, $p < .001$).

About 67% of all college-aged individuals who have at least one parent working for a SBO were attending college while only 42% of all college-aged individuals whose parent is not an employee of SBO were attending college. Moreover, 3.8% of all individuals who have at least one parent working for a SBO was attending college with government financial assistance whereas twice less (1.9%) number of individuals who do not have parents (a parent) working for a SBO was attending college with government assistance (Table 54).

When SES was examined in relation with government assistance, after controlling for age, gender, marital status, household size and origin of location, for each increase in standardized SES level, individuals were about 2.2 times more likely to be in college without assistance ($RRR = 2.2$ ($95\% CI$: 1.90 -2.47), $SE = .146$, $t = 11.47$, $p < .001$) and 1.69 times more likely to be in college with a grant ($RRR = 1.69$ ($95\% CI$: 1.15-2.47), $SE = .328$, $t = 2.69$, $p =$

.007) when compared to individuals who were not in college. The effect of standardized family SES in predicting college attendance without government assistance, compared to not attending college, was still statistically equivalent to the effect of standardized SES in predicting college attendance with a grant, compared to not attending college ($F(1, 1168) = 1.7$, $p = .182$, Table 57).

After accounting for the families with parents working for SBO, the number of individuals who were in college with government grants was relatively the same for all SES levels. More specifically, the number of students in college with government grants whole families fall into the wealthiest three SES levels was almost the same as the lowest three SES levels. Government financial assistance is not reaching the poorest and most marginalized individuals in the society.

- Research question #3: *How has the role of socioeconomic status in influencing access to higher education changed in the past decade?*

Four different age-cohorts were examined including individuals at age between 17 to 36 years old in regard with the effect of their socioeconomic status on access to higher education. It covered about 18 years of post-socialist era in Mongolia, from 1992 to 2010, as their college entrance year. In all four different logistic regression models, built using sequential model building technique, the effect of standardized family SES was found significant on college attendance for all age-cohorts (Table 73). Age-cohorts and SES interactions effects on access to higher education remained relatively stable and significant for the four models, except only model 1 for the age-cohort 1 and SES interaction. However, the relationship between SES and college attendance was different at each age-cohort; $F(3, 1243) = 11.8$, p<.001 (Table 73).

Specifically, as SES increased, age-cohorts 3, 2, and 1 all had significantly higher rates of college attendance than the youngest cohort, the age-cohort 4; *OR* = 1.49 (*95% CI*: 1.27 – 1.76), 1.59 (*95% CI*: 1.25 – 2.03), 1.76 (*95% CI*: 1.28 – 2.43), respectively (Table 73).

Predicted probabilities over the range of SES values were examined for the four age-cohorts. Probability of attending college increased as SES increased, as expected, for all age-cohorts (Figure 38). However, age-cohort 3 (22-26 years old) had the highest probability of attending college over the range of SES, followed by age-cohort 2 (27-31 years old) and age-cohort 1 (32-36 years old). And age-cohort 4, the youngest generation (17-21) had the lowest probability of attending college (Figure 38).

The interactions between location and SES, and location and gender were both significant ($F(3, 1243) = 9.36$, p<.001; $F(3,1243) = 4.00$, p = .008, respectively). Predicted probabilities over the range of SES levels were examined for four locations of origin. Probabilities of accessing higher education increased as SES levels increased for individuals from all four locations: Ulaanbaatar (capital city), provincial centers (aimag centers), small town centers (soum centers), and countryside. Individuals from Ulaanbaatar had the highest probability to access higher education, followed by the provincial centers, small town centers and countryside, respectively. Individuals from countryside, the rural areas, had the least probability to attend college (Table 75 and Figure 39). Interestingly, females maintained their higher chance of attending college than the male counterparts throughout all four locations (Figure 40).

# 5.0    DISCUSSIONS, IMPLICATIONS, AND RECOMMENDATIONS

## 5.1    SOCIAECONOMIC STATUS OF COLLEGE-AGE POPULATION IN MONGOLIA

Socioeconomic status (SES), the key explanatory variable in the study was constructed from six different subscales, including: a). Household total annual salary income, b). Household annual income from livestock activity, c). Household total annual income from cropping/horticulture activity, d). Household total annual income from entrepreneurial activity, e). Highest parental educational attainment, and f). Highest parental occupational prestige index. The total annual incomes from the four different income sources were added. The highest level of educational attainment among parents of each observation was chosen and was ranked using an educational attainment ranking scheme, similar to SAMIN used in Shavit et al. (2007). The highest level of occupational prestige ranked by a job prestige scheme similar to EGP class (Erikson & Goldthorpe, 1992) among parents was chosen. The values of total annual household income, highest parental educational attainment, and highest parental occupational prestige index were then standardized into Z scores. The three Z scores were then added and averaged to create the value for the standardized composite SES variable for each observation in the study sample (See Figure 6 of Chapter 3 which describes the SES variable).

In the **college-age sample** (n=5,310) there were 3,240 households with salary information, 2,120 households who reported information on livestock activity, 501 households with information on cropping/horticulture, and finally 835 households reported on revenues and expenditures on their family entrepreneurial efforts. In the **age-cohorts sample** (n=16,057) there were 10,086 households with annual salary income, 2,251 households reported information on their livestock activity while 1,156 households reported on their cropping/horticulture related activities, and finally there were 2,034 households that held family based entrepreneurial activity.

By composing the SES variable from the six different subscales for the college-age sample, I was able to add 1,288 additional households to the sample that did not have any salary income, based on their livestock activity. Another 57 households were added that did not have either salary or livestock activity income, based on their income from cropping activity. Finally, 277 households were added to the sample, who did not have any income from any other income sources but enterprise. (See Figure 13)

By the same strategy of composing the SES variable, for the age-cohorts sample, 3,615 households were added to the sample, who did not have salary income, based on their livestock activity. Furthermore, 222 families were added who did not have either salary or livestock activity income. Finally, by drawing in households based on their entrepreneurial activities, 950 families, who did not have any income from any other sources but enterprise, were added to the sample. (See Figure 34)

In both samples there were a number of households whose expenditure amounts exceeded the revenue amounts on either livestock, cropping/horticulture or entrepreneurial activities.

Therefore, there were 132 (out of n=5310) and 363 (out of n=16,057) households whose total annual household income subscale had a value less than 0 in the college-age and age-cohorts samples respectively.

The highest educational attainment account among the parents of the college-age sample indicated that only 60 (out of n=5310) had no formal education, a third had completed secondary education, while about 16% showed a post-secondary vocational educational attainment, and another 22% had a higher education degree ranging from a higher education diploma degree to a doctorate. For the age-cohorts sample only 1.5% (243) had no formal education, about 19% and 30% had completed primary and secondary education respectively, while 20% showed a post-secondary vocational education, and the remaining 21.5% had obtained a higher education degree ranging from a diploma to a doctorate.

The highest occupational prestige index among parents of the college-age sample revealed about 20% unemployment. The figure in the age-cohorts sample was slightly higher, 23%. Ranked from 1 to 10 referring to the prestige of the occupation in ascending order, level 5 had the highest frequency in both samples. The highest four prestige levels took 15.5% and 14% in the college-age and age-cohorts samples respectively. The lowest two levels combined took about 31.6% in the college-age sample and 35% in the age-cohorts sample.

The standardized composite SES variable ranged from (-2.5080) to 3.7430 (M=.032; SD=.685) in the first sample and it ranged from (-3.0544) to 4.4198 (M=.002; SD=.655) for the latter. Table 76 demonstrates the basic statistics of the ten SES groups in the college-age sample, including average value, standard deviation, and range. See Table 49 for the descriptive statistics of all six subscales of the SES in Chapter 4.

Table 76. Ten SES Groups in Ascending Order.

| SES groups | N | M | SD | Range |
|------------|-----|------|-----|------------------|
| SES 1 | 487 | -.95 | .20 | - 2.50 – (-.69) |
| SES 2 | 486 | -.61 | .06 | -.69 – (-.51) |
| SES 3 | 489 | -.41 | .05 | -.51 – (-.33) |
| SES 4 | 488 | -.29 | .03 | -.33 – (-.23) |
| SES 5 | 484 | -.15 | .04 | -.23 – (-.09) |
| SES 6 | 489 | -.02 | .04 | -.09 – .05 |
| SES 7 | 486 | .14 | .05 | .06 - .23 |
| SES 8 | 487 | .37 | .09 | .23 - .54 |
| SES 9 | 491 | .78 | .15 | .54 – 1.06 |
| SES 10 | 484 | 1.46 | .38 | 1.06 – 3.74 |

Descriptive analyses of the six subscales that formed the socioeconomic status of households unfold interesting stories. The number of families that have regular salary income increases as the socioeconomic status level ascends. The number of families that are involved with livestock is highest on SES level 4, slightly below the average SES spectrum, and decreases as SES levels go upwards. The fewest number of families are involved in cropping/horticulture as a source of income in comparison to the other income sources analyzed in the study, however, the number of families doing cropping and horticulture is relatively consistent throughout the ten SES levels. Furthermore, on average, more families are involved in entrepreneurial activities than the ones doing cropping/horticulture, and the number of entrepreneurial families remain consistent for the entire spectrum of the SES as well (See Figure 22).

The average household salary income increases consistently throughout the SES levels. Although livestock is captured in all levels of SES, livestock income is found highest on SES levels 6 and 7, but the lowest among the lowest and highest SES. However, the average income from cropping/horticulture is highest on SES level 10 and higher on SES level 5 and 7, but lowest among the poorest three SES levels. It is interesting to find that families of all SES levels

have tried some type of entrepreneurial activity. The average entrepreneurial income increased steadily from SES level 2 through 9, however it surged drastically on SES level 10 and fell severally on SES level 1. These dynamics may well be showing the risks of small/family based enterprises where you could either win high or lose significantly in business (See Figure 23).

Analysis on the percentage compositions of household income by the four different subscales reveals interesting outcomes as well. Salary is an important contributor to the household annual income throughout the entire socioeconomic status spectrum. The second most consistent contributor is entrepreneurial income. It has the most impact on the highest and lowest SES levels, in particular. The percentage of income made from livestock is highest on SES level 2 and gradually decreases as SES levels go up reaching the least on SES levels 9 and 10. Finally, cropping/horticulture takes the smallest percentage of the total household income composition, in comparison to the other three sources, for all SES levels. It is higher for the mid-levels than for the rest of the levels (See Figure 24).

Finally, the scores of the remaining two subscales of the SES composite – parental education and occupation – in the college-age sample gradually increase throughout the socioeconomic continuum. However, in the lowest three levels, the educational attainment levels of the parents were higher than their occupational prestige scores, and in the highest two levels, the occupational prestige levels were higher than their educational attainment levels. And parental educational and occupational scores are almost equal for those in the five consecutive levels in the middle of the SES continuum (See Figure 25).

**5.2     GROWTH IN HIGHER EDUCATION IN MONGOLIA: FROM EQUITY**

**PRESPECTIVE**

Undoubtedly, the higher education enrollment has increased rapidly and was unprecedented in Mongolia since the collapse of socialism. Bachelor level total enrollment in Mongolia in the 1990 – 1991 academic year was 13,826. Ten years after, in the 2000 – 2001 academic year the number escalated to 77,281, which is an almost six-fold increase.   The enrollment kept increasing into the 2000s as well. In the 2011–2012 academic year there were 154,481 students enrolled in bachelor degree level studies in the Mongolian higher education system, which is an almost twelve-fold increase from the 1990 undergraduate enrollment, and two-fold from the total undergraduate enrollment in 2000 (See Table 12).

There are two key factors in the increase: a). Finance-driven higher education reform policies and their implementation in post-socialist Mongolia and b). Privatization in the higher education system. Tuition was introduced and became a norm in the 1992 – 1993 academic year. An annual tuition which initially equaled about four months' salary of a university lecturer, remained relatively stable over the years despite the unstable national currency value in comparison to the market dollar rate (Table 4). Government controls the maximum level of higher education tuition, thus higher education institutions have no rights to increase their tuition levels without the consent of the government.

However, the tuition is the single most important source of revenue for public and private higher education institutions in Mongolia. A survey among 75 higher education institutions revealed that the percentage of tuition in the total revenue of the institution ranged between 88%

and to 94%, on average (Table 7). In other words, tuition revenue has replaced the government appropriations that the public higher education institutions used to receive prior to the collapse of socialism.

Such unprecedented enrollment increase would not have been possible without the establishment of private higher education institutions in Mongolia. The 1991 amendment to the Law on Education legalized the private higher education institution for the first time in the country's history. Consequently, between 1992 and 2002, within the first ten years of the legalization of private higher education, 136 private institutions were established enrolling students. However, such mushrooming of private institutions faced strong criticism from the public. Most of these newly opened private institutions were small, mainly social studies focused (as a way to avoid the heavy investment in laboratories, technology and equipment that natural science programs require). Many of them were ill-equipped and offered an inadequate quality of instruction (ADB, 2011a). Subsequently, as the result of measures taken by the Ministry of Education in the 2000s, such as merging some of the smaller public institutions and raising the accreditation procedures and criteria for private institutions, the total number of higher education institutions decreased to 101, in 2011, of which 81 were private (See Table 8).

However, the national level aggregate numbers on student enrollment do not show the socioeconomic status background of the enrolled students. The quest into whether the higher education expansion benefited all segments of the society necessitates further empirical investigation. The government set up Student Lending and student grant programs at nearly the same time as when tuition was introduced (Figure 1). The Student Lending program is aimed at poor and marginalized students (Table 11), whereas about 60% of all grants are devoted to

students whose parent(s) work for State budget organizations (SBOs), while the remainder of the grant program is directed at reaching the poorest and most vulnerable. In aggregate numbers about 15% – 22% of the total undergraduate enrollment in Mongolia receives either a grant or a loan from the government as of 2011.

However, from equity perspective, the aggregate number do not allow making a conclusion whether the government financial assistance programs are reaching the targeted groups. The State Training Fund, the organization that handles the management of the government financial assistance programs is a semi-government organization and no information was found on whether it involved public or civic representations in its operations. The findings of the empirical analyses into the equity in access to higher education in post-socialist Mongolia, in particular, whether the government financial assistance is benefiting the targeted individuals is discussed in the following sections.

## 5.3    RELATIONSHIP BETWEEN SES AND ACCESS TO HIGHER EDUCATION

Logistic regression models were run to determine the effect of standardized family SES on access to higher education using the college-age sample with 4,871 observations. Survey weights, primary sampling units, and strata were accounted for in the models. In the first model, SES significantly predicted college attendance; $F(1,1168)=178.46$, $p<.001$. For every standardized unit increase in the SES, an individual was 2.3 times more likely to attend college ($OR = 2.3$(95% CI: 2.04-2.61), $SE=.144$, $t = 13.36$, $p<001$. In the second model, which accounted

for age, gender, marital status, household size and region of origin, the effect of SES remained significant. For every standardized unit increase in the SES, an individual was around 2 times more likely to access higher education; $OR = 2.09$ (95% $CI$: .81-.88), $SE = .14$, $t = 11.08$, $p<.001$. Overall, the variables significantly predicted access to college, $F(8, 1161)= 47.93$, $p<.001$, and there was no evidence for lack of fit in the model as well; $F(9, 1160) = .95$, $p = .478$. (See Table 47).

Moreover, after controlling the SES, younger individuals were more likely to attend college. A one-person increase in the household was associated with a 5% decrease in the odds of attending college. Females were almost 2 times more likely to attend college than their male counterparts. Marital status had a negative effect on college access, and a married individual was 50% less likely to be in college. The original location of residence was significantly related to college attendance. In comparison to coming from a family that lives in Ulaanbaatar, those who live in aimag centers, soum centers, and the country side decreased the likelihood of attending college.

A closer look into the SES revealed more details as well. A logistic regression was run predicting college attendance by SES. This time SES was treated as categorical variables with 10 levels, controlling for age, gender, marital status, household size, and location of original residence. Overall, the variables significantly predicted college attendance, $F(16, 1153) = 25.95$, $p<.001$, and the model fit passed the expected level, $F(9, 1160) = .22$, $p=.991$. The effect of categorized SES levels were overall significant, $F(9, 1160) = 17.04$, $p<.001$. The result showed that individuals had higher odds of attending college when reaching the higher levels of SES levels (Table 50).

In particular, individuals from the top two SES levels (well above average) were about 3 times and 5 times more likely to attend college than those in the lowest level, $OR$ = 3.07 (95% $CI$: 2.18 – 4.32), $SE$ = .54, $t$ = 6.41, $p$<.001; $OR$ = 4.98 (95% $CI$: 3.45 – 7.19), $SE$ = .93, $t$ = 8.60, $p$<.001, respectively. Even individuals from the "average" SES (SES level 5 out of the ten levels) were 50% more likely to attend college than those in the lowest SES level; $OR$ = 1.49 (95% $CI$: 1.07 – 2.09), $SE$ = .25, $t$ = 2.35, $p$ = .019 (Table 50). The effects of the other variables in the model were similar to the ones described under the second model.

In post-socialist Mongolia, family background represented by socioeconomic status has a strong effect on accessing higher education. The higher up an individual's socioeconomic status, the more likely she will attend a higher education institution. Individuals who belong to families that are in the lowest socioeconomic level are 5 and 3 times less likely to obtain a higher education degree than their peers whose families fit in the highest and second highest socioeconomic status levels in the country. These results demonstrate that poor and marginalized segments of the society need additional support to help them access higher education. Whether such support systems exist and how these systems work in practice is discussed in the next section.

## 5.4    EQUITY IN HIGHER EDUCATION AND THE ROLES OF THE

## GOVERNMENT

The rate of government assistance for students in college was examined for each level of SES by constructing a contingency table between the ten SES levels and the categorical variable College Access (with three outcomes: not in college, in college with government assistance, in college without government assistance). There was a low to moderate relationship between the two variables, $\varphi_c = .21$, $\chi2$ (18) – 421.4, $p<.001$. The rate of college attendance increases as the socioeconomic status levels increase. Only 31% of the college-age individuals from the lowest SES level was attending higher education (with or without government assistance) compared to 76% of the highest SES group. Yet the rate of students receiving government financial support to pay for tuition remains relatively stable throughout the ten SES levels, with the second highest SES level receiving the highest number of government tuition assistance, despite their well-above-average income and occupation status (Table 52).

If the government financial assistance programs' goal is to support the individuals with the least means, and if the implementation of the program aligns with the goal, the students receiving government support would have been distributed more frequently among the lower levels of SES groups. The current distribution in the government financial assistance programs, and their implementation in the real world does not demonstrate a clear priority of the government to support the improvement of equity in access to higher education for lower socioeconomic background individuals. Rather it demonstrates a flattened-out, even distribution of the limited resource throughout the entire spectrum of the society, including the highest end of

the continuum who may not even need the support. Such uniform distribution of the limited resource could be explained by a specific policy to support parents working for state budget organizations (SBOs), which I will discuss in the next section.

The SES status and parental employment at a SBO were examined for the college-age sample. Having a parent(s) working for a SBO had statistically significant relationship with SES levels, and as SES level increased (the richer a family got) the likelihood that a parent worked for a SBO grew as well ($\varphi_c$ =.36, $\chi$2(9)=622.6, $p$<.001; Table 53). There are 6.5 times more number of SBO employee-parents in the highest three SES groups than those in the lowest three SES groups; and there were 16.5 times more SBO employee-parents in the highest SES group than those in the lowest SES group.

As expected individuals with parents working for a SBO were more likely to be attending college and were slightly more likely to have a government financial assistance as well ($\varphi_c$ = .18, $\chi^2$ (2) = 180.3; $p$ < .001, Table 54). 67% of all college-aged individuals in the sample who have at least one parent working for a SBO were attending college while only 42% of all college-aged individuals whose parent is not an employee of SBO were attending college. Moreover, the number of individuals with parent(s) working for SBO who were attending college with government financial assistance was 2 times more than the individuals with parent(s) not working for SBO who were receiving government financial assistance.

The results of these analyses readily demonstrate that families with SBO employee-parent(s) are highly concentrated in the well above-the-average and specifically in the top three socioeconomic status levels in the country. Individuals attending college with government money who have SBO employee parent(s) are twice more than those without SBO employee

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parent(s). A further examination was drawn into whether accounting for the SBO employee status makes a difference for the distribution of the remaining government financial assistance. The results were alarming.

As expected based on the previous analyses and results, vast majority of students whose parent(s) work for SBOs (77.4%) and who receive government financial assistance belong to the highest four SES groups. Unlike the distribution among the families with SBO employee-parents, the number of students attending higher education with government financial assistance among families without a parent working for SBOs are fairly evenly distributed across the ten socioeconomic status groups (Table 55). Consequently, the number of students with government assistance that belong to the lowest three SES groups were almost equal to the number of students with government assistance falling into the highest three SES groups. This result indicates that, accounting for the SBO grant, the government financial assistance is not necessarily prioritized for the lower level of socioeconomic status families.

Multinomial logistic regression models were run to determine if access to higher education and government assistance (as a dependent variable with three outcomes mentioned earlier) were related to family SES. The college-age sample with 4,871 observations were used and survey weights, primary sampling units and stratification were accounted for in the models, and "not in college" was the reference. The overall effect of SES was significant ($F(2, 1167) = 84.06$, $p < .001$). For each increase in SES level, individuals were 2.3 times more likely to be in college without assistance ($RRR = 2.3$ (*95% CI*: 2.03-2.61), $SE = .148$, $t = 12.95$, $p < .001$), and 1.89 times more likely to be in college with assistance ($RRR = 1.89$ (*95% CI*: 1.28-2.81), $SE = .379$, $t = 3.19$, $p = .001$) when compared to individuals who were not in college. The effect of

family SES in predicting access to college without government assistance, compared to not attending college, was statistically equivalent to the effect of family SES in predicting college attendance with a government assistance, compared to not attending college ($F(1, 1168) = 0.96$, $p = .327$; Table 56).

Second multinomial logistic regression model included more variables, gender, marital status, age, household size, and original location of residence, "not in college" was used as the reference group as earlier (Table 57). The findings were similar. For each increase in the SES level, individuals were about 2.2 times more likely to be in college without assistance ($RRR = 2.2$ ($95\%$ $CI$: 1.90 -2.47), $SE = .146$, $t = 11.47$, $p <.001$) and 1.69 times more likely to be in college with a grant ($RRR = 1.69$ ($95\%$ $CI$: 1.15-2.47), $SE = .328$, $t = 2.69$, $p = .007$) when compared to individuals who were not in college. The effect of standardized family SES in predicting college attendance without government assistance, compared to not attending college, was still statistically equivalent to the effect of standardized SES in predicting college attendance with a grant, compared to not attending college ($F(1, 1168) = 1.7$, $p = .182$).

Socioeconomic status has a statistically significant, direct effect on access to higher education in post-socialist Mongolia. As SES level increases, the individual's probability of being in college without assistance increases 2.2 times more, and almost 2 times more of being in college with assistance, compared to the individuals who have no access to higher education. Secondly, when it is compared to the group who is not in college, the effect of SES is similar to the group who attends college without assistance and the group that attends college with assistance. In other words, when the effect of the socioeconomic status on access to higher

education is taken into consideration, the families whose children go to college with or without financial assistance do not differ significantly.

Lastly, the government financial assistance programs which specifically intend to support the poor and marginalized families are not fully reaching the lower socioeconomic status groups. The reasons for the failure of reaching the poorest could either be in the way the programs are set up, i.e., the government assistance was not genuinely targeted at the poorest and most marginalized individuals, or the way how they are administered and implemented.

## 5.5    THE CHANGE IN THE EFFECT ON SOCIO-ECONOMIC STATUS ON ACCESSING HIGHER EDUCATION IN THE LAST DECADE

With the goal of exploring how the role of socioeconomic status in influencing access to higher education changed over the past two decades, HSES2008 and HSES2011 datasets were combined and age-cohorts sample was created for the analyses of the research question with total 16,057 observations (n=16,057). The survey sampling weight, primary sampling units and sampling stratus of both datasets were similar and were accounted for in the regression models (Table 58, Table 59). Four age-cohorts were created: 1). Age-cohort 1 comprising 32 – 36 year old individuals, 2). Age-cohort 2 with 27 – 31 years old individuals, 3) Age-cohort 3 covering 22 – 26 years olds, and 4). Age-cohort 4 encompassing 17 – 21 years old individuals. The sub-sample size of these four age-cohorts were 751, 1659, 4712 and 8974 respectively (Table 60).

Individuals with a higher education degree and individuals without differed, significantly, in their SES background, household size, gender and location of original residence (Table 62). The socioeconomic status composite variable (SES) was created in the same way as it was for the college-age sample discussed earlier in this chapter. The SES was composed from six subscales: total annual household salary income, annual livestock income, annual crop/horticulture income, total family entrepreneurial income, as well as, the highest parental educational attainment and occupational prestige index (See Figure 29; Table 71 for more details).

Logistic regression models were run using sequential model building techniques to find out the whether the relationship between family SES and college attendance (binary dependent variable indicated if the individual have or had access to higher education) was different for each age-cohort. 14,798 observations in the sample had complete data and were used and four different models were run in sequence by adding more relevant variables into the models (Table 73). Family SES was significantly related with college attendance for all age-cohorts and remained significant for all four models. The interaction effects of family SES and age-cohorts on college attendance remained significant and relatively stable for all four models as well. For the final extended model all included variables significantly predicted college attendance; $F(19, 1227) = 74.49$, $p<.001$ (Table 72 or Model 4 in Table 73).

As family SES increased, age-cohort 3, 2, and 1 all had significantly higher rates of college attendance than the youngest age-cohort (age-cohort 4); $OR=1.49$(95% $CI$: 1.27-1.76), 1.59(95% $CI$: 1.25-2.03), 1.76(95% $CI$: 1.28-2.43), respectively. Females were more likely to attend college than males; $OR = 1.66$, $t=7.44$, $p<.001$. Individuals were less likely to be in

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college if their household size was larger; $OR=.86$, $t = -10.14$, $p<.001$. The location of residence was also significantly predicting college attendance, $F(3,1243)=11.77$, $p<.001$, and those from Ulaanbaatar were more likely to access higher education than those who come from aimag centers, soum centers and countryside.

Predicted probabilities over the range of SES values were examined for the four age-cohorts, and as expected, the probability of attending college increased as family SES increased for all age-cohorts. However, age-cohort 3 had the highest probability followed by age-cohort 2 and 1. And the youngest cohort had the lowest probability of attending college (Figure 38). Moreover, the differences in the probability between the age-cohorts were smaller at the low end of SES, indicating that individuals from the lowest SES levels were less likely to go to college throughout the four generations examined. The difference appeared more for the individuals who are from average or above average SES levels.

Furthermore, individuals from Ulaanbaatar had the highest probability of accessing higher education followed by aimag centers, soum centers, and the country side respectively. Most interestingly, the examination of predicted probability over four locations (Ulaanbaatar, aimag center, soum center, and the countryside) for gender revealed that females had higher probability of attending college than their male counterparts throughout the four locations (Figure 40).

Finally, the effect of SES on accessing higher education were almost identical for all age-cohorts (see Table 73, the coefficients of odd ratios of the age-cohort and SES interaction terms throughout the 4 models). The coefficients of the odd ratios slightly decreased indicating slightly

more chance of accessing higher education as the years passed, which indicates a slightly less effect of SES, however, the value was minor.

## 5.6    IMPLICATIONS OF THE STUDY

### 5.6.1    Measuring Socioeconomic Status Using HSES Survey Data

Measuring socioeconomic status has long been an inevitable exercise in studies of attainment and mobility. Several varying methods of quantifying socioeconomic status have been utilized (Powers, 1982; Nam & Terrie, 1982; NCES, 2012), either by subjective or objective measures of occupational positions or scoring educational and income attainment, or a combination of the two. In recent years home resources, such as books, computers, space to study, and neighborhood have been used to indicate family socioeconomic status as well. However parental income, educational attainment and occupational prestige remain to be the key indicators of student background in educational studies (Walpole, 2003; Sirin, 2005). The arguments around the validity and reliability of measuring SES are focused more on whether it should be represented by a single variable, several single measure variables or a composite of several measured variables, and seem to come to an agreement that a composite variable for SES is more advantageous (NCES, 2012).

National Household Social and Economic Survey data (or previously called Living Standards Measurement Survey) is one of very few probabilistic datasets that are available, especially, in developing nations (Deaton, 1997). Despite its main goal of identifying household

income, expenditure levels, updating and renewing the consumer price index, and estimating GDP, the Household Social and Economic Survey offers comprehensive and rich information which can be utilized in social studies research including education. Its probabilistic nature offers opportunities for researchers to conduct empirical and in depth analyses and draw inferential results. The present study is unique in using Household Social and Economic Survey datasets in educational attainment inquiry, especially in constructing a composite SES variable out of six different subscales (Figure 6).

Quantifying and representing socioeconomic status of an individual, i.e., an individual's family background, in a context of a country like Mongolia needed to be considered as comprehensive as possible for an accurate characterization of its society. Mere total household salary income was not an adequate indicator of socioeconomic status. The unemployment rate was 8.2% in 2012 (Mongolian Statistical Yearbook, 2012). The unemployment is especially high in the *khangai* (forestry) region (15.2%) and the eastern region (13%) in comparison to Ulaanbaatar, the capital city (7.1%).

Furthermore, considering salary income only would exclude individuals who draw income from still significant, if not thriving, portions of the informal economy in the country. Named also "shadow economy" or "underground economy", the informal sector in Mongolia is comprised of unlicensed taxi drivers, street vendors and services, farmers and herders, and entertainment workers found at night clubs, hotel bars and karaoke clubs, to name a few (Tolson, 2012). Despite the lack of an unanimously agreed size of the informal sector in Mongolia's economy, the government officials estimation as 8% of GDP in 2006 (Demberel & Lkhagvajargal, 2008) grew to 13.7% in 2010 (Oyunjargal, M. ….) However, the World Bank

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estimated 18% in 2006, whereas the International Labor Organization (ILO) claimed that the true measurement was 60% that year, moreover, the figure rose to 40% by Asian Development Bank as of 2012, according to Tolson (2012).

In order to reflect the part of the informal economy and its reflection on the household annual total income, income from agriculture related activities, cropping and horticulture activities, and family based entrepreneurial and business efforts were taken into account. The agriculture sector which includes livestock/cattle herding, cropping and horticulture, forestry and fishing, is still an important sector in the making of the country's economy in this traditionally nomadic, herding nation. In 2012, the agriculture sector made 14.8% of GDP (Mongolian Statistical Yearbook, 2012). It is a significant proportion especially in juxtaposition with the other more commonly known economic sectors such as mining (21.4%), wholesale and retail trade and services (16.3%) and construction (2.3%). In 2012 alone the GDP grew by 12.3%, however 21.3% of that growth came from the agriculture sector, which was the fifth growing industry in the country preceded by accommodation and food services (45%), arts, entertainment and recreation (31%) financial and insurance activities (26%), and construction (26%). Even the mining and quarrying which is known as the most attractive economic sector in Mongolia grew less than the agriculture, only by about 9% in the same year (Mongolian Statistical Yearbook, 2012).

Of significance was the consideration of family based entrepreneurial activities in the total household annual income as well. The private sector in Mongolia has grown rapidly from virtually zero percentage in GDP in 1991 to about 75-80% (ADB, 2004). About 90% of all enterprise in the country is now privately owned. However, it should be noted that the family

based entrepreneurial activities taken into account in the construction of the socioeconomic status variable in the present study should mainly be coming from the small and medium business enterprises (SME). There were 3,400 SMEs as of 2004 and it was stated that due to the widespread underreporting of revenue and profit in the country, the number is expected to be higher in reality (ADB, 2004). The newly registered individual traders alone (whom I perceive behind the households that provided information under the family entrepreneurial activity) at the State Registration Department of the National Taxation ranged between 27,816 – 2,800 in 1995 – 2002 and were expected to grow (ADB, 2004).

Finally, highest educational attainment and highest occupational prestige among parents (each scored by ten scores) were included in the construction of the socioeconomic status (Figure 25). The comparison of parental occupational and educational scores for the college-age sample was interesting as lowest three SES groups had higher level of education than their occupation, whereas the highest two SES groups showed higher occupational levels than their educational attainment. The education and occupation of the individuals in five SES groups in the middle of the SES spectrum seemed equivalent. In her study of educational expansion in Mongolia, Yano (2012) estimated about 27% of the population was overeducated, which was higher than in countries in Europe, USA and Asia and Pacific regions. She noted that most of the incidence of overeducation was found among workers and associate professionals which could be represented in the lowest three SES groups mentioned above. Moreover, Yano (2012) also estimated about 30% of undereducation (educational level lower than the occupation requires) in Mongolia which may well be represented in the highest two SES levels mentioned earlier as well.

### 5.6.2   Growth in Higher Education

The higher education enrollment growth was unprecedented in post-socialist Mongolia (Government of Mongolia, 2006). The gross enrollment rates in 1991, 1995, 2000, and 2007 were 14%, 15%, 29%, and 47% respectively and despite various implications of different government policies the enrollment kept growing, reaching 172,798 in the year of 2011, its peak in the history of the past two decades (World Bank, 2010; Batchimeg & Tamir, 2013). At the start of the transition from a socialist system to the free market economy, there were 14 state-owned higher education institutions (ADB, 2010b); nonetheless, the number has grown into 101 by 2011 (American University of Mongolia, 2012).

However, the growth has come with a high cost. First of all, there is no evidence found so far that the quality of higher education has improved in the past two decades (ADB, 2010b). The government direct appropriation to higher education institutions consistently declined over the past two decades, reallocating the limited government funding for higher education increasingly to students as financial assistance to pay for tuition  (Bat-Erdene, 2010), yet still restricting the independence and autonomy the higher education institutions could benefit from in decision-making and self-sufficiency (Munkh-Erdene, 2008). As a result, tuition has become the single most important revenue source for all higher education institutions accounting for 80% on average (Read, 2008), yet, the tuition revenue alone is inadequate to cover costs in higher education. As of 2010 per-student public expenditure on higher education was only about $339, far below by international standards, as the figure in OECD countries on average is $11,520 (World Bank, 2010). This is one of the key factors constraining quality in higher education.

Secondly, the situation described above forced the institutions to increase enrollment for better revenue, especially in areas of social science and humanities, which did not require extensive investment and facilities. The vast majority of the private higher education institutions opened since 1991 were in social science and humanities. Such distorted enrollment expansion in higher education has contributed to the mismatch in the labor market between labor demand and higher education skills available (Read, 2008; Postiglione, 2009; Batchimeg&Tamir, 2013; ADB, 2011a).

Thirdly, equity suffered as well. The *fairness* notion of Marginson's (2011) approach in improving equity in higher education could be considered achieved, in speculation, assuming that 884 students (discussed in Chapter 4 under results) from the lowest five SES levels attending higher education may not have been able to access university prior to the expansion when higher education enrollment was only about 15%. However, the notion of *inclusiveness* in ensuring equity is far from being achieved, because higher education attendance is not proportionally represented by the whole spectrum of the society in Mongolia as of 2011 (discussed in 5.3). An increase in socioeconomic status level predicts not only access to higher education but also government financial assistance awards (5.3 and 5.4 of Chapter 5), implications of which are discussed in the following sections.

### 5.6.3  Socioeconomic Status and Access to Higher Education

Research exploring effects of family background or socioeconomic status of students on access to and performance in schooling is not uncommon. Significance of family background on

educational attainment, especially in primary and secondary levels have been proven empirically (Coleman, 1966; Jenks et al., 1972; Gamaron, 2001; Weis et al., 2011), especially in the United States and other western countries. In developing countries family background has a weaker effect on student performance than school resources (Heyneman & Loxley, 1983).

However, research on socioeconomic status and its relationship with higher educational attainment in developing or transitional countries is rare. Studies sponsored by international agencies and development banks on higher education in developing and post-socialist countries repeatedly state the lack of information management system. They need these systems to collect and manage information related with social indicators of the individuals in higher education. But there is a lack of incorporation of such information in policy making for higher education (ADB, 2010b; ADB, 2011c). Yet the need to enable the poor and socially marginalized individuals to access and attain higher education is pertinent and inexorable in Asia as well as in Mongolia (ADB, 2012; World Bank, 2010): the stakes with higher education degrees are so high that the percentage of those with a university degree in poor and non-poor classification is as contrasting as 9.7% and 90.3% (World Bank, 2009, p.89 cited in Postiglione, 2009).

A few international and comparative studies have been made available that explored family background and socioeconomic standing of individuals in relations with their higher education attainment (Shavit & Blossfeld, 1993; Shavit, Arum, & Gamoran, 2007). Shavit and Blossfeld (1993) tested whether the educational expansion has contributed to reducing inequality of opportunity between social strata and concluded that the inequality remained relatively stable over time. However, Later Shavit, Arum and Gamoran (2007) reached a rather optimistic conclusion, stating that enrollment expansion in higher education allows larger proportions of all

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social strata to attend higher education, and it is especially true in diversified systems. However, they also noted that in some countries with less diverse higher education systems, expansion was associated with increased inequality of access and more diversion of lower socioeconomic background students into lower-tier institutions, keeping the top-tier for the elite.

As discussed under section 5.3 of this Chapter, the present study found that socioeconomic status is significantly related to accessing higher education in post-socialist Mongolia. Despite the extraordinary enrollment increase in higher education, individuals' chance of attending a university is much higher for those who come from a higher level of socioeconomic status background. Given the dramatic change in the financing of higher education early the 1990s, the tuition-driven nature of the higher education institutions and the souring demand for building a knowledge society in the country, students and their parents from lower socioeconomic status groups are in imminent need of financial support that is systematic, well targeted, and well implemented with a participation and active involvement of civic society, parents and students themselves, which is lacking at the moment.

### 5.6.4 Roles of the Government in Equity in Higher Education

Higher education presents a high stake in individuals' future wellbeing. Having a degree of higher education matters and has important implications worldwide. On average, in the US, a college graduate makes 84% more over a lifetime than their high school-educated peers (Carnevale et al., 2011). In OECD (Organization for Economic Cooperation and Development)

countries, men aged 25-64 with a higher education degree could expect 5.6 more years of employment than their counterparts with secondary education (World Bank, 2000).

The situations in former socialist Eastern European countries are similar or the stake is even higher. Higher education degree holders are employed approximately 11, 13, and 9 years more than their peers with secondary education in Czech Republic, Hungary and Poland respectively, and higher education essentially guarantees that a family will not be poor compared to the families with a head with only primary or secondary education (World Bank, 2000).

Former socialist Central Asian countries portray similar images as well. There is a high return to higher education in Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Mongolia (World Bank, 2007; 2010; Weidman et al., 2004; Vicol, 2005; Pastore, 2010). Poverty rates for those with a higher education degree and without were 41% and 92%, 50% and 75%, and 24% and 48% in Kyrgyzstan, Tajikistan and Uzbekistan respectively (Brunner & Tillet, 2007). The importance of equal access to higher education has been emphasized repeatedly by international agencies in their declarative documents (UNESCO, 2009; World Bank, 2000).

Yet there is increasing inequality represented in higher education systems of nations in the last twenty years (UNESCO, 2009). Despite many policy initiatives in recent years, broader participation in higher education has not benefitted all groups of societies equally (Shavit et al., 2007), and although there aren't many empirical studies on socioeconomic background and higher education attainment, aggregate information from national surveys indicate that most students come from wealthy families, and as such, equity in higher education does not improve (World Bank, 1994; 2002).

The present study revealed that socioeconomic status is statistically significantly related with access to higher education in post-socialist Mongolia. One level increase in SES not only increases the individual's probability of being in college, but also it increases the probability of being in college with government financial assistance by almost 2 times in comparison to the individuals who have no access to higher education. The government loan and grant policies, as of 2011, developed under the umbrella of improving equity and social justice in higher education, are not only failing to benefit the individuals and families with the most need, but also are reinforcing its own status quo and furthering the social stratification by favoring those who work for the government organizations and their families who clearly are not even below the average among the socioeconomic strata.

A few other studies on higher education in Mongolia have also mentioned the ineffectiveness, ambiguity and lack of transparency of the State Training Fund (STF), the organization that manages the government financial assistance for student tuition (Read, 2008; World Bank, 2010). Both the government (Ministry of Education) and STF fail to present any report or indication which shows to which extent the government financial assistance programs are reaching their target groups or what proportion of the students enrolled in higher education actually come from the poorest and most marginalized segments of the society (World Bank, 2010). Therefore, if equity and social justice is indeed the overarching goal for the government policies on financial assistance programs in higher education, the policies need immediate attention of re-design and implementation of better mechanisms.

### 5.6.5　Change in the Effects of Socioeconomic Status in Access to Higher Education

Socioeconomic status or family background significantly predicts access to higher education for all four age-cohorts examined in the present study. The four age-cohorts covered college age population of the average college entrance years between 1995 and 2010, about fifteen years of duration in post-socialist Mongolia. The predicted probabilities of attending college for the individuals from these four generations increased, also, as the range of SES values increased as well, reconfirming the effect of family background for all individuals included in the study.

Interestingly, when the predicted probability of accessing higher education was examined and compared for the four generations, the second youngest generation (population with an average college entrance year of 2005) had the highest probability followed by second oldest (population with average college entrance year of 2000) and the oldest respectively (population with an average college entrance of 1995). However, the youngest generation (population with average college entrance year of 2010), the most recent college-age population included in the study had the lowest probability of attending college. In other words, probability of accessing higher education increased for college-age population from 1995 to 2000, and it kept increasing for the college-age population of 2005 as well. Then in 2010 the probability fell back to the level even lower than the probability level for the 1995 population.

In brief, the predicted probability of attending higher education for all individuals increased in the first decade after the collapse of the socialist regime. However, the probability fell back starting from the second decade from the transition. The change in the predicted probability is found for all individuals of the entire socioeconomic status spectrum to some

extent, however, the difference in the probability is smaller at the low end of SES level, and larger for the average and above average SES levels, which indicates that individuals from the lowest SES levels were less likely to access higher education throughout the four generations. On the other hand, the effect of SES kept fairly stable for the four generations, if not increased.

In summary, over the last two decades in post-socialist Mongolia, socioeconomic status maintained its effect on access to higher education. Individuals had higher probability of attending college in comparison to the previous year during the first decade after the collapse of socialism, however the probability fell back to down to the level lower than the 1995 college entrance level as the country proceeded into the second half of the second decade post-transition. However, the effect of SES on accessing college did not change over the last two decades in Mongolia. The findings of the present study support the findings of the previous research on inequality in higher education attainment (Shavit & Blossfeld, 1993; Shavit et al., 2007).

Females had higher probability of attending college than their male counterparts. Their dominance in higher education participation was maintained throughout all four locations as well. Reverse gender imbalance in educational attainment is widely talked about issue in Mongolia, boys especially from nomadic herder families are at the highest risk of dropping out in primary and secondary education level (Steiner-Khamsi & Gerelmaa, 2008). And the female participation dominates in higher education as well (Adiya, 2010). However, of pertinent an issue is the gender representation within the various areas of study in higher education, and in the representation in the labor market, and employment in the country (Nozaki et al., 2007; Pastore, 2010b).

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Individuals from Ulaanbaatar had the highest probability of accessing higher education followed by aimag centers, soum centers, and the country side respectively. The urban rural divide and the less representation of individuals from rural areas in higher education has been stated in other studies. A study states the underrepresentation of the rural individuals in higher education as well indicating more than 70% of the total students enrolled were from urban areas whereas only less than 30% of the students were from rural areas (Postiglione, 2009). More than 90% of all higher education institutions are located in the capital city, which could be contributing to this urban-rural mismatch in higher education.

## 5.7    CONCLUSIONS

The present study finds that socioeconomic status (SES) has a strong effect on access to higher education in post-socialist Mongolia. The higher the SES level, the more chance an individual has to attend college. The effect of SES on access to higher education is significant for all generations since the collapse of socialist system.

Tuition of higher education institutions in Mongolia is not a light burden for individuals. Average bachelor level tuition equals to roughly 16% of the Gross National Income per capita. This is higher than most OECD countries, similar to South Korea, and lower than Chile (World Bank, 2010). Thus, tuition is a substantial load on students and their parents' shoulders.

Yet tuition revenue constitutes, on average, 80% of the total annual revenue of higher education institutions in Mongolia, and it reaches as high as 98% for some institutions. Higher

education institutions are highly dependent on tuition revenue because the government funding for higher education has been switched abruptly from direct appropriations to the institutions to tuition support to students. The major force behind this paradigm change in financing higher education seems to be political. Political parties find students as a major voting power that can be influential in the election results, and appealing to them directly is more beneficial for the politicians.

On the other hand, the autonomy of the higher education institutions has been relegated in the last decade back to the government. Despite the trivial funding support to them, government controls most of the decision making of the institutions, including setting the cap of the tuition they are allowed to charge. In order to increase their revenue, thus, higher education institutions increase their student enrollment, especially in areas that require less or little investment such as social science or humanities, jeopardizing quality of instruction.

The evidence for enhancement of equity and social justice is think when the souring higher education enrollment increase is explored. The effect of SES on accessing higher education did not chance in the past two decades. The predicted probability of attending college increased for individuals during the first decade post-transition, but it has fallen back to the lowest level starting from the second half of the second decade. Average tuition and living expenses are substantial burden on students and parents, especially, for the poor and marginalized segments of the society.

The government financial support for students to pay tuition exists in two forms: concessional loans and grants. The two programs are administered by State Training Fund (STF), a semi-governmental organization whose operation stays ambiguous and who lacks to provide

any report on to what extent its operation has reached the poorest and the most marginalized. There is no evidence of any monitoring or accountability mechanisms set up for the operation of STF as of today.

While both the loan and grant programs state poverty and other indicators of social marginality in their eligibility criteria, more than 50% of the grant program was earmarked for students whose parent(s) work for the state budget organizations as of 2011. The amendment in the Law on Civil Service, made in July 9th of 2011 invalidated this clause that guaranteed a grant to one child of SBO employees. Therefore, from this date on, the special endorsement for the state budget organizations' employees does not exist anymore. The eligibility criteria of the government grant program, as of today, include the following: stipend support for all students; tuition support for orphaned and disabled students; students whose parents are both disabled; incentive stipend for exceptional academic performance. The eligibility criteria of the government loan program include: orphaned students; students from herders' family; students from poor families; those who served for the army for 2 years; and stipend for students studying overseas.

However, as of 2011, the present study revealed that, even after accounting for the students with SBO employee parents, the remaining of the grants were allocated across the entire SES spectrum. The government financial assistance is not well targeted, and is not reaching the poorest and most marginalized in the society as the study found. The government financial assistance programs were not set up, for the pure purpose of supporting or improving equity and social justice in Mongolia. Rather, the limited funding was spread out for myriad goals and

purposes with an aim of addressing tuition needs of everyone; and it fails to demonstrate a specific target.

The concessional loan repayment is only 2% at present. The loan is treated like a grant by the government, as often the cabinet announces loan forgiveness. Due to the low repayment rate, the loan program has no system in place for self-sufficiency. Instead, the grant program, as of 2011, was mostly used as an incentive for individuals who work for the government. The program's outreach to the poor is extremely limited as demonstrated by this study.

What do these findings mean for poor students? Students from a poor background are already disadvantaged in the preparation and competition for an access to college. But once they finally make it to higher education, they face an even bigger challenge – to find ways to pay for it. The average bachelor level tuition in Mongolia is unsurmountable load for the poor. Yet socioeconomic status is highly influential on access to higher education in post-socialist Mongolia. The existing government financial assistance programs are not well-targeted for the poor and marginalized. Moreover, the administration and management of these programs are overly ambiguous. Finally, there is no evidence of systemic reporting on to what extent these programs are serving the poor.

## 5.8 RECOMMENDATIONS FOR FUTURE POLICY

This study makes two sets of recommendations based on its results: recommendations in regard to the data collection and data management for quality research that can be used in effective

policy development and decision making processes; and recommendations in regard to the existing government structure and policies on financial assistance for students in higher education.

Recommendations on data collection and management:

- Higher education institutions must collect data on student social and economic indicators.

- A database must be created at the Ministry level that compiles the information, and should be used for conducting research, so that the policy development and decision making on equity and social justice in higher education are based on the results of quality research work.

- The Household Social and Economic Surveys conducted on annual basis in Mongolia should include questions that will help collect information on social and economic background of each individual interviewed in the survey. Such information will be very useful for future studies on social stratification and educational attainment in Mongolia.

Recommendations for the strengthening of the existing government structure and policy formulation efforts on student financial assistance:

- The structure, operation, administration, and management of State Training Fund must be clear and transparent. The status of the STF and its relation to the Ministries of Education and Finance must be clear and communicated effectively to all stakeholders.

- The communication between individual higher education institutions and the STF must be clear and transparent in regard to the student application processes for the financial assistance programs and final selections.

- The current government financial assistance programs for students are varied and miscellaneous. The government needs to make the target groups of the financial assistance clear.

- The government ought to develop a clear, well targeted financial assistance programs for poor and marginalized students, and maintain transparent and systematic monitoring and reporting on the programs.

## 5.9    LIMITATIONS OF THE STUDY

This study has two key limitations. First, the Household Socio-Economic surveys are cross-sectional and the unit of analysis is a household. Within each household, the head of the household and his or her spouse is identified first and all other participants of the surveys are identified as per their relationship to the head of household. For this study identifying parent(s) and their educational attainment and occupational prestige levels for each observation included in the samples was the key step in the data management. This was possible for the survey participants who were identified as children of the heads of households. However, the survey does not contain the parental information for the heads of the households and their spouses themselves. This resulted in missing values for some observations (approximately 7-8% of the sample) who fell within the selected age limits but were also heads of households.

Second, looking at the institutional differentiation within higher education system is vital in any attainment study that considers family background. Distinguishing higher education

institutions—by ownership, size, and length of existence—would have offered an opportunity to delve into the quality of higher education the individuals were receiving in Mongolia. Private and public higher education institutions were identifiable only for the college-age sample. For the age-cohort sample the data did not offer information on such variations, thus the analyses were limited on the access to the quality and its relations with the family background for the four age-cohorts.

### 5.10    FUTURE RESEARCH

The influence of individuals' socioeconomic status on educational attendance and access to higher education has been well explored in status attainment studies in western countries. The findings of this dissertation confirm, empirically, the effect of socioeconomic background on college access in the context of a post-socialist country. The future studies on equity and social stratification in higher education in Mongolia should consider the following:

First, the differentiation among higher education institutions should be looked and taken into considerations in the future studies. A goal of the future research in this realm can be examining not only the access to higher education, but also the quality of the higher education individuals receive and how socioeconomic background of the individuals is associated with what quality higher education they receive. The identification of the types of the higher educational institutions will be necessary for such examinations.

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Second, future studies in equity and social stratification in higher education in Mongolia should focus on the existing and potential government financial assistance programs. Qualitative and quantitative approach can be utilized in such studies. The focus of the suggested studies may include: (a). priority setting for government financial assistance programs; (b). the effectiveness and efficiency of the organizational management relevant to all institutions and stakeholders involved in the implementation of government financial assistance programs; (c). more in-depth analyses on particular financial assistance programs (or specific categories among these programs) and their implications on social equity and justice.

# APPENDIX A: DATA STRUCTURE OF THE HOUSEHOLD SOCIOECONOMIC SURVEY 2011

| File | Contend | Observations | Variables |
|------|---------|--------------|-----------|
| Household | Contains info on Agriculture production, non-agriculture production, trade, service, groups and housing related information | 11211 | 75 |
| Individual | Contains Information on individuals | 42538 | 71 |
| Livestock | Contains info on Livestock, revenue from livestock/production | 12936 | 8 |
| Livestock Expenditure | Contains info on Livestock/production related revenues | 7489 | 3 |
| Product | Contains info on revenue from livestock/production related | 24907 | 9 |
| Crop | Contains info related with revenue from agriculture production | 2768 | 8 |
| Agricultural Expenditure | Info on expenditure related with agriculture | 10956 | 3 |
| Enterprise | Info on revenues and expenditures related with non-agriculture production, trade, service | 1781 | 23 |
| Other income | Other revenues, insurance, social welfare, pension etc. | 257853 | 13 |
| Remittance | Other revenues, gifts, assistance, donations etc. | 3230 | 9 |
| Energy | Energy, power consumption related info | 67266 | 8 |
| Payment service | Housing fee related info | 145743 | 6 |
| Durable | Durables, properties related info | 482067 | 5 |
| Non-Food | Non-food expenditure and non-food consumption | 3964092 | 6 |
| Urban Diary | Capital city, provincial center food consumption related info | 758705 | 16 |
| Rural Food 7 day | Soums and rural areas food consumption related info | 609024 | 8 |
| Basicvars | Household general information | 11211 | 14 |

**Figure 41.** Data Structure of the Household Socioeconomic Survey 2011

# APPENDIX B: ACCOUNTING FOR SURVEY SAMPLING WEIGHT IN THE

## ANALYSIS IN HSES2011

<u>Survey sampling strata and weights</u>

a. The dataset was adjusted based on the information I have in regard with the Primary Sampling Units (cluster), number of strata (strata) and sampling weights that is assigned to each observation. The summary of these sets of information looks as following:

```
. sum strata cluster hhweight

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
      strata |      5310    2.150282    .8699667          1          3
     cluster |      5310    637.7593    367.8969          1       1248
    hhweight |      5310    64.07112    28.28076   7.935576   178.8902
```

**Figure 42.** Survey Sampling Strata and Weights

b. svyset command was used in order to identify the weights, primary sampling units and strata in Stata which gave the following result:

```
. svyset cluster [pweight=hhweight], strata(strata)

      pweight: hhweight
          VCE: linearized
  Single unit: missing
     Strata 1: strata
         SU 1: cluster
        FPC 1: <zero>
```

**Figure 43.** Adjusting Survey Sampling Strata and Weights in the Analyses

# APPENDIX C: INDEPENDENCE OF IRRELEVANT ALTERNATIVES ASSUMPTION TEST

This assumption (IIA) requires that the inclusion or exclusion of categories of the outcome variables in multinomial logit model does not affect the relative odds among the remaining categories (i.e., does not affect the relative risks associated with the regressors in the remaining categories).

One method of testing the IIA is Hausman test.

The choice of being out of college, in college with no grant, and in college with grant is modeled as function of the other IVs described above. Out of college is the base category.

Step 1: Run the model.

The Figure below demonstrates the results.

```
. mlogit CollAccess SES age female married hhsize urban

Iteration 0:   log likelihood = -3820.2561
Iteration 1:   log likelihood = -3485.2051
Iteration 2:   log likelihood = -3483.6725
Iteration 3:   log likelihood = -3483.6715
Iteration 4:   log likelihood = -3483.6715

Multinomial logistic regression                    Number of obs   =       4871
                                                   LR chi2(12)     =     673.17
                                                   Prob > chi2     =     0.0000
Log likelihood = -3483.6715                        Pseudo R2       =     0.0881
```

| CollAccess | Coef. | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| no_college | (base outcome) | | | | | |
| **college_no_grant** | | | | | | |
| SES | .8564745 | .0503448 | 17.01 | 0.000 | .7578004 | .9551486 |
| age | -.1474897 | .0185756 | -7.94 | 0.000 | -.1838973 | -.1110821 |
| female | .728813 | .0626863 | 11.63 | 0.000 | .6059502 | .8516758 |
| married | -.6892568 | .1726306 | -3.99 | 0.000 | -1.027607 | -.3509071 |
| hhsize | -.0374386 | .0180892 | -2.07 | 0.038 | -.0728929 | -.0019844 |
| urban | .3228026 | .0636754 | 5.07 | 0.000 | .198001 | .4476042 |
| _cons | 2.480434 | .3853472 | 6.44 | 0.000 | 1.725168 | 3.235701 |
| **in_college_with_grant** | | | | | | |
| SES | .5754674 | .1408675 | 4.09 | 0.000 | .2993722 | .8515626 |
| age | -.2066118 | .0589133 | -3.51 | 0.000 | -.3220798 | -.0911438 |
| female | .7450111 | .1966455 | 3.79 | 0.000 | .3595929 | 1.130429 |
| married | -.6250833 | .6052033 | -1.03 | 0.302 | -1.81126 | .5610933 |
| hhsize | -.1366909 | .0615889 | -2.22 | 0.026 | -.2574029 | -.0159788 |
| urban | .7652439 | .2130508 | 3.59 | 0.000 | .3476721 | 1.182816 |
| _cons | .8727564 | 1.215336 | 0.72 | 0.473 | -1.509258 | 3.254771 |

```
. estimates store allcats
```

**Figure 44.** Step 1 of Independence of Irrelevant Alternatives Assumption Test

Step 2: The estimates of this model is stored.

Step 3: Under the IIA assumption, we expect that if we exclude one of the categories from the outcome, there won't be any systematic change in the coefficients (Hausman and McFadden,

1984). So I re-estimate the parameters, excluding the "in college with grant" category of the outcome variable.

```
. mlogit CollAccess SES age female married hhsize urban if CollAccess != "2": CollAccess
(value label dereference "2":CollAccess not found)
(value label dereference "2":CollAccess not found)

Iteration 0:   log likelihood = -3820.2561
Iteration 1:   log likelihood = -3485.2051
Iteration 2:   log likelihood = -3483.6725
Iteration 3:   log likelihood = -3483.6715
Iteration 4:   log likelihood = -3483.6715

Multinomial logistic regression              Number of obs   =       4871
                                             LR chi2(12)     =     673.17
                                             Prob > chi2     =     0.0000
Log likelihood = -3483.6715                  Pseudo R2       =     0.0881
```

| CollAccess | Coef. | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| no_college | (base outcome) | | | | | |
| **college_no_grant** | | | | | | |
| SES | .8564745 | .0503448 | 17.01 | 0.000 | .7578004 | .9551486 |
| age | -.1474897 | .0185756 | -7.94 | 0.000 | -.1838973 | -.1110821 |
| female | .728813 | .0626863 | 11.63 | 0.000 | .6059502 | .8516758 |
| married | -.6892568 | .1726306 | -3.99 | 0.000 | -1.027607 | -.3509071 |
| hhsize | -.0374386 | .0180892 | -2.07 | 0.038 | -.0728929 | -.0019844 |
| urban | .3228026 | .0636754 | 5.07 | 0.000 | .198001 | .4476042 |
| _cons | 2.480434 | .3853472 | 6.44 | 0.000 | 1.725168 | 3.235701 |
| **in_college_with_grant** | | | | | | |
| SES | .5754674 | .1408675 | 4.09 | 0.000 | .2993722 | .8515626 |
| age | -.2066118 | .0589133 | -3.51 | 0.000 | -.3220798 | -.0911438 |
| female | .7450111 | .1966455 | 3.79 | 0.000 | .3595929 | 1.130429 |
| married | -.6250833 | .6052033 | -1.03 | 0.302 | -1.81126 | .5610933 |
| hhsize | -.1366909 | .0615889 | -2.22 | 0.026 | -.2574029 | -.0159788 |
| urban | .7652439 | .2130508 | 3.59 | 0.000 | .3476721 | 1.182816 |
| _cons | .8727564 | 1.215336 | 0.72 | 0.473 | -1.509258 | 3.254771 |

**Figure 45.** Step 3 of Independence of Irrelevant Alternative Assumption Test

Step 4: Perform Hausman test against the full model.

```
. hausman . allcats, alleqs constant

Note: the rank of the differenced variance matrix (0) does not equal the number of coefficients being tested
        (14); be sure this is what you expect, or there may be problems computing the test.  Examine the output
        of your estimators for anything unexpected and possibly consider scaling your variables so that the
        coefficients are on a similar scale.

                    ———— Coefficients ————
                       (b)           (B)            (b-B)     sqrt(diag(V_b-V_B))
                        .           allcats        Difference        S.E.

college_no_grant│
         SES │    .8564745      .8564745             0                 0
         age │   -.1474897     -.1474897             0                 0
      female │     .728813       .728813             0                 0
     married │   -.6892568     -.6892568             0                 0
      hhsize │   -.0374386     -.0374386             0                 0
       urban │    .3228026      .3228026             0                 0
       _cons │    2.480434      2.480434             0                 0
             │
in_college_with_grant│
         SES │    .5754674      .5754674             0                 0
         age │   -.2066118     -.2066118             0                 0
      female │    .7450111      .7450111             0                 0
     married │   -.6250833     -.6250833             0                 0
      hhsize │   -.1366909     -.1366909             0                 0
       urban │    .7652439      .7652439             0                 0
       _cons │    .8727564      .8727564             0                 0

                          b = consistent under Ho and Ha; obtained from mlogit
              B = inconsistent under Ha, efficient under Ho; obtained from mlogit

      Test:  Ho:  difference in coefficients not systematic

                  chi2(0) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          0.00
                Prob>chi2 =            .
                (V_b-V_B is not positive definite)
```

**Figure 46.** Step 4 of Independence of Irrelevant Assumption Test

The test results indicates: difference in coefficients not systematic. Thus, there is no evidence

that the IIA Assumption has been violated.

These steps were repeated with a different model where "in college with no grant" category was

excluded. The results also showed no difference in coefficients.

Test:  Ho:  difference in coefficients not systematic.

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**APPENDIX D**: **TRUNCATION OF SES FOR COLLEGE-AGE SAMPLE**

Once SES composite variable was created, 2 extreme variables on the negative end of the continuous variable were truncated and replaced by the value equal to the 1st percentile point of the SES.

The following shows the details of this process.

The summary of the initial SES composite

```
. sum SES

    Variable |      Obs       Mean   Std. Dev.      Min        Max
─────────────┼───────────────────────────────────────────────────
         SES |     4871   .0291606   .7139447  -13.53062   3.743009
```

**Figure 47.** Summary of SES Composite Variable Prior Truncation

The details of the initial SES variable distribution with the smallest 4 and largest 4 values:

```
. sum SES, de
```

                    Family SES Cont. Var.
─────────────────────────────────────────────────

      Percentiles      Smallest
 1%    -1.118075      -13.53062
 5%    -.8954389      -4.127881
10%    -.6870964      -2.508008     Obs              4871
25%    -.4230281      -2.072857     Sum of Wgt.      4871

50%    -.0934136                    Mean         .0291606
                       Largest      Std. Dev.    .7139447
75%     .3663354       3.070307
90%     1.061626       3.082736     Variance     .5097171
95%     1.351926       3.493283     Skewness    -.6910675
99%     2.025849       3.743009     Kurtosis     30.33684

**Figure 48.** Details of SES Distribution Prior Truncation


In order to see more details of the SES variable distribution, in particular, its $1^{st}$ and $99^{th}$ percentile distribution values, I check the scalers of the distribution. The results are shown in the Figure below.

Further details of the initial SES variable with 1<sup>st</sup> percentile and 99<sup>th</sup> percentile values:

```
. return list

scalars:
              r(N) =  4871
          r(sum_w) =  4871
           r(mean) =  .0291606378848962
            r(Var) =  .5097170611613209
             r(sd) =  .7139447185611229
       r(skewness) =  -.6910675209880622
       r(kurtosis) =  30.33683694181005
            r(sum) =  142.0414671373292
            r(min) =  -13.53062343597412
            r(max) =  3.743009090423584
             r(p1) =  -1.118075489997864
             r(p5) =  -.8954389095306397
            r(p10) =  -.6870963573455811
            r(p25) =  -.4230280816555023
            r(p50) =  -.0934135913848877
            r(p75) =  .3663353621959686
            r(p90) =  1.061625599861145
            r(p95) =  1.351926207542419
            r(p99) =  2.025848865509033

.
```

**Figure 49.** Scalers of SES Distribution Prior Truncation

Summary of SES composite variable after truncation:

```
. sum SEStrunc
```

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| SEStrunc | 4871 | .0323268 | .6847948 | -2.508008 | 3.743009 |

**Figure 50.** Summary of SES Distribution Post Truncation

## More details with smallest 4 and largest 4 values:

```
. sum SEStrunc, de
```

```
                           SES truncated

      Percentiles    Smallest
 1%    -1.118075     -2.508008
 5%     -.8954389    -2.072857
10%     -.6870964    -2.072857     Obs                 4871
25%     -.4230281    -1.562106     Sum of Wgt.         4871

50%     -.0934136                  Mean            .0323268
                      Largest      Std. Dev.       .6847948
75%      .3663354     3.070307
90%     1.061626      3.082736     Variance        .4689439
95%     1.351926      3.493283     Skewness        .8413909
99%     2.025849      3.743009     Kurtosis       3.976202
```

**Figure 51.** Details of SES Distribution Post Truncation

## Further details with 1<sup>st</sup> percentile and 99<sup>th</sup> percentile values:

Further details with 1$^{st}$ percentile and 99$^{th}$ percentile values:

```
. return list

scalars:
                 r(N) =  4871
             r(sum_w) =  4871
              r(mean) =  .0323267953534347
               r(Var) =  .4689439063578443
                r(sd) =  .6847947914213749
          r(skewness) =  .8413909066582617
          r(kurtosis) =  3.976202432030779
               r(sum) =  157.4638201665803
               r(min) =  -2.508007526397705
               r(max) =  3.743009090423584
                r(p1) =  -1.118075489997864
                r(p5) =  -.8954389095306397
               r(p10) =  -.6870963573455811
               r(p25) =  -.4230280816555023
               r(p50) =  -.0934135913848877
               r(p75) =  .3663353621959686
               r(p90) =  1.061625599861145
               r(p95) =  1.351926207542419
               r(p99) =  2.025848865509033
```

**Figure 52.** Scalers of SES Distribution Post Truncation

**Table 77.** Comparison Table: Prior and Post Truncation of SES, HSES2011.

|  |  | Original values | After truncation |
|---|---|---|---|
| Number of valid observation | | 4,871 | 4,871 |
| Average SES | | .0291606 | .0323268 |
| Median SES | | - .0934136 | - .0934136 |
| SES level of the first four observations (smallest SES) | Smallest | - 13.53062 | - 2.508008 |
| | 2nd smallest | - 4.127881 | - 2.072857 |
| | 3rd smallest | - 2.508008 | - 2.072857 |
| | 4th smallest | - 2.072857 | - 1.562106 |
| SES level of the last four observations (highest SES) | 4th largest | 3.070307 | 3.070307 |
| | 3rd largest | 3.082736 | 3.082736 |
| | 2nd largest | 3.493283 | 3.493283 |
| | Largest | 3.743009 | 3.743009 |

# APPENDIX E: T-TEST RESULT FOR AGE-COHORT SAMPLE BETWEEN IN COLLEGE AND OUT OF COLLEGE GROUPS

```
. ttest SEStruncate , by(CollAttend) unequal welch

Two-sample t test with unequal variances

─────────────────────────────────────────────────────────────────────────────
   Group │    Obs       Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
─────────┼───────────────────────────────────────────────────────────────────
0. Out c │  10502   -.1349617   .0054234    .5557868   -.1455926   -.1243308
1. In Co │   4298    .3123931   .0114079    .7478939    .2900276    .3347585
─────────┼───────────────────────────────────────────────────────────────────
combined │  14800   -.0050474   .0053451    .6502614   -.0155245    .0054297
─────────┼───────────────────────────────────────────────────────────────────
    diff │          -.4473547   .0126315               -.4721167   -.4225927
─────────────────────────────────────────────────────────────────────────────
    diff = mean(0. Out c) - mean(1. In Co)                   t = -35.4159
Ho: diff = 0                        Welch's degrees of freedom =  6327.51

   Ha: diff < 0                Ha: diff != 0                  Ha: diff > 0
 Pr(T < t) = 0.0000        Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

**Figure 53.** T-Test Result for In and Out-of-College Groups in Age-Cohort Sample

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