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A comparative analysis of determinants of labor force participation and economic valuation of social security programs in: China, Colombia, Egypt and Sierra Leone

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Abstract

Understanding labor market dynamics, especially in developing countries has become a central issue in light of the global financial crises of 2008. This study analyzed labor markets in four developing countries: China, Colombia, Egypt and Sierra Leone to estimate determinants of the labor force participation, wages, and willingness to pay for job-related benefits. It then quantified the monetary values of job benefits through the contingent valuation (CV) method. For the analysis, logistic, OLS, and Tobit models were used. The results of the logistic regression analysis revealed that gender, age, age-squared, marriage, household head, and difficult health were statistically significant determinants of the labor force participation in all countries. The study confirmed the findings of previous literature that women tend to have lower labor force participation than men. The impact of tertiary education on labor force participation was also positive and significant in Colombia and Egypt. Moreover, chronic and prolonged health problems precluded labor force participation in all the countries. The study unsurprisingly has shown that heads of household had extremely higher participation in all the countries. On the other hand, marriage only increased labor force participation in China and Sierra Leone, whereas it actually decreased in Egypt and Colombia. Location played a role in labor force participation as urban areas had significantly lower participation in China and Sierra Leone. Furthermore, results from the OLS regression analysis showed that gender, wealth and higher educational attainment were main determinants of wages. There was a gender pay differential between women and men in all countries, except Sierra Leone. Higher education significantly and positively affected wages in Colombia, Egypt and Sierra whereas it was insignificant in China. The results also demonstrated that the impact of wealth on wages was significant and positive in all countries, supporting the hypothesis that individuals with higher status are able to garner higher wages. Similarly, results from the Tobit model revealed that income, household size, location, gender and education played a role in determining willingness- to-pay (WTP) for social security and other job-related benefits. The impact of income on WTP for health insurance, pension benefits, and permanent contract was significant and positive for most countries. Men were also found to have slightly greater WTP for social benefits. The impact of education on WTP differed among countries and the types of benefits, and no clear patterns emerged.
Finally, the analysis of contingent valuation data showed that China consistently had a lower mean WTP for social benefits than Sierra Leone and Egypt; 2-5% and 4-20% of monthly income, respectively. The same pattern emerged for their willingness-to-accept (WTA) loss for job-related benefits. The study has also illustrated that individuals in all the countries, who participate in social security programs, as well as other job-related benefits, demanded a substantial increase in income, in terms of WTA compensation for losing access to social benefits. On the other hand, those, without social security systems and benefits were willing to contribute a significant amount of their monthly income to participate.

Keywords: Contingent valuation, logistic regression, OLS, Tobit, labor markets, willingness to pay, willingness to accept, human capital theory, instrumental variables, China, Colombia, Egypt, Sierra Leone.

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Abbreviations

AHO: African Health Observatory

BHI: Basic Health Insurance

CEOs: Collective-owned Enterprises

CIA: Central Intelligence Agency

CPC: Communist Party of China

CR: Contributory Regime

CV: Contingent Valuation

DB-PAYG: Defined Benefits Pay-as-you-go

Fafo: Forskningsstiftelsen

GDP: Gross Domestic Product

Government Insurance Scheme

ILO: International Labor Organization

LFP: Labor Force Participation

LFPR: Labor Force Participation Rate

LIS: Labor Insurance Scheme

MLE: Maximum Likelihood Estimation

NASSIT: National Security and Insurance Trust

NCMS: New Cooperative Medical Insurance

NDC: Non-financial Defined Contribution

NHS: National Health Survey

OLS: Ordinary Least Squares

PAYG: Pay-as-you-go

RSIs: Randomly Selected Individuals

SOEs: State Owned Enterprises

SR: Subsidized Regime

UEPS: Urban Enterprise Pension Scheme

URBMI: Urban Residents Basic Medical Insurance

US-SSA: United Stated Social Security Administration

VIF: Variance Inflation Factor

WB: World Bank

WDR: World Development Report

WTA Willingness to Accept

WTO: World Health Organization

WTP: Willingness to Pay

1 Introduction

Employment is essential for poverty reduction and economic growth. In fact, creating employment and other income generating activities are fundamental to achieving sustainable economic and social development. While most jobs foster economic growth and development and have high social value, some jobs are less productive, can have adverse environmental effects or result in negative spillover effects that must be avoided. According to World Bank Development Report (2013), over 3 billion people have jobs worldwide, but the types and levels of their jobs vary greatly. Approximately 1.65 billion work in the formal sector and earn regular wages and some 1.5 billion engage in farming and small family enterprises, most of them from developing countries. Worldwide, approximately 200 million people are unemployed, many of them young. Further, "Almost 2 billion working-age adults are neither working nor looking for work; the majority of these are women, and an unknown number are eager to have a job" (WorldBank, 2013).

Jobs have become a central issue in light of the global financial crises of 2008. The sharp rise in unemployment has had a huge negative effect on the economic performance of many economies, especially in the developing countries. The crises have also hit many developed countries quite hard; in Europe, Portugal, Italy, Ireland, Greece, and Spain (PIIGS) have experienced debt crises and financial downturn. They attempted to solve the crises through implementing austerity which made high unemployment even worse as PIIGS were forced to reduce public employment, which usually serves as the employer of last resort during recessions. Globally, the number of unemployed people has skyrocketed and according to International Labor Organization (ILO) estimates (ILO, 2010, ILO, 2013), have risen from 178 million in 2007 to 212 million in 2009, before finally plummeting to 197 million in 2012. Since then, individual countries and development institutions have focused on addressing these issues, especially focusing on policies that foster economic growth to create employment and income generating opportunities as a global strategy.

Labor markets in most developing countries face many challenges ranging from weak institutions to policy frameworks and regulations. A well-functioning labor market is essential

for the performance of the economies, which requires competent institutions and implementation of effective labor market regulations and policies. Effective regulations and sound employment policies lead to economic growth, which in turn affects gains from the labor force participation and concomitant wage increases, consequently affecting the underlying job-related benefits[1]. Thus, there is a link between labor force participation, wages, and job benefits.

1.1 Determinants of labor force participation and wages

While there are several personal characteristics such as: gender, age, marital status, education, experience, possession of wealth, health condition etc., and household characteristics such as household head, household size, presence of pre-school and school aged children, husband's occupation and income etc., affect labor force participation and wages. Labor economists also consider economic performance, quality of institutions, labor market regulations, and policy interventions to be significant factors affecting both the labor force participation and earnings. A country's economic growth and the existence of competent labor market institutions and policies play a key role in increasing the participation rate and wages. This is because if an economy experiences economic growth, its manufacturing and services sectors expands, the demand for labor increases, and, as a result, firms hire more labor. Theoretically, we expect that economic growth and the subsequent wage increases attract more employees as the opportunity cost of being idle increases. Thus, there is a strong positive relationship between economic growth, participation, and concomitant wage increases. Labor force participation rate (LFPR) is a key economic indicator and, understanding factors that influence labor force participate rate is important for several reasons. In economics, production function primarily depends on labor, capital, and technology. An economy's potential Gross Domestic Product (GDP) grows if production of goods and services increases, hence, economic growth is considerably dependent on productivity of the labor force. Also, from an economic policy perspective, labor force participation rate is used to formulate labor market policies— important for the performance of the labor markets. On the other hand, LFPR also plays a vital role in understanding labor markets, studying factors that affect the size and composition of a country’s available human

[1] Refers to health insurance, pensions, sick leave allowance, permanent contract, housing and transportation allowances

resources, formulating and implementing employment policies, planning and determining job training needs, calculating expected lives of the population as well as retirement benefits, – which is crucial in planning social security programs (ILO, 2014).

Similarly, wage rate can be used to improve and stimulate worker's efficiency, which in turn contributes to increased productivity, expansion, and growth. Therefore, studying wage differentials and factors influencing wage is important in formulating wage policies. Theoretically, factors that affect the wage differential across countries include a country's level of economic performance and population density, etc. Wage differentials between individuals are explained by factors such: as level of education, experience, gender and type of industry, etc. Taken together, increasing labor force participation and wages is essential to the functioning and dynamics of labor markets. Hence, some of the research questions of this study attempt to investigate factors affecting labor force and wages, and if these factors have an impact on social security and job-related benefits.

1.2 Social security programs and other job-related benefits

A striking feature of social security schemes in developing countries is their low coverage(Dorfman and Palacios, 2012). In most low and middle-income countries, social protection and expanding coverage is top priority, particularly in countries facing rapid aging such as China where the population demographics weigh heavily to the elderly and the demand for pension insurance grows. Worldwide only 30 % of workers have access to social insurance; in Africa and Asia, the figure is less than 25% (WorldBank, 2013). According to the World Bank (2013) "On average, coverage rates are highest in aging societies and emerging countries and lowest in conflict-affected and agrarian economies, where less than 10 % of working population is enrolled in pension programs". In general, impoverished workers are least likely to be covered. Such social security programs and job-related benefits have become even worse after the global financial crises, which resulted in massive job losses in both emerging and industrial countries. In particular, the crises drastically affected the economies of developing countries, which resulted in political upheavals in the Arab world stemming from the discontent of educated youth who were severely affected by unemployment. Other aspects of jobs such as a permanent contract, sick leave, and transportation and housing allowances are highly valued by

some employees. But, in most developing countries access to these job-related benefits is very difficult. Due to the global financial crises, many jobs have been lost, and as a result job-related benefits have disappeared. Developing country governments must, therefore, focus on policies that create jobs, increase labor force participation and policies that affect employee's access to benefits.

1.3 General and Specific Objectives

On top of directly contributing to household incomes, jobs affect other aspects of well-being and have consequences beyond income. Other dimensions of employment such as entitlements to pensions, health insurance, sick leave allowance and other amenities are highly valued by employees. Yet, quantifying the monetary value of these job-related benefits poses a challenge and requires careful attention. Employment that contributes to development will have a positive impact on well-being, in addition to increasing workers' level of satisfaction. There is vast literature which has examined the effect of job satisfaction in various labor market outcomes(Clark et al., 1998, Freeman, 1978), and studies also found that job satisfaction and engagement of workers increases productivity (Bartling et al., 2013, Böckerman and Ilmakunnas, 2012). Hence, focusing on both increasing labor force participation rate, as well as improving workers' monetary and non-monetary benefits undoubtedly motivates work performance and increases productivity.

Understanding factors that affect labor force participation of both males and females, and analyzing factors that affect wage differences across individuals as well as quantifying the value of job attributes are crucial in understanding labor markets. This knowledge would also help policy makers take effective steps towards implementing policies that create jobs, improve labor market performance and enhance employees' benefits. This study begins by examining labor market issues in four selected developing countries: China, Colombia, Egypt and Sierra Leone. These countries represent a good case study for examining these issues because not only do they represent 3 different continents, but they also help to a deeper understanding of labor market dynamics in developing countries and the resulting patterns of wages, employment, and other job amenities. Thus, this study is justified for four main reasons: Firstly, by employing logistic regression, the study examines determinants of the labor force participation in all countries.

Secondly, it also explores determinants of wages using multiple regression analysis. Thirdly, by using the Tobit regression model, the study investigates determinants of willingness to pay for job-related benefits. Fourthly, while considerable literature has used contingent valuation method to value health insurance and pensions, few studies if any has attempted to use contingent valuation to quantify the monetary value people put on job amenities, for instance, a permanent contract, sick leave, transportation and housing allowances. In order to assess how much individuals would be willing to pay for job-related benefits, some form of contingent valuation (or willingness-to-pay) method is applied. Thus, this study quantifies monetary value of a permanent contract, health insurance, pension benefits, and sick leave, housing and transportation allowances.

In light of the above arguments, this study attempts to answer the following research questions:

1. What are determinants of the labor force participation and wages in these countries?
2. What are determinants of willingness to pay for pensions, health insurance, permanent contract, sick leave, and transportation and housing allowances?
3. What is the mean willingness-to-pay (WTP) of individuals in terms of reduced income to get permanent contract, health insurance benefits, pensions, sick leave, housing and transportation allowances, if they currently do not have it?
4. What is the mean willingness-to-accept (WTA) compensation of individuals in terms of increased income to no longer get paid permanent contract, health insurance, pensions, sick leave, transportation and housing allowances, if they currently do not have it?

1.4 Organization of the Thesis

This thesis is organized as follows: Section 1 gives a brief introduction and statement of objectives. Section 2 presents background information on recent economic performance and challenges, an overview of health insurance and pension schemes as well as a brief review of other job-related benefits of the four countries. Section 3 presents a brief review of theory and related literature. The estimation methodology, survey and data sources, as well as a description of the variables along with their expected signs, is provided in section 4. Section 5 reports the empirical findings and Section 6 concludes the thesis.

2 Background

This section provides background information of the study areas in the four selected countries, China, Colombia, Egypt, and Sierra Leone.

2.1 Country Introductions

2.1.1 China

China's transition from a centrally planned to a market-oriented economy began in 1978. During the process, China initiated a broad system of economic reform. In order to stimulate and rebuild its industrial quiescent economy, China encouraged the establishment of rural ventures and private businesses, liberalized international trade by attracting foreign direct investment, implemented outward-looking trade policies, reduced government's exercise over some prices, and invested in industrial production and the education of its labor force (Hu and Khan, 1997). As a consequence, China achieved rapid economic and social development and became one of the fastest-growing economies. GDP has grown tremendously since 1979, according to the (WorldBank, 2014); "GDP growth rate has averaged about 10 percent a year and has lifted more than 500 million people out of poverty". Furthermore, being the most populous country in the world with a population of over 1.3 billion, China's GDP surpassed that of Japan and became the world's second-largest economy in 2010. China's GDP in 2013 was US $ 9.240 trillion, while Japan was nearly half of that at 4.902 trillion (WorldBank, 2014). China is also the world's largest exporter ($ 2.21 trillion USD) and manufacturer (CIA, 2013). China's major export partners are Hong Kong, US, Japan and South Korea (CIA, 2013).

Despite achieving rapid economic growth and becoming a forefront in international trade, China faces many economic challenges and still remains a developing country. Its per capita income is very small relative to developed countries and its market reforms are incomplete. Poverty remains a national challenge and an estimated 98.99 million people lived below the national poverty line at the end of 2012 (WorldBank, 2014). Other economic challenges include high inequality, rapid urbanization, environmental concerns, aging population, internal migration of labor, and external imbalances.

The present study uses data collected from respondents in Jianyang, China. Jianyang is a city located in Sichuan Province, China. It has a total area of 2,215 square kilometers and a population of approximately 1.5 million people. The economic growth in China has brought widening income inequality across the country, particularly between rural and urban areas, and between the Western and Eastern regions (Zhang et al., 2012). China's labor market experienced rapid growth as a result of rural-urban migration, which drastically changed how people perceive their work related benefits. "Sichuan province lies in the South-Western provinces, a region which is more developed than the North-Western regions, but lags behind parts of the Eastern provinces" (Zhang et al., 2012)**.** Sichuan has tremendous agricultural potential, and in 2011, it was ranked 23rd in terms of per capita income. Jianyang is a large city and is among the 173 counties in Sichuan province which supplies food and meat. Jianyang has experienced rapid development in the past few years, and in 2007, the firm Fapai Group announced a $ 336 million investment in the construction of clothing manufacturing base, the largest in western China and expected to generate revenues of slightly over $ 800 million and create over 20,000 jobs.

2.1.2 Colombia

Located in the northwest of South America, Colombia is a country bordered by Venezuela, Brazil, Panama, Ecuador and Peru and, shares maritime borders with Costa Rica, Nicaragua, Honduras, Jamaica, Dominican Republic and Haiti. Economically, Colombia depends heavily on energy and mining exports and is "the world's fourth largest coal exporter and Latin America's fourth largest oil producer" (CIA, 2013). Colombia has taken bold steps towards implementing sound economic policies that have promoted free trade in recent years and has buffered its economy against external shocks. "Real GDP has grown more than 4% per year for the last three years, continuing almost a decade of strong economic performance" (CIA, 2013). Yet Colombia faces many economic challenges including high unemployment (10.5%) (WorldBank, 2014), one of the highest in Latin America, as well as inequality, poverty, poor infrastructure, and drug trafficking. For almost five decades, Colombia has been in civil strife experiencing long conflict between the government forces and anti-government insurgent groups.

The information collected for Colombia was based on cross-sectional data collected from Risaralda. Risaralda is one of the 32 administrative departments in Colombia and is situated in the western central area of the country and part of Paisa region with a total of 14 municipalities. Pereira is the capital and the largest city, which has the highest urban unemployment rate in Colombia (Bjørkhaug et al., 2012). According to Colombia's statistics agency (DANE), the country's unemployment rate was 12.1 percent in 2012, a 0.4 percent decrease from the previous year, while unemployment in Pereira stood at 16.7 percent. Political turmoil and years of civil conflict have had a negative impact on the country's economy. Because the country has experienced persistent crises for more than 60 years, creation of employment and income generating opportunities can help the country recover from the conflict. The motivation for selecting Risaralda as one of the study areas is that in situations with persistent high levels of unemployment and conflict, understanding people's perception of good jobs will help formulate relevant policies. Also, understanding and identifying factors affecting labor force participation as well as willingness to pay for job benefits is the key step forward to proposing and implementing labor market policies that increase access to labor markets and jobs.

2.1.3 Sierra Leone

Geographically, Sierra Leone is located in West Africa, bordered by Guinea and Liberia to the northeast and southeast respectively. The country borders the Atlantic Ocean to the southwest. Freetown is the capital and the largest city of Sierra Leone with around 1.2 million people. Porto Loko is located in the Northern Province and has borders with the Western Regions, which is the wealthiest region in Sierra Leone (Hatløy et al., 2012). The district has a population of slightly over half a million people and the fourth most populated district in the country. Unlike Porto Loko which is dominated by Temne people, the largest ethnic group in Sierra Leone, Freetown has a very diverse population with different cultural and religious beliefs. The country experienced civil conflict from 1991 to 2002, and its economy heavily relied on International aid, which has become a lifeline and a buffer against economic hardships in the entire country.

2.1.4 Egypt

Cairo, the capital of Egypt, is located near the Nile Delta. Cairo is the second largest city in Africa (after Lagos) with a population of around 6.76 million people. According to CIA (2013), unemployment in Egypt stood at 13.40 percent in 2012 while youth unemployment reached 25 percent. Foyoum is located in Middle Egypt about 100 kilometres (62 miles) southwest of Cairo. The Egyptian crises of 2011 rooted from high levels of youth unemployment, recurrent economic recessions and political discontentment. Hence, understanding the features of the Egyptian labor market will help formulate better policies that would help the country recover from persistent levels of unemployment and economic crises.

2.2 Summary of labor market, macroeconomic and social indicators

China has the world's largest workforce: in 2012, the total labor force in China was 787 million, representing 24% of world, 1.23 times of the high-income countries (642 million), roughly 5 times the size of US., and little over 3 times the size of EU (246 million) (WorldBank, 2014). Hence, employment creation of China's escalating labor force remains a key challenge that China is confronting. Furthermore, Colombia has a labor force of 23 million, while it is 27 and 2.34 million in Egypt and Sierra Leone respectively. Compared to other countries, China has the largest labor force participation rate (71%) followed by Colombia and Sierra Leone (67%) while Egypt has the lowest (49%). In addition to the impact of key economic variables, labour force participation, wages and job amenities are also affected by economic growth and government employment policies. In these countries, China has undertaken extensive market reforms in late 1970s which has brought spectacular changes in the labour market policies, participation rates, wages as well as other job-related amenities. Similarly, Colombia has embarked market reforms in 1993. Therefore, I expect to see higher levels of participation and improved job benefits in both countries. Economic growth and the rising incomes of husbands have brought an income effect allowing women to withdraw from the labor force in order to engage home activities. Thus, I expect women to have lower participation than males. I also expect that because gains from education, younger cohorts are expected to have lower wages and low participation due to schooling. Higher unemployment is also anticipated in urban areas due to migration and rural household's fall-back work of subsistence farming if the formal labor market is weak.

Unemployment (% of total labor force) is the highest in Egypt and Colombia 12 and 10 % respectively while Sierra Leone and China have the lowest 3 and 5 % respectively. Alarming levels of unemployment in Egypt symbolizes that the country has experienced economic crises and has been in a dictatorship for almost 30 years from 1981-2011 and was part of the Arab spring in 2011. Colombia has also experienced five decades of civil strife and armed conflict and unemployment has been a major economic problem for Colombia. The striking result to appear from Table 2.1 is that female unemployment is highest in Egypt and Colombia (27 and 14%) and lowest in China and Sierra Leone.

Table 2.1 Main labour market indicators

	China	Colombia	Egypt	Sierra Leone
Labor Force, total (millions)	787	23	27	2.34
LFP rate, (total % population ages 15+)	71	67	49	67
LFP rate, (% of female ages 15+)	64	56	24	66
Unemployment, total	4.50	10.40	11.90	3.40
Unemployment, male	5.10	8.00	7.00	4.60
Unemployment, female	3.70	13.50	27.10	2.20

Source: World Bank, 2014

On the other hand, Table 2.2 (below) reveals selected macroeconomic and social indicators of these countries. China has recorded the largest annual GDP growth rate while Colombia has the largest GDP per capita (figure 2.1). While in Both China and Colombia have the lowest GDP share in agriculture, in contrast Sierra Leone's economy is dominated by agriculture. The table further illustrates that China and Colombia's macroeconomic and social indicators are more positive than Egypt and Sierra Leone.

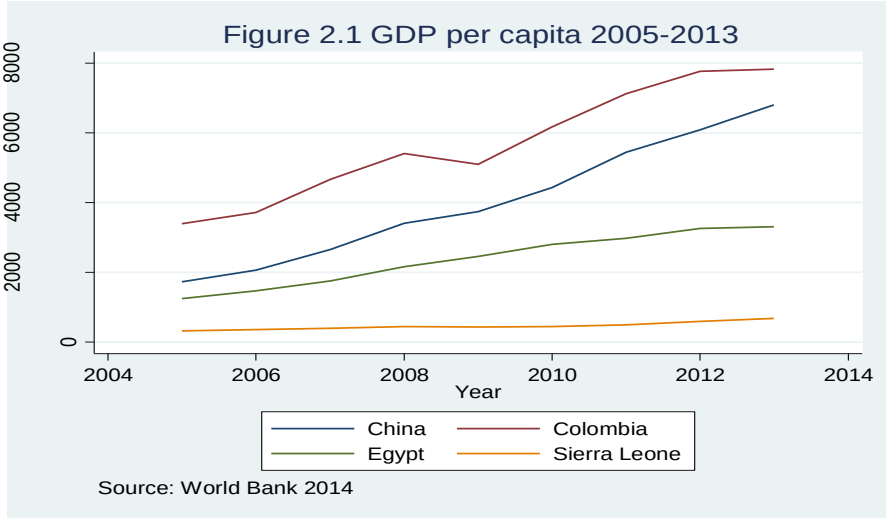


Table 2.2 Selected macroeconomic and social indicators

Indicators	China	Colombia	Egypt	Sierra Leone
GDP (current US$, billion)	9240.3	378.42	271.97	4.136
GDP per capita (current US$)	6807.4	7831.2	3314.4	679
GDP growth rate (annual %)	7.7	4.7	2.1	5.5
Services (% GDP)	46.1	56.7	46.3	32.6
Industry (% GDP)	43.9	37.2	39.2	8
Agriculture (%GDP)	10	6.1	14.5	59.5
Inflation, GDP deflator (annual %)	1.7	1.5	9	10.8
Foreign direct investment (BoP current US$)	347.85	16.2	5.553	0.144
Literacy rate, (% of people ages 15 and above)	95	94	74	44
School enrolment, tertiary (% gross)	27	45	30	-
Life expectancy at birth, total (years)	75	74	71	45
Health expenditure, total (% of GDP)	5.4	6.8	5	15.1

Health expenditure, public (% of total health expenditure)	56	75.8	39	16

Source: World Bank, 2014.

2.3 Overview of Health Insurance schemes in China, Colombia, Egypt and Sierra Leone: Historical development and current reform initiatives

Prior to 1998, there were two main employment-based social health insurance schemes for urban residents in China—the Labor Insurance Scheme (LIS) and the Urban Insurance Scheme (GIS) were created in 1951 and 1952, respectively (Liu and Wang, 1991). Employees insured against LIS include workers in large state-owned enterprises (SOEs) and collective-owned enterprises (COEs); GIS provides medical insurance coverage to employees and retirees of government institutions as well as college and university students (Barber and Yao, 2010). Anticipating and addressing limitations of LIS and GIS for instance, fragmentation, limited risk pooling capacity, lower participation and escalating costs (Xu et al., 2007), in 1998 the Chinese government launched the so-called Urban Employee Basic Medical Insurance (UEBMI), covering all those who are eligible for LIS and GIS, which additionally expands health care coverage to private sector workers and small-scale public companies (Liu, 2002, Barnighausen et al., 2007). While the 1998 reform aimed to expand population coverage, 45% of China's urban population still did not have insurance in 2007 (Xu et al., 2007). An estimated 420 million urban residents did not have any insurance coverage (Liu, 2002). Addressing: healthcare challenges particularly for the rural population, reducing healthcare inequalities between rural and urban areas and improving health care provision as well as increasing insurance coverage, the Chinese government implemented a series of health sector reforms including the full scale Health Care System Reform that was launched in 2009 by the Communist Party of China (CPC) and the State Council on excavating the Health Care Scheme Reform. Furthermore, the New Cooperative Medical Scheme (NCMS) was implemented in 2003, where 80 % were without insurance (Wagstaff et al., 2009), this was followed by the Urban Residents Basic Medical Insurance (URBMI) that was established in 2007 to cover health insurance of informal workers in urban areas, children, aging population as well as unemployed urban residents (Liu and Zhao, 2012).

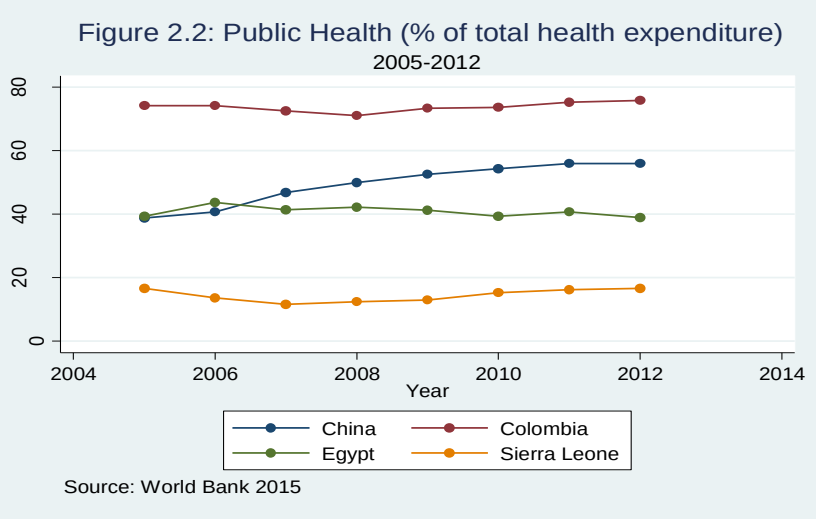
Consequently, in 2011, the total insured urban and rural residents reached 1.295 billion or approximately 95% of the population (WTO, 2015).

On the other hand, Colombia aimed to expand health insurance coverage to its population in 1993 by introducing a universal health insurance system designed to provide medical coverage for entire population regardless of their financial position. More than 80% of Colombia's population are currently entitled to one of two social health insurance schemes depending on income (Giedion and Uribe, 2009). The contributory regime (CR) covers employees and their family members who earn a minimum specified monthly income above approximately $170, and the subsidized regime (SR) which entitles insurance to the poorest among the population. The number of the insured population increased from 24% before 1993 to more than 80% in 2007 according to the 2007-2008 National Health Survey (NHS) data. As a result, Colombia has become an example and one of the very few developing countries moving towards achieving universal health care coverage (Shaw, 2007). Despite Colombia's success in implementing health care for all, there are many opponents of the reform and undoubtedly lack of sufficient financial means and corruption might have reduced program's reach of the population.

Egypt has a very complex and highly pluralistic health care system, with numerous public agencies involved in the overall management, financing and provision of services. The Ministry of health and population guides overall health-related issues, population policy, provision of public health services and health insurance organization (WTO, 2013). Similarly, there are various other key ministries including Ministry of Interior, Transport Ministry, Ministry of Agriculture, Ministry of Religious Affairs, and Defense Ministry that operate health centers, providing medical services to their respective employees (WTO, 2010). There are also quasi-governmental institutions and private entities that provide health services too. And in Sierra Leone, although health sector is largely dependent on international aid, the Ministry of Health and Sanitation is responsible in the overall management, financing and provision of health services as well as designing and implementing health-related policies. Health care expenditures come from private, out of pocket payments 69 % (AHO, 2014). In 2009, the Ministry of Health and Sanitation has designed a comprehensive National Health Sector Strategic Plan consisting of

six core pillars through which to provide and finance health care. Health insurance is a new phenomenon throughout the country. In collaboration with donor organizations the Ministry of Health and Sanitation is contemplating creating and implementing a viable national health insurance scheme in Sierra Leone (AHO, 2014).

Unlike China and Colombia which have quite viable health insurance systems largely managed and financed by the government, healthcare provision in Egypt and Sierra Leone is disorganized and fragile and inaccessible especially in rural areas. Figure 2.2 illustrates public health expenditure as a percent of total health expenditure in China, Colombia, Egypt and Sierra Leone. Public health expenditure is highest in Colombia followed by China while Sierra Leone has the lowest.



2.4 Overview of pension schemes in China, Colombia, Egypt and Sierra Leone.

Having provided a brief review of historical developments as well as recent health insurance reforms, I will now move on to provide a brief review of their pension systems. As far as pensions are concerned, China has made tremendous efforts in expanding pension coverage for its population over the past 15 years. The 1997 reform has brought spectacular improvements towards the Chinese social insurance system. This has led the establishment of contributory pension system which covered over 280 and 460 million workers in 2011 and end of 2012 respectively (Pozen, 2013). Currently, there are four pension systems in China: Urban Enterprise

Pension Scheme (UEPS) covers employees of large private enterprises and state-owned enterprises (SOEs); the Rural Pension Scheme covers rural workers who provide voluntary contributions subsidized by local and central governments; The Civil Service Pension Scheme covers employees of state institutions and parastatal agencies and a new introduced small pension system covers the unemployed urban population. Despite expanding coverage, the Chinese pension system still faces many challenges ranging from system fragmentations and limited availability of funds to meager investment returns and demographic composition of the elderly population.

Similarly, Colombia has undertaken a pension system reform in 1993, with subsequent amendments culminating in the two current systems: a public system known as defined-benefits pay-as-you-go (DB-PAYG) system and a defined-contribution (DC) privately funded system, allowing employees to substitute between the two systems if certain criteria are met. Also, Egypt has PAYG system which covers 80% of employed workers, which is one of the highest pension coverage among developing countries (SSA, 2010). Like most other developing countries, the Egyptian pension system suffers from a number of challenges: low pension benefits, inflation, weak administration of the social insurance system and limited funds. In 2010, Egypt passed a pension system reform based on Non-financial (or Notional) Defined Contribution (NDC) scheme for which implementation was envisaged 2013 (Holzmann, 2013). However, due to Egyptian crises the program is yet to be implemented. In Sierra Leone, the existing social pension system was established in July 2001, managed by the National Security and Insurance Trust (NASSIT). According to (NASSIT) "the primary responsibility of the Trust is the part replacement of income lost as a result of the contingencies of old age, invalidity and death".

2.5 Overview of other aspects of employment-related benefits

Income is considered to be the most important benefit that a job provides. Nevertheless, jobs have consequences well beyond earnings; some individuals put a high value on other aspects of employment such as a permanent contract, sick leave, housing and transportation allowances. Health-care provision and pension benefits are among the most important employment-related benefits. The first provides coverage to individuals in case of illness and pays for their medical expenses and, the latter being a form of income provided to employees when they retire. These

employee benefits buffer individuals and their families against severe financial difficulties caused by illness, unemployment, and other unexpected health care expenditures.

In developing countries, access to other employment-related benefits such as sick leave, transportation, and housing allowances is difficult to obtain. Of these benefits, sick leave allowance could be regarded as more important than housing and transportation allowances. As the name suggests, the sick leave allowance entitles monetary benefits to employees when they are off from work. In China, (since market reforms in the late 1970s), employees are entitled sick leave allowance for a period of 3-24 months depending on total working years and duration of experience with the current firm. For example, employees with 5-10 years of experience are given up to 3 months sick leave paid while those with 10 years or more are entitled to a period of 6-24 months where the minimum sick leave wage is 80% of the minimum wages in China (China-Employment-Handbook, 2009).

Also, in Colombia employees are provided sick leave allowance if they present a valid medical certificate to their employer where they receive 66.67% of their wages from the employer for the first three days and from the fourth onwards (for a maximum period of 180 days), compensation is paid by the government's social security system (Association-of-Corporate-Counsel, 2013). Similarly, according to the Egyptian labour law, employees are entitled to sick leave allowance of up to 75% of their salaries (LexMundi, 2012). Unlike other countries, Sierra Leone is among countries in the World without sick leave allowance. Sick leave allowance is an important job-related benefit as it protects employees against economic hardships caused by illness. Although labor laws of China, Colombia, and Egypt stipulate the payment of sick leave to workers (at least covered on paper), it may be that some workers do not necessarily receive the benefits.

Some employers provide housing and transportation allowances for their employees especially when they undertake assignments in overseas countries. International staff, experts and highly qualified workers are among employees who have access to such employment-related benefits. These allowances compensate workers for high transportation and housing in some countries. These benefits are not only allocated to expatriates, but local employees can access these benefits depending on the terms of the contract and when they travel to other cities for assignments.

These benefits are provided in the form of income supplementing worker salaries. Jobs that offer transportation and housing allowances are considered as good jobs since provision of these secondary benefits only come after basic job-related benefits are satisfied

Another important aspect of a job benefit is finding a permanent contract. A key shortcoming of a temporary contract over a permanent contract is its lack of job security. Conversely, securing a permanent contract entitles employees to a number of benefits including periodic wage-premiums, regular evaluations and promotions, career development such as on-the-job training programs and other company benefits/incentives. On the other hand, permanent contract holders enjoy long-term job security; work in close-knit teams in order to build long-term relationships with colleagues and company management. Nevertheless, sometimes the contributions of the temporary staff may outweigh that of permanent staff if they have the chance of getting their contracts renewed. Having a permanent contract is also seen as the only means that people in developing countries can escape from the misery and the vicious cycle of poverty. However, finding a permanent contract depends on many factors including, skills, education, experience and contact with people.

3 Literature Review

This chapter aims to provide background information on the subject area based on relevant previous literature. The first part presents a brief overview of the determinants of the labor force participation, followed by a detailed review of factors affecting participation in each country. A brief literature review of the factors that affect earnings as well as a detailed review of the contingent valuation method is then presented in Sections 2 and 3 respectively.

3.1 Brief review of determinants of the labor force participation

The neoclassical theory of labor supply is the starting point for analyzing labor force participation of individuals and how they allocate time to alternative activities. According to this theory, the choice between hours of work and leisure changes in response to wages (Mincer, 1962). An increase in the real wage has two effects; a positive substitution effect and negative income effect. The first implies an increase in hours of labor supplied by an individual whereas the later tends to increase the demand for leisure. Consequently, work-leisure trade-off depends on individual preferences and relative values placed on each additional income and leisure. Besides the allocation of time between market work and leisure, Mincer (1962) also maintains that labor force participation of married women is affected by non-work activities.

Furthermore, while the basic neoclassical theory of labor supply focused the impact of real wages on hours of labor supply, Cullison (1979) extended the model by incorporating a number of personal, sociological and governmental factors that affect labor force participation[2]. Since then, a growing body of literature has investigated factors that affect labor force participation. Strikingly, a significant amount of the research has been devoted to studying labor force participation of married women see e.g., (Gronau, 1974, Killingsworth and Heckman, 1986, Mincer, 1962); among many others. In the following section, I present some of the empirical research findings on determinants of the labor force participation in these countries.

[2] The respecified model and the details of factors affecting labor force participation can be found in Cullison (1979).

3.1.1 Chinese empirical studies

Using data from the Chinese population censuses of 1982, 1990, and 2000, Maurer-Fazio et al. (2005), examined the impact of economic reforms on labour force participation in urban and rural China. Substantial change in the labour force participation appears when they disaggregate the data by age group, marital status, gender, and location. For the analysis, a Probit regression is used. They found that labour force participation of females has decreased compared to men while rural women have increased participation more than urban women. Due to increased return on education, single urban youth have decreased their labour force participation than single rural youth. Also, labor force participation of the elderly was higher in rural areas than in urban areas. They also found evidence of feminization in agriculture. The authors conclude that economic reforms have resulted in changes in the labour force participation of particular sub-groups of the Chinese population.

Maurer-Fazio et al. (2011) analyzed the effect of childcare and eldercare on married urban women's labor force participation decisions in China in the years 1982-2000. They found that the odds of women participating in the labor market increases in households with older persons (parent or parent-in-law and any person aged 75 or above) while the presence of young children decreases it. They show that the negative effect on female's participation on having pre-school aged children in the household is significantly larger for married, rural-to-urban migrants than for their non-migrant counterparts. Similarly, the presence of elders is larger for rural-to-urban migrant females than for non-migrant groups.

Using population census data, He and Zhu (2013) examined the effect of childbirth on married women's labor force participation in urban China. To estimate the causal relationship between fertility and female labor force participation, the authors employ OLS and IV linear regression models. They found that when used OLS; having one more children decreased female labor force participation by 6.7% and 8.5% in 1990 and 2000 respectively and when used IV method revealed small and insignificant changes for both years.

In their paper, Barrett et al. (1991) examined factors affecting female labor force participation in rural and urban China, using census data of 1982. The authors found that labor force

participation of women was higher in areas with increased agricultural employment opportunities, educational levels, presence of female-headed households, and higher male-to-female sex ratios. The authors claim that the size of the service sector and fertility rate has insignificant effects on female labor force participation. They also show that when other variables are controlled for, urban areas have a high rate of female participation. Finally, the authors conclude that education have a vital role on women's labor force participation in urban places, whereas sex ratio and household structure played a key role in rural places.

Using China Health and Nutrition Survey database of 2006, Chen et al. (2014) analyzed factors that affect the labor force participation of female employees in urban and rural places, from the perspective of individuals and households. Applying Probit regression in their studies, they found that family related issues were considered more important than individual factors and the difference was large between urban and rural areas. The authors also argue that individual specific factors played a vital role for women from urban areas, whereas family factors were more important for those who resided in rural areas. The conclusion was that labor market policies should take into account structural differences between urban and rural women.

3.1.2 Colombian empirical studies

Posada and Arango (2007) estimated factors that affect the labor force participation decision of married women in Colombia between the years 1984-2000. They found that factors such as past history of participation, educational levels, and labor income taxes, young children between 1 and 2 years of age, as well as the presence of unemployed people at home are the main determinants of married female's labor market participation in Colombia.

Amador et al. (2012) investigated the effect of fertility, marital status and education on the rise of female participation that increased Colombia's participation from almost 47% in 1984 to 65% in 2006. They decompose factors affecting participation into changes resulting from population composition and structure and changes attributable to education, childbirth, and marital status. The authors found that married and cohabiting women and women with low education increased female participation in Colombia. They argue the effect of fertility is negligible, and changes in the composition have second order effects. The study also reveals that other factors such as past

participation, divorce rates, and legislation increased female labor force participation. They found no evidence of correlation between participation and business cycles.

Castafieda (1986) analyzed factors that affect mother's labor force participation in Colombia. Potential factors, those affect participations, included mother's education and family income, number of children and schooling of children. He found that education increased mother's participation while low family income decreased it. The presence of school going children increased mother's labor force participation implying that the presence of pre-school aged children decreases mother's participation. Contrary to the empirical findings in other countries, He found no statistically significant relationship between the number of children in a family and mother's participation in the labor force.

3.1.3 Egyptian empirical studies

Using a sample of 3882 married women in 1984, Soliman (1991) examined determinants of female labor force participation and hours of work in Cairo, Egypt. He found that married women's participation is significantly influenced by weekly earnings, income, unemployment, age, schooling, and fertility measures. Soliman (1991) found that education increased the probability of participation by 47-48% as well as hours of work by 6.2-6.8 hours. Income increased both participation and hours of work while, presence of pre-school children under age 5, and unemployment of a household member decreased participation.

Sayre (2013) examined female labor supply in Egypt, Tunisia, and Jordan. Noticeably, labor force participation of women in the Middle East is one of the lowest in the World. He found that the effect of marriage on female participation is negative for all women with the effect increasing females in their 20s with secondary or lower education. By comparison, women in Jordan, West Bank/Gaza, Syria and Algeria have lower participation than women in Egypt, Morocco and Tunisia. In the Middle East and many Muslim countries, institutional factors including social and cultural attitudes impede participation of women in the labor market.

3.1.4 Sierra Leone empirical studies

In their analytical report, Hatløy et al. (2012) analyzed determinants of the labor force participation in urban and rural Sierra Leone. They employed logistic regression and selected population age group 18-65. They investigated how variables such as gender, age, education, health condition, household size, dependency ratio and, wealth index affected participation. Hatløy et al. (2012) found that women in both urban and rural areas are less likely than men to participate in the labor market. Age exhibited an inverse U-shape relationship, implying that participation decreases as individuals get older. The report also revealed that individuals with chronic health problems are less likely to participate in the labor force particularly in the urban areas. Urban dwellers with large household size were less likely to participate in the labor market, whereas household size was important (albeit insignificant) for participation, indicating the importance of labor for subsistence farmers.

There are a number of similarities among the research studies discussed in this section. While some studies have examined determinants of the labor force participation of men and women, a significant amount of literature has analyzed factors affecting labor force participation of married women. A common finding among these research studies is that both personal and household characteristic variables are significant. Age, tertiary education, household head, presence of school going children have a positive effect on labor force participation while marriage[3], gender (being female), location and having chronic health condition affects participation negatively. Furthermore, some variables that ought to affect participation of married women e.g. presence of pre-school aged children, may not be significant when analyzing labor force participation of both men and women. Studies by Maurer-Fazio et al. (2011) and Posada and Arango (2007) include the presence pre-school children as an explanatory variable and concludes that the presence of young children decreases mother's labor force participation. The impact of this variable when analyzing labor force participation of men and women is not clear. Despite examining determinants of the labor force participation of men and women, this study will include the variable KIDS (household with children below 5 years) as an explanatory variable to see if it affects participation. Maurer-Fazio et al. (2005) also include location as an explanatory variable

[3] Theoretically married individuals have higher participation than singles. Nevertheless, in Egypt, marriage is expected to have negative effect on participation.

and concludes that labor force participation was higher in rural areas than in urban areas. Moreover, while governmental factors affect labor force participation, Amador et al. (2012) include employment legislation and concludes that it increased participation. Chen et al. (2014) also reveals the role of household decision-making on participation was more important for those who resided in rural areas.

As many of these studies reveal, both personal and household characteristics are important determinants of labor force participation. The findings of these previous empirical studies have inspired this study to include variables of both personal and household characteristics in an attempt to investigate the determinants of labor force participation of the these countries under discussion.

3.2 Brief review of determinants of wages

This section briefly reviews some of the existing literature on determinants of wages. A large body of empirical research has explored the existence of substantial wage differentials among individuals with heterogeneous skills in different industrial units, see e.g. (Dickens and Katz, 1986, Holzer et al., 1988, Jean and Nicoletti, 2002, Krueger and Summers, 1986, Virén and Pankki, 2005). Several factors including education, age, gender, experience, marital status, residence and professional background have been proposed to be significant factors that can explain wage differentials across individuals. However, there is much debate among labor economists on the relative importance of these variables in earnings (Mincer, 1974, Rosen, 1972).

Dickens and Katz (1986) analyzed the extent of inter-industry wage differences for non-union workers and found that even after controlling for multiple individual characteristics and geographic location, the existence of substantial wage differentials among individuals can be accounted for by industry differences which, explained at least 6.7% and at most 30% of inter-personal wage variation. While the importance of inter-industry effects is clear, the reasons for the wage differences are more difficult to establish. They found that average education and industry profitability was significantly positive related to wages. Some empirical evidences have examined factors affecting industry differences and found that, high-wage industries have lower quit rates, higher labor productivity, fewer women, more skilled workers, longer work weeks, a

higher ratio of nonwage to wage compensation, higher unionization rates, larger establishments and firms, higher concentration ratios and are more profitable. More profitable industries offer high wages that explain substantial wage differentials among individuals.

In her analysis of determinants of employee salary Xiao (2001), using data from 2206 employees in Shanghai, China, in 1998, estimated the effects of formal education on-the-job training and adult education on employee salary growth. She found that pre-job formal education, experience, on the job-training and long-term adult education is related to salary growth. She also found that capacity of firms had a significant effect on salary growth, while technical efficiency level of employees is not related to salary growth.

Using a sample of 860,000 individuals from the 1973 Census Population Fields and Schultz (1977) investigated income determinants and income inequality in Colombia. They used variables such as education, age, region and location (rural/urban) as factors affecting income variation. A widely accepted notion is that education is important, and the expansion, promotion, and reform of education would lead to greater equality and social development. Less educated and the young have lowest incomes. They found that education being the most important determinant increases income for both men and women. Additional year of schooling is one average associated with almost 20% more earnings for male employees and employers.

Taken together, the findings of empirical research on determinants of wages reviewed in this section reveals that wage differentials among individuals is explained by education, conforming to human capital theory (Becker, 1964), which argues that wages depend on human capital of the individual. Likewise, other factors such as type of industry, years of experience, on the job-training programs and age are important determinants of wages. In addition to using similar variables, this study will also include possession of health and marital status to see if they have an impact on wages.

3.3 Brief review on contingent valuation method

Contingent Valuation Method (CV) is among a class of stated preference methods, which involves asking a random sample of individuals for their willingness to pay for specific good, or willingness to accept a loss (Oezdemiroglu et al., 2002). It involves asking respondents

hypothetical questions intended to capture the value of the good in question. It is called contingent valuation because responses are contingent upon the hypothetical scenarios and features of the questions offered. Stated preference is a widely accepted approach which uses specifically designed questionnaires to elicit estimates of willingness to pay (WTP) or willingness to accept (WTA) compensation for a particular non-market good or service. Willingness to pay is the maximum amount of money a person is willing to forgo to obtain a good, while a willingness to accept is the minimum monetary amount an individual would sacrifice for some specific good or tolerate some damage.

The first study of contingent valuation was reported in 1947, when Ciriacy-Wantrup (1947) wrote on the economic consequences of preventing soil erosion. The study proposed the use of contingent valuation surveys as a technique to estimate the value of non-market goods. Stressing the need to preserve public goods, he recommended that one approach to estimating the demand for these goods would be to elicit how much individuals would be willing to sacrifice for successive increments. However, he did not discuss how to conduct practical experiment of contingent valuation type surveys.

Almost two decades later, the concept of contingent valuation became widely used in applied academic research. Davis (1963) studied the economic value hunters and wilderness lovers allocated to a particular recreational area. The subject gained much attention when Krutilla (1967) examined the importance of the irreversible nature of the environment.

Since then, economists have undertaken contingent valuation studies based on CV surveys to elicit estimates of the value of non-market goods and services. The method has not only been limited to natural resource and environmental economics, but has been widely applied in many areas ranging from health insurance programs to marketing and transportation services. While health care is organized by the governments in most developed countries, very few governments in developing countries prioritize national health problems of their citizens. In developed countries, health care is paid for through taxes and national insurance contributions taken directly from wages and salaries and, the government decides the amount, that will be spent on health service, while in developing countries, implementing such programs is either perceived as being cumbersome or, voluntary contributions of the public do not exist. Thus, in recent years,

there has been a growing body of literature which has examined people's willingness to pay for health insurance services as governments and public policy makers in developing countries took bold steps about improving access to health benefits, especially for the poorest families and informal workers (e.g. China, India and a number of African countries). In the following section, I present some of the empirical research findings on contingent valuation of health insurance in developing countries.

Barnighausen et al. (2007) analyzed WTP for health insurance among informal sector workers in Wuhan, China. Age, sex (male), income and past health expenditure were found to be statistically significant factors affecting willingness to pay for health insurance. They also found that informal sector workers report WTP estimates that greatly exceeds the cost of Basic Health Insurances (BHI) based on past health expenditures. Respondents were also willing to forgo a major portion of their incomes (46%).

In a study conducted in India, Jain et al. (2014) analyzed willingness to pay for community health insurance programs. They found that majority of respondents would only demand healthcare when symptoms are obvious. Only a small percent of respondents (6%) would forgo some amount of money for preventive measures. Among those willing to pay for health insurance premium on average would pay $ 27 per annum. Onwujekwe et al. (2010) examined WTP for community-based health insurances in Nigeria with the objective to analyze socio-economic characteristics and geographic differences of willingness to pay for community-based health insurance. For the analysis, a bidding game format of the contingent valuation method was used to elicit estimates of the WTP. They found that less than 40% of the respondents were willing to pay for the program. Rural households were willing to pay $ 1.7 compared to $ 2.9 of urban dwellers. This shows that rural communities are, less informed than urban households and an awareness campaign is needed to ensure accessibility of the program. Using a unidirectional bidding game, Dror et al. (2007) investigated willingness to pay for health insurance in India. They found that poorer persons were willing to pay a major percentage of their income on health insurance premiums than higher income groups. Asfaw et al. (2008), examined willingness to pay for health insurance with the objective to analyze the proposed market for new low-cost

health insurance in Namibia. They found that 87 percent of the uninsured respondents were willing to be part of the program and on average would pay NAD 48 per month.

A rich literature is available on WTP for health insurance in developing countries, but to my knowledge, no study has analyzed WTP in terms of a permanent contract, sick leave, and housing and transportation allowances. Assessing the values of these job benefits to the workers is of paramount importance. While governmental social security programs can affect the willingness to pay for health insurance and other job benefits, these studies suggest that income, age, gender and residence determine people's willingness to pay for health insurance benefits. Taking into account the findings of these studies, I also assume that income, age, education and residence to be important factors affecting willingness to pay for health insurance, pension benefits, and permanent contract. In China and Colombia where the government has undertaken extensive social security reforms, willingness to pay for health insurance and pensions are expected to be lower than in Egypt and Sierra Leone.

3.3.1 Studies on the gap between Willingness to pay and Willingness to Accept

The divergence between the values obtained from willingness to pay (WTP) and willingness to accept (WTA) compensation for a particular non-market good or service is a widely documented exercise both through theory and experiments (Horowitz and McConnell, 2002). Researchers have not been able to provide any conclusive evidence as to what causes the differences and, even when specifically structured surveys are employed to elicit estimates, divergence based on WTP and WTA compensation seems to exist. This contradicts standard economic theory, which convincingly argues that valuations made by individuals based on their WTP and WTA should be approximately identical (Willig, 1976). The underlying argument is that, the WTA-WTP disparity is attributed to the income effect and that the difference should be negligible. However, experiments conducted by (Kahneman et al., 1990) demonstrate a major difference between WTA and WTP of individuals even for normal goods (e.g. Mugs and pens), which do not exhibit significant income effects. Along similar lines, Hanemann (1991) provides further evidence of such disparity and dissenters to the view that approximate equality of WTP and WTP is misconceived. Researchers have also questioned the reliability of WTA against WTP and argued

that WTP may be considered as a better measure of valuation than WTA (Garrod and Willis, 1999).

4. Data and Methods

This chapter is divided into three parts. Part 1 provides an overview of econometric models which will be applied in the empirical chapter of the thesis. Part 2 discusses expected sign of the variables and presents a description of all variables. Part 3 introduces the data and briefly discusses socio-economic characteristics of respondents.

4.1 The choice of model

Labor force participation is a response variable which takes the value one if the individual participates in the labor force, and zero otherwise. When the dependent variable is binary (categorical) in nature, we use a class of binary response models. The Linear Probability Model (LPM) is the easiest and most straightforward to estimate, though it has some drawbacks. The three main disadvantages are that the fitted probabilities can lie outside (0-1) range, the variance of the disturbance term is heteroscedastic and the observed value of the regressand are not normally distributed, but rather exhibits binomial distribution. A model with multiple independent variables is shown as:

$$y_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots\dots\dots\dots\dots \beta_k x_k + \varepsilon_i \qquad (4.1)$$

Where x are the independent variables$(i = 1 \dots\dots\dots k)$; α is the predicted probability of labor force participation when all $x_{j's}$ are equal to zero; β is a vector of coefficients $(k\ x\ 1)$ which measures the probability of participation when x_j changes, holding other variables fixed; ε_i is the disturbance term $(E(\varepsilon_i) = 0)$; and y = 1 when a respondent participates in the labor force and 0, otherwise i.e. $y_i = \begin{cases} 1 & for\ a\ participant \\ 0 & otherwise \end{cases}$.

When the dependent variable y is categorical, it is certainly true that the probability of labor force participation is the same as the expected value of y i.e. $P(y = 1 \mid x = E(y \mid x)$. Hosmer and Lemeshow (1989, p. 6) refer this probability $\pi(x)$. Consequently, this gives the following equation:

$$\pi(x) = E(y|x) = \mathrm{P}\,(y = 1 \mid x = \alpha + \beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2 + \dots\dots\dots\dots + \beta_k \mathrm{x}_k + \varepsilon_i \qquad (4.2)$$

"These limitations of LPM can be overcome by using more sophisticated binary response models"(Wooldridge, 2009).

4.1.1 The Logistic Model

To overcome the foregoing disadvantages, many authors have suggested several procedures, see, e.g. Hosmer and Lemeshow (1989), Long (1997) and Wooldridge (2009). To eliminate the probability that labor force participation (LFP) is outside the (0-1) limit, a logistic regression is recommended. The logistic transformation of workforce participation p is log $p/(1-p)$, which is written as logit (p), where $p/(1-p)$ are the odds of participation, which converts the log (p) in the limit of (0-1) to -∞ to ∞. If p is the probability of participation, then $p/(1-p)$ are the odds of participation. In this case, the odds are shown as:

$$\frac{P(y=1|x)}{P(\,y=0\,|\,x)} = \frac{P(y=1|x)}{1-p(y=1\,|\,x)} \tag{4.3}$$

Here, (y= 1) indicates the odds of participation compared to (y= 0), the odds of not participating in the labor force. The linear logistic model for the relationship between the dependent variable (LFP) on $k+1$ explanatory variables is:

$$logit\ (pi) = \ \alpha\ +\ \beta_1 x_1 + \beta_2\, x_2 + \ldots\ldots\ldots\ldots + \beta_k x_k \tag{4.4}$$

The equation can also be written as

$$pi = \frac{\exp(\ \alpha\ +\ \beta_1 x_1\ \ + \beta_2\, x_2 + \ldots\ldots\ldots\ldots + \beta_k x_k\ )}{1 + \exp(\ \alpha\ +\ \beta_1 x_1\ \ + \beta_2\, x_2 + \ldots\ldots + \beta_k x_k)} \tag{4.5}$$

Firstly, the $k+1$ unknown parameters $\alpha + \beta_1 + \ \beta_2 + \ \ldots\ldots\ldots\ldots\ldots\ \beta_k$ are predicted using the maximum likelihood estimation (MLE) which is given by:

$$L(\beta) = \ \prod_{i=1}^{n} p_i^{yi}\ (1-p_i)^{1-y_i} \tag{4.6}$$

The final equation which estimates labor force participation in the four developing countries: China, Colombia, Egypt and Sierra Leone can be written as:

$$LFP = \propto + \beta_1(GENDER) + \beta_2(AGE) + \beta_3(AGESQR) + \beta_4(ELEMEDU) + \beta_5(INTEDU) + \beta_6(HIGHEDU) + \beta_7(SLIGHT) + \beta_8(DIFF) + \beta_9(HHEAD) + \beta_{10}(SIZE) + \beta_{11}(DEP) + \beta_{12}(KIDS) + \beta_{13}(WEALTH) + \beta_{14}(ETHNI) + \beta_{15}(MARRIAGE) + \beta_{16}(WID) + \beta_{17}(DIVORCE) + \beta_{18}(LOC) + \varepsilon_i \quad (4.7)$$

4.1.2 The OLS model

Multiple regression analysis is used when a continuous dependent variable is regressed on $k + 1$ explanatory variables which can be either continuous or dummy variables. The dependent variable, wage, is continuous and in such a case employing OLS is the most appropriate statistical method. The linear regression model can be written as:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots\ldots\ldots\ldots\ldots + \beta_k x_{ik} + \varepsilon_i \qquad (i = 1,2,\ldots\ldots\ldots N) \quad (4.8)$$

When OLS assumptions are satisfied, OLS estimators are unbiased estimators of the population parameter (Wooldridge, 2009).

Table 5.2 summarizes the empirical results employing the following core equation:

$$\log wage = \alpha + \beta_1(GENDER) + \beta_2(AGE) + \beta_3(AGESQR) + \beta_4(HIGHEDU) + \beta_5(WEALTH) + \beta_6(MARRIAGE) + \beta_7(WID) + \beta_8(MANUC) + \beta_9 + \beta_{10}(EDUC) + \beta_{11}(PUBDEF) + \beta_{12}(LOC) + \varepsilon_i \quad (4.9)$$

Where log wage is the dependent variable; α is the intercept; $\beta_1, \beta_2, \ldots\ldots\ldots\ldots \beta_k$ is a $(k + 1)$ vector of coefficients which measures the change in the dependent variable with respect to explanatory variables, holding other variable constant; ε_i is the error term.

4.1.3 The Tobit Model

Since the dependent variable, WTP takes zero values for a significant fraction of the sample and positive values with different outcomes for the rest, I applied Tobit regression model to investigate determinants of WTP for job-related benefits. Following Verbeek (2008), the standard model for the observed willingness to pay is defined as:

$$y_i* = x'\beta + \varepsilon_i, \quad i = 1, 2, 3, \ldots, N, \tag{4.10}$$

Where y_i* is latent variable representing household's willingness to pay

β is a vector of unknown coefficients;

X_i is a vector of explanatory variables;

ε_i is the error term such that $\varepsilon \sim NID\ (0, \sigma^2)$ and independent of x_i

Designating y_i as the observed dependent variable then such that $y_i = \begin{cases} y_i^* \ if \ y_i^* > 0 \\ 0 \ if \ y_i^* \leq 0 \end{cases}$

Verbeek (2008) refers the model in equation (4.10) as censored regression model illustrating two things. One is the probability that $y_{i=}$ 0 (given x_i), given by

$$P\{y_i = 0\} = P\{y* = 0\} = P\{\varepsilon_i = -x'\beta\} \tag{4.11}$$

$$= P\left(\frac{\varepsilon_i}{\sigma} = -\frac{x'\beta}{\sigma}\right) = \Phi\left(-\frac{x'\beta}{\sigma}\right) = 1 - \Phi\left(\frac{x'\beta}{\sigma}\right) \tag{4.12}$$

The second one is the expected distribution of y_i given that it has positive values.

$$E\{y_i | y_i^* > 0\} = x'\beta + \sigma \frac{\Phi(x'\beta / \sigma)}{\Phi(x'\beta / \sigma)} \tag{4.13}$$

The last part of equation (4.13) is the conditional expectation of a mean zero normal variable given that it is larger than $-x'\beta$.

The estimated coefficients of the Tobit model can be interpreted in several ways. The marginal effect of a change in the explanatory variables (x_i) on the probability of willingness to pay for a job-related benefit is given by:

$$\partial E\left(\frac{y_i}{\partial x_{ik}}\right) = \beta_k \Phi\left(\frac{x'\beta}{\sigma}\right) \tag{4.14}$$

Equation (4.14) states that the marginal effect of a change in independent variables (x_i) upon expected outcome y_i is given by the estimated coefficients β_k multiplied by the likelihood of having a positive value. Similarly, the marginal effect of the latent variable y_i* is given by

$$\partial\, E\left(\frac{y_i\,*}{\partial x_{ik}}\right) = \beta_k \tag{4.15}$$

The Tobit model is estimated using the maximum likelihood estimation (MLE). Following Verbeek (2008), the log likelihood function is formalized as follows:

$$LogL_1\,(\beta, \sigma^2\,) = \sum_{i\,\epsilon lo} log\left[\;\; 1 - \Phi\left(\frac{x'\beta}{\sigma}\right) \;\;\right] + \sum_{i\,\epsilon l1} log\left[\;\; \frac{1}{\sqrt{2\,\pi\sigma^2}}\, exp\left\{\;\; -\frac{1}{2}\,\frac{(y_i - x'\beta)^2}{\sigma^2} \;\;\right\} \;\;\right] \tag{4.16}$$

The core equation estimating determinants of WTP for job-related benefits are shown below:

$$WTP_i = \alpha + \beta_1 INCOME + \beta_2 GENDER + \beta_3 AGE + \beta_4 ELEMEDU + \beta_5 HIGHEDU + \beta_6 SIZE + \beta_7 KIDS + \beta_8 MARRIAGE + \beta_9 LOC + \varepsilon_i \tag{4.17}$$

Since I have very few observations for sick leave allowance, explanatory variables such as GENDER, ELEMEDU, and KIDS are not included in the final estimation. Similarly, the variable (KIDS) is excluded in the final estimation of determinants of pension benefits, permanent contract, and housing and transportation allowances.

4.2 Expected sign of the variables

The effect of the explanatory variables on the dependent variable can be either positive or negative. Before presenting my analysis chapter, I have a priori expectation of how variables might affect our response variable. Descriptions of the variables used in the regressions are presented in Table 4.1. Based on the findings of previous empirical studies, the expected sign of the variables is as follows:

i. *Gender*. This variable is expected to have a negative sign since women have lower participation rate than men. The negative sign of the variable coincides with the findings of previous empirical studies that women tend to participate less in the labor market activities than men see, e.g. (Maurer-Fazio et al., 2005, Verick, 2014) among many others. Similarly,

when OLS is employed to estimate determinants of wages, this variable exhibits a negative sign corresponding to previous empirical results that male employees earn more wage than female employees. Furthermore, the coefficient of the gender variable reveals a negative sign when analyzing determinants of WTP, implying that males have higher willingness to pay than females confirming the findings of other previous studies.

ii. *Age and Age-squared.* It is expected to have a positive and negative signs respectively. The expected positive effect of the Age variable is that labour force participation increases with age. Older individuals tend to have more labour-market experience and network contacts leading to increasing participation. Age-squared is expected to have a negative sign since participation increases with age and then declines as the individuals retire.

iii. *Education.* In this study, the variable Education is divided into three categories: primary, intermediate and senior secondary or tertiary education. The effect and the sign of the first two categories are ambiguous and might exhibit different effects or signs in participation. However, tertiary educational attainment is expected to have a positive sign and raises participation rate. Furthermore, the expected sign of higher education can be ambiguous in the short-run since some individuals who would have participated in the labour market chose to attain higher studies, however in the long-run tertiary education raises both potential earnings and participation. The variable is also expected to have a positive sign in the OLS equation estimating determinants of wages. Similarly, the expected impact of higher education on willingness to pay for job-related benefits is positive.

iv. *Health Condition*. Health is expected to have a positive effect on labor force participation. In this study, the variable Health Condition has two categories: difficult health and slightly difficult health condition. The variable difficult health condition is expected to have a negative sign since individuals who suffer from chronic health problems are unable to participate in the market. But, the expected effect of the variable slightly difficulty health is ambiguous and can exhibit either negative or positive signs. Previous empirical findings maintained that the coefficient of difficult health condition has a negative sign.

v. *Household head*. It is expected to have a positive sign since heads as breadwinners are responsible for supporting the family. Fadayomi and Olurinola (2014) examine determinants of labor force participation in Nigeria. They found that household heads have higher participation (88.4%) than non-heads (45.3%).

vi. *Household size (5 members or more).* This variable can either have a positive or a negative sign. The presence of the elderly members might increase financial burdens of the family requiring members to increase participation. On the other hand, the presence of pre-aged children might decrease female labor force participation.

vii. *Kids (children below 5).* The expected sign of this variable on labor force participation is negative, especially for women due to child rearing responsibilities.

viii. Marital status. In this study, the variable marital status is classified into three categories: Married, Widowed and, Divorced. Different empirical studies have found conflicting results. The effect of marriage on labor force participation depends on several factors and can exhibit either positive or negative signs. Theoretically, marital status is expected to have a positive sign implying that married individuals have higher participation than singles. Also, the effect of marriage on males and females vary. Married men are more active in the labor market than married women indicating that participation of married females decreases partly due to the presence of young children in the household. A vast literature has examined the impact of married female on labour force participation and found that marriage decreases female participation rate. See, e.g. (Posada and Arango, 2007, Robinson, 2005). Variables such as widowed/divorced are expected to have a positive sign with higher participation rate.

ix. *Wealth index*. It is expected to have a negative sign since members of richer families may tend to prefer leisure. According to Goodstein (2008), wealth has a negative effect on participation. Conversely, in the OLS equation estimating determinants of wages, a priori expectation of this variable is that it has a positive sign. Richer individuals tend to earn more than other workers. Similarly, the effect of the wealth index on willingness to pay for job-

related benefits is positive as wealthier individuals would sacrifice income for access to the benefits.

x. *Ethnicity.* The expected sign of this variable is unknown. In some countries, minority groups are deprived accessing employment opportunities and thus tend to have lower participation than ethnic groups.

xi. Location *(urban vs. rural).* This variable is expected to have a negative sign since participation tends to be higher in rural areas than in urban areas. A considerable amount of literature has documented that rural dwellers have higher participation compared to urban dwellers. The impact of this variable on wages is positive since urban dwellers are expected to earn more than their counterparts. Similarly, urban dwellers are expected to have higher willingness to pay for job-related benefits than rural residents.

xii. *Type of industry.* Type of industry can have an impact on worker's pay. Studies have shown that there are inter-industry wage differences (Dickens and Katz, 1986). In this study, I investigate whether workers in the manufacturing, construction, education and public defense sectors earn more or fewer wages than other workers. The expected sign of all these variables is unambiguous.

Table 4.1 Description of all variables used in the regressions

		Expected Sign of effect on		
Variable name	Variable description	Logistic	OLS	Tobit
GENDER	Dummy variable coded as 1 for females, and 0 for males	-	-	-
AGE	Household member's age (in years)	+	+	+
AGESQR	The square of household member's age (in years)	-	-	
ELEMEDU	1 if completed primary school; 0 otherwise	+ ?	+ ?	+ ?
INTEDU	1 if completed junior school; 0 otherwise	+ ?	+ ?	+ ?
HIGHEDU	1 if completed secondary school or higher; 0 otherwise	+	+	+
SLIGHT	1 for slightly difficult health; 0 no health problem	-?		
DIFF	1 for difficult health condition; 0 no health problem	-		
HHHEAD	1 for household head; 0 otherwise	+		

SIZE	1 if the household contains 5 members or above; 0 otherwise	?		?
DEP RATIO	Continuous variable calculated as: $No.of\ dependents\ (0-14\ and\ over\ age\ 65)/(total\ working\ adults)$	+		
KIDS	1 for children below 5 years; 0 otherwise	-		-
WEALTH	Continuous variable indicating household's possession of different assets.	+	+	+
ETHNI	1 for majority ethnic group; 0 otherwise	?		
MARRIAGE	1 for currently married; 0 otherwise	+ ?	+ ?	+ ?
WIDOW	1 for currently widowed; 0 otherwise	+ ?	?	?
DIVORCE	1 for currently divorced; 0 otherwise	+	+ ?	
LOC	1 for urban area; 0 otherwise	-?	+	-?
MANUF	1 if the individual works in manufacturing sector; 0 otherwise		+ ?	
CONSTR	1 if the individual works in construction; 0 otherwise		+ ?	
EDUCA	1 if the individuals works in education sector; 0 otherwise		+ ?	
PUBDEF	1 if the individual works in public defence; 0 otherwise		+ ?	
INCOME	Monthly income of those who access job-benefits		+	+
Dependent variables				
LFP	1 for labor force participation; 0 otherwise			
WAGE	Monthly income of the RSIs			
WTP HEALTH	Maximum WTP for health insurance			
WTP PENSIONS	Maximum WTP for Pension benefits			
WTP SICK LEAVE	Maximum WTP for sick leave allowance			
WTP PERMANENT	Maximum WTP for permanent contract			
WTP HOUSING	Maximum WTP for housing allowance			
WTP TRANSPORT	Maximum WTP for transportation allowance			

4.3 The Data

The data in this analysis is obtained from the Norwegian research institute, Fafo Institute for applied International studies. Fafo conducted the Good Jobs survey in 2012 in four selected developing countries: China, Colombia, Egypt and Sierra Leone. The survey covers both rural and urban areas of all selected countries and is a representative sample for the selected areas. The data was primarily used as a background material in the World Development Report 2013. Fafo was commissioned by the World Bank to conduct the surveys in collaboration with local partners

in each of the four countries. The aim of the questionnaire was to gather data on people's perceptions of good jobs and how they vary with a number of socio-economic variables that affect labor market outcomes. It also gathered contingent valuation data in order to assess the monetary value of social insurance programs, as well as job-related benefits.

The questionnaire is mainly divided into two parts with eight sections. The first part comprises basic household information such as household demographic characteristics, education level, labour force participation of household units aged (15 and above) and, household dwelling and assets. The reference target respondent of this part of the questionnaire was the household head or any other responsible adult who could serve as a household informant. Having collected all relevant background information about the households, the second portion of the questionnaire targeted Randomly Selected Individuals (RSIs) in each selected family aged 18 or above. RSI section contained questions relating to job features, job evaluation and participation and trust. The RSI respondent answered a wide range of relevant questions pertaining to person's employment status, perceptions of jobs, participation and trust and, confidence in various institutions and groups.

Since the presence of missing values can affect the quality of the results, observations coded as missing or incomplete as well as outliers and influential figures were deleted from the dataset. While the main objectives of this study are to investigate determinants of the labour force participation and wages, as well as determinants of job characteristics and to quantify the monetary value of job-related benefits through contingent valuation method, I use both parts of the questionnaire to answer research questions specified in chapter 1. For this purpose, the data on determinants of the labour force participation was taken from part I of the questionnaire while the data on the determinants of wages and job characteristics were taken from the RSI section. Furthermore, contingent valuation questions were asked among randomly selected wage workers. In their analytical report, Fafo examined determinants of the labour force participation of all countries (Bjørkhaug et al. (2012), Hatløy et al., 2012, Kebede et al., 2012, Zhang et al., 2012). I use the same data, but add additional explanatory variables such as, household head, household size, ethnicity, young children below 5, and marital status. Tables 4.2-4.5 (Appendix 1) present the socio-economic characteristics of households in both urban and rural areas of

China, Colombia, Egypt and Sierra Leone respectively. Table 4.6 (Appendix 1) gives detailed socio-economic characteristics of wage-workers in all countries. The characteristics of individuals, those are willing to pay/accept job-related benefits are illustrated in Table 4.7 and 4.8 (Appendix 1, respectively). Descriptive statistics of the variables used in the logistic regressions, along with their standard deviations are displayed in Table 4.9. Similarly, descriptive statistics of variables used in the OLS and Tobit equations are in illustrated in the appendix 1 (Table 4.10 and 4.11 respectively).

As can be seen from Table 4.2, the employment rate is higher (61%) and, unemployment is lower (47%) in rural areas than in urban areas in China. Slightly over a quarter of the households in the sample never attended school. The fraction is higher in rural areas while the proportion of households with tertiary education is higher in urban areas. As can be expected, the proportion of male-headed household is higher than female-headed households in both urban and rural locations. Poverty is higher in rural areas while, in terms of the wealth index, more households reported as being rich in rural areas than in urban areas. The average household size in both urban and rural areas is 2.10; while majority of households have household size of 3-5 with uniform distribution in both urban and rural areas.

Table 4.3 reveals that households headed by males constitute 65% of total respondents in both urban and rural Colombia. The employment rate is slightly higher in rural areas (57%) than in urban areas. The table further reveals that about 36% of the households never attended school, while those with tertiary education constitute 29% and, the majority live in urban areas. The average age of households is 34 years with a standard deviation of 22. This shows that quite a large number of respondents are still in their productive age. Also, 11 % of households have 1-2 members, 42% have 3-4 members while 12 % have more than 5 members in Egypt.

Table 4.4 illustrates socio-economic characteristics of urban and rural households in Egypt. As can be seen from the table, male-headed households account for 86% of total households even though the Egyptian sample contains slightly more females than males. Religious and cultural factors are contributing to the prevalence of male-headed households in Egypt. As in other countries, the proportion of rural households working is higher (57%) than urban households; unemployment is also lower in rural areas. While 37% of households have tertiary education,

urban residents are better educated than rural residents while nearly half of the households (48%) have no education. The Table also reveals that 52% of households have 5-7 members, 42% have 1-4 members while only 7% have more than 8 members. A large proportion of households reported as being neither poor nor rich while in terms of the wealth index, rural households reported as being rich compared to urban households.

As can be seen from Table 4.5, there are slightly more women than men in both rural and urban Sierra Leone. The Table further reveals that male-headed households constitute 83% of total respondents in both urban and rural locations, where the proportion is even higher in rural areas. Nearly 60% of households in rural areas engage in employment activities while unemployment is also lower in rural areas (16%). Nearly 60% of the households in Sierra Leone never attended school, while the fraction is considerably higher in rural households. Conversely, the proportion of households with higher educational level is higher in urban areas. A considerable portion of the households, 43% and 42% respectively have between 5-7 and more than 8 members, while only 15% have 1-4 members. Exactly a third of the households in both urban and rural locations reported as being rich, however the proportion is slightly more in urban locations.

Taken together, the socio-economic characteristics of the households in all countries reveal that the employment rate is higher and, the unemployment is lower in rural areas than in urban areas. This high employment rate is probably due to factors such as higher composition of working-age adults, a higher proportion of employed males, rural-urban migration and, engagement of rural residents in subsistence agriculture. While the fraction of households who never attended school is more in rural areas, the proportion of households with tertiary education is higher in urban areas. A considerable proportion of households are headed by males while women account for the majority of households except in China. Also, while poverty is more prevalent in rural locations, quite a large numbers of rural households reported themselves as being rich in all countries.

Furthermore, as can be seen from the table 4.6, the majority of salaried workers among the RSIs are males in all countries and, the proportion is significantly higher in Egypt and Sierra Leone, 83% and 71% respectively, implying that employment opportunities are predominantly dominated by males. Similarly, male-headed households constitute nearly 60% in China, 68% in

Colombia and Sierra Leone while it is remarkably high in Egypt (89%). The proportion of employees with tertiary education is considerably high in all countries except in China (42%). Also, uneducated employees represent a small fraction among those employed, indicating that education is significant for labor market participation. It is apparent from this table that almost two-thirds of the employees in Colombia and Sierra Leone, 69% and 67% indicate that they have enough money to live well, while the figure is nearly a third 34% and 32% in China and Egypt respectively.

Having presented basic characteristics of the households and the RSIs, I will now move on to reveal the characteristics of those willing to pay/accept job-related benefits. It is to be noted that, WTP questions were directed towards salaried workers among the RSIs, who were not entitled to any employment-related benefits while WTA compensation were asked individuals who had access to the benefits. Thus, I assume that, revealing the characteristics of (one group) i.e. those willing to pay/accept health insurance benefits is analogous as manifesting willingness to pay/accept other job-related benefits.

Tables 4.7 and 4.8 compare the basic characteristics of those individuals willing to pay/accept health insurance benefits. There are a number of similarities between the characteristics of those WTP/WTA job-related benefits in all countries. Since the employment is dominated by males, men constitute the largest portion of this group. A significant portion of the individuals is either married or cohabiting, implying that married/cohabiting individuals are willing to pay considerable fraction of their income to access the benefits or are willing to accept compensation for the loss of the service. Most of the respondents work in the service sector and have attained tertiary education except in China where a considerable number of respondents have an intermediate level education.

One notable distinction between the characteristics of the two groups is that, those willing to pay for the service are rural residents whereas those willing to accept compensation are urban inhabitants, implying that the provision of job-related benefits are mostly provided to urban dwellers. This is true for many developing countries where health insurance is covered and implemented in urban locations.

Table 4.9. Descriptive Statistics of Variables Used in the Logistic Regressions

	China	**Colombia**	**Egypt**	**Sierra Leone**
Variables	Mean (STD)	Mean (STD)	Mean (STD)	Mean (STD)
LFP	0.8478	0.6683	0.4796	0.7577
	(0.359)	(0.470)	(0.499)	(0.428)
GENDER	0.5033	0.5414	0.497	0.531
	(0.500)	(0.498)	(0.500)	(0.499)
AGE	40.29	37.40	34.61	31.04
	(13.94)	(14.64)	(14.58)	(12.87)
ELEMEDU	0.192	0.210	0.119	0.1137
	(0.394)	(0.407)	(0.324)	(0.317)
INTEDU	0.3626	0.1408	0.1435	0.194
	(0.480)	(0.347)	(0.350)	(0.395)
HIGHEDU	0.2269	0.4286	0.4002	0.215
	(0.418)	(0.495)	(0.490)	(0.410)
SLIGHT	0.0507	0.0375	0.0400	0.0408
	(0.219)	(0.190)	(0.196)	(0.197)
DIFF	0.0028	0.0196	0.0455	0.0165
	(0.052)	(0.138)	(0.208)	(0.127)
HHEAD	0.315	0.310	0.330	0.236
	(0.464)	(0.462)	(0.470)	(0.432)
SIZE	0.888	0.881	0.527	0.827
	(0.314)	(0.323)	(0.499)	(0.377)
DEP	0.212	0.262	0.266	0.327
	(0.191)	(0.210)	(0.229)	(0.200)
WEALTH	-0.00315	0.0901	0.0246	0.0294
	(0.974)	(0.978)	(0.987)	(1.030)
ETHNI	0.996	0.981		0.639
	(0.059)	(0.134)		(0.480)
MARRIAGE	0.775	0.2561	0.563	0.527
	(0.417)	(0.436)	(0.496)	(0.499)
WIDOW	0.0176	0.0321	0.0600	0.0291
	(0.131)	(0.176)	(0.237)	(0.168)
DIVORCE	0.0121	0.0143	0.0158	0.00544
	(0.121)	(0.118)	(0.125)	(0.0735)
LOC	0.451	0.4814	0.485	0.505
	(0.497)	(0.499)	(0.499)	(0.500)
Sample size	**2543**	**2108**	**2868**	**3989**

Descriptive statistics of variables used in the logistic regression are provided in table 4.9 (above). China had the highest labour force participation rate 85 % followed by Sierra Leone 76% and Colombia 67%, while Egypt had the lowest 48%. The percentage of females was slightly higher than that of males in all countries except in Egypt. In most countries, there was slightly more women than men in the population. In terms of education, 23% of respondents have completed secondary school or higher in China, 43% in Colombia, 40% and 22% in Egypt and Sierra Leone respectively. About 5% are reported having slightly difficult health in China, 3.75% in Colombia, 4% in Egypt and Sierra Leone respectively.

Furthermore, in China less than 1% reported having chronic and prolonged health problems, while it is 1.96%, 4.55% and 1.65% in Colombia, Egypt and Sierra Leone. Household head represented nearly a third of respondents in China and Colombia (31.5%) and (31%), while approximately a third and nearly a quarter (33%) and (23.6%) in Egypt in Sierra Leone respectively. In China, the majority of respondents were Han Chinese (99.6%) and minorities only made up (0.4%). Similarly, mestizo outnumbered other ethnic groups and was the largest respondent cluster in Colombia (98.1%), while temne accounted around two thirds in Sierra Leone (63.9%). The proportion of urban dwellers (45.1%), (48.14%), and (48.5%) was lower than rural inhabitants (54.9%), (51.86%) and (49.3%) in China, Colombia and Egypt respectively, while the proportion of urban dwellers (50.5%) was slightly higher than rural inhabitants (49.5%) in Sierra Leone.

Chapter 5 Results and Discussion

To analyze the determinants of the Labor Force Participation (LFP), wages and job-related benefits, I employed logistic, OLS and Tobit regression models. This chapter comprises four parts; the first part presents post-estimation issues of the three models followed by an analysis and interpretation of the results in part two. Part three discusses the results of the contingent valuation survey using descriptive analysis while part four briefly discusses possible limitations of the regression results.

5.1 Post-estimation issues

For the logistic regression, several diagnostic tests were conducted to ensure validity and reliability of the results. The chi-square test which is used to indicate the overall statistical significance of the logistic regression model exhibits a p-value of (Prob > chi2 = 0.00000) in all countries, implying that the model fits the data reasonably well and provides a better fit than an empty model with no predictors. Similarly, the Pseudo R2 (McFadden's pseudo R-squared) reported in the tables reveal that my explanatory variables are meaningful in explaining variations in the response variable. Furthermore, visual inspection of Pearson Standardized Residuals against predicted probabilities displayed no particular influential observations in all countries, thus assuming valid and consistent estimates (Appendix 3, part V). Controlling for the presence of multicollinearity, Variance Inflation Factor (VIF) is employed which yielded a value of 8.79, 5.69, 8.63 and 5.64 in China, Colombia, Egypt and Sierra Leone, suggesting that the model does not suffer from multicollinearity (Appendix 3, Part VI).

On the other hand, ordinary Least Squares (OLS) relies on several particular assumptions. An important assumption is "*no perfect collinearity*", which assumes that independent variables are not perfectly correlated. There are several procedures to test for multicollinearity such as correlation matrix and VIF. VIF tests displayed in Appendix 3, part III reveal that multicollinearity is not an issue in our data. Another important assumption is that residuals are normally distributed $\varepsilon \sim N(0, \sigma^2)$. To check the assumption of normality, kernel density and standardized normal probability (P-P) plots were conducted. The graphs reveal that the normality

assumption is satisfied[4]. Similarly, the link test for model specification shows that the model is correctly specified (Appendix 3, part I). Since heteroskedasticity is a common problem in cross-sectional data (Greene, 2008), I estimated robust standard errors to get rid of problems of heteroskedasticity. Heteroskedasticity occurs when variance of the error term, given the independent variables are not constant. Violation of this assumption does not cause bias and inconsistency in the OLS estimators (Wooldrige, 2009). Breusch-Pagan test shows the presence of heteroskedasticity (Appendix 3, part II) and is corrected by estimating robust standard errors.

Finally, The Tobit model particularly relies on two main assumptions: normality and homoscedasticity of the disturbance term. If these assumptions fail, equation (4.10) is not valid and Tobit estimates are inconsistent. In General, the assumption of homoscedasticity can be satisfied by estimating robust standard errors; nevertheless Greene (2008) argues that using robust standard errors in MLE is misdirected effort. Furthermore, satisfying the normality assumption is often difficult. " Research is ongoing both on alternative estimators and on methods for testing for this type of misspecification" (Greene, 2008). However, Wooldridge (2009) argues that "for moderate departures from the assumptions, the Tobit model is likely to provide good estimates of the partial effects on the conditional means". One possible way to evaluate whether the Tobit model is appropriate is to estimate OLS model, which produces roughly similar coefficients. I estimated OLS equation to check if coefficient estimates of the Tobit and OLS are approximately similar. The estimated results of willingness to pay for job-related benefits employing OLS method is shown in the (Appendix 2). Since the coefficients are somewhat similar, and OLS satisfies normality assumptions, the estimates from the Tobit model can be relied on.

5.2 Presentation and interpretation of results

The regression outputs obtained from logistic, OLS and Tobit models are presented and interpreted in sections 5.2.1, 5.2.2 and 5.2.2 respectively. Not all regressions have similar variables. The choices of the explanatory variables depend on factors such as norms established in previous research and whether the variable is thought to affect the regressand.

[4] When sample size is large, normality plays no role in the unbiasedness of OLS

5.2.1 Determinants of LFP: Results from logistic model

This section examines factors affecting labor force participation in Jianyang China; Risaralda, Colombia; Cairo and Fayoum, the Arab Republic of Egypt; and Port Loko and Free Town, Sierra Leone. Labor force participation is defined as the percentage of the number of employed persons, in any category including self-employed, unpaid family work and causal labor in all sectors of the economy in relation to the total working-age population (ILO, 2014). The results of logistic regression in the age group of 15-65 are presented in table 5.1 below. Similarly, the results from the logit regression are shown in table 5.1a (Appendix 1).

Table 5.1 Logistic regression of labor force participation

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
GENDER	0.579***	0.217***	0.067***	0.786**
	(0.08)	(0.02)	(0.01)	(0.08)
AGE	1.442***	1.229***	1.531***	1.392***
	(0.05)	(0.03)	(0.05)	(0.03)
AGESQR	0.995***	0.997***	0.995***	0.996***
	(0.00)	(0.00)	(0.00)	(0.00)
ELEMEDU	0.788	0.962	0.825	0.525***
	(0.18)	(0.16)	(0.14)	(0.08)
INTEDU	0.883	0.802	0.799	0.540***
	(0.20)	(0.16)	(0.15)	(0.07)
HIGHEDU	1.378	1.821***	1.717***	1.194
	(0.36)	(0.32)	(0.25)	(0.18)
SLIGHT	1.252	0.349***	0.294***	0.618
	(0.44)	(0.11)	(0.10)	(0.19)
DIFF	0.106**	0.513*	0.285***	0.396**
	(0.12)	(0.18)	(0.09)	(0.16)
HHEAD	2.293***	1.698***	3.190***	1.974***
	(0.46)	(0.24)	(0.62)	(0.37)
SIZE	1.401*	0.912	0.883	0.894
	(0.28)	(0.17)	(0.10)	(0.12)
DEP	0.602	0.902	1.440	1.223
	(0.22)	(0.25)	(0.46)	(0.37)
KIDS	1.090	1.013	1.311*	1.061
	(0.18)	(0.13)	(0.20)	(0.11)
WEALTH	0.870	0.784***	0.906	0.668***
	(0.08)	(0.05)	(0.08)	(0.04)
ETHNI	2.550	0.900		1.074
	(1.96)	(0.35)		(0.11)
MARRIAGE	1.914***	0.794*	0.322***	1.887***

	(0.48)	(0.11)	(0.07)	(0.24)
WIDOW	1.126	0.842	0.278***	0.879
	(0.52)	(0.25)	(0.10)	(0.29)
DIVORCE	2.064	0.730	0.194***	3.411
	(1.67)	(0.29)	(0.09)	(3.00)
LOC	0.299***	0.864	0.783	0.187***
	(0.05)	(0.10)	(0.13)	(0.03)
Constant	0.005***	0.211***	0.003***	0.036***
	(0.01)	(0.13)	(0.00)	(0.01)
Observations	2,542	2,108	2,868	3,989
Pseudo R-squared	0.238	0.165	0.389	0.343
Prob < chi2	0	0	0	0

Exponentiated coefficients; robust standard errors in parentheses
Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Columns 1 through 4 in Table 1 display estimates of socio-economic determinants of the labor force participation in four selected developing countries: China, Colombia, Egypt and Sierra Leone respectively using a binary logistic model. Consequently, the most significant results are reported in more detail. Furthermore, all estimates from the logistic model are presented as odds ratios[5]. Odds ratios equal to 1 indicate no relationship, values greater than 1 show positive relationships and values below 1 display a negative relationship. By investigating the significance of the exponentiated coefficients, we can immediately establish that variables such as: GENDER, AGE, AGE-SQUARED, MARRIAGE, DIFFICULT HEALTH, and HOUSEHOLD HEAD are statistically significant in determining labor force participation in all countries. As expected, women are less likely than men to participate in the labor force. This is revealed by the negative and the highly significant coefficient of GENDER variable. This coincides with the findings of the World Bank that women in most countries are less likely than men to participate in the labor force (WorldBank, 2012). This result is also consistent with the findings obtained by (Bjørkhaug et al., 2012, Dayıoğlu and Kırdar, 2009, Hatløy et al., 2012, Kebede et al., 2012, Maurer-Fazio et al., 2005, Verick, 2014, Zhang et al., 2012) conducted in developing countries. Similarly, in developed countries e.g., US, Japan, Australia, and Canada, labor force participation of women is lower than their male counterparts, see (WorldBank, 2014).

[5] Odds ratio can be expressed as $p/(1-p)$, where p is the probability of participating in the labor force, which is a function of covariates x.

On the other hand, women's labor force participation rates vary considerably among these countries. The probability of women participating in the labor force decreased by 42% in China and 21% in Sierra Leone while it decreased substantially by 93% and 78% in Egypt and Colombia respectively (table 5.1). Sierra Leone has the highest women labor force participation while Egypt has the lowest (table 51, table 2.1). Age and age squared are statistically significant with expected positive and negative signs. The negative sign of age squared implies that labor force participation increases with age up to a certain point, but then labor force participation diminishes as individuals get older. Hence, the relationship between age and labor force participation is exhibited by an inverted U-shape relationship. Furthermore, both age and age-squared was also found significant in most labor force participation empirical studies.

Elementary and intermediate education does not contribute to the likelihood of the labor force participation in China, Colombia, and Egypt. However, Elementary and Intermediate variables are statistically significant with a negative sign in Sierra Leone, indicating that the odds of participation decreased by almost 48% and 46% respectively, compared to no education. Thus, the basic educational attainment is not a prerequisite for entering the labor market in these countries. Furthermore, tertiary educational attainment (*HIGHEDU*) is statistically significant with expected positive signs in Colombia and Egypt while it is insignificant in China and Sierra Leone despite showing a positive association with labor market participation. The estimates 1.821 and 1.717 indicates that *HIGHEDU* has a positive effect on labor force participation and increases the probability of participating by almost 82% and 72%, in contrast to individuals without education. Higher education is associated with a higher labor force participation rate in Colombia and Egypt, which coincides with previous empirical findings (Bowen and Finegan, 1966, Kuvvet Lordoğlu, 2012). According to World Bank estimates (2014), tertiary education enrolment is higher in Colombia and Egypt than China and Sierra Leone (table 2.2). Globally, higher education and skill acquisition is linked to favorable labor market outcomes for individuals, including higher labor force participation, higher wages, and enhanced job benefits. Also, well-educated individuals are less likely to become unemployed, discouraged or drop out from the labor force.

Labor force participation is also affected by the health condition of individuals. The variable

difficult health (DIFF) is statistically significant at the 5% level in China and Sierra Leone and 1% and 10% level in Egypt and Colombia with a negative sign, which highlights that individuals who have reported having chronic and prolonged health problems are unlikely to be in the workforce. Interestingly, enduring difficult health conditions decreased the odds of the labor force participation massively by 89% in China, and 48%, 72% and 60% in Colombia, Egypt, and Sierra Leone respectively. The negative relationship between chronic health conditions and labor force participation confirms the finding in the literature that prolonged diseases have a negative effect on labor force participation for both males and females (Cai, 2010, Schofield et al., 2014). Similarly, the estimated parameter of living with slightly difficult health for men and women is statistically significant with an expected negative sign in Colombia and Egypt, indicating that even relatively small health problems impede people from participating in the labor market. Surprisingly, the probability of participation decreases enormously by 65% in Colombia, more than it decreased suffering from a difficult health situation. The variable Household head (HHEAD) is statistically highly significant at the 1% level with a positive sign in all countries. Theoretically, the household head as the *"bread winner"* of the family is expected to engage in the labor force compared to other household members. This positive link between household head and participation is in line with the finding of Fadayomi and Olurinola (2014).

Household size (SIZE) is statistically significant at the 10% level in China whereas it is insignificant in other countries. The estimate 1.401 indicates that household size has a positive effect on labor force participation and increases the odds of participation by almost 40%. The wealth possession variable, *WEALTH*, is statistically significant at the 1% level in Colombia and Sierra Leone respectively whereas it is insignificant in China and Egypt. Interestingly, the odds of participating in the workforce decreased by 22% and 33% in Colombia and Sierra Leone respectively, indicating that wealthier individuals of these countries are less likely to be in the labor force partly due to their preference for leisure. Ethnicity which captures a hierarchy of differentiated cultures, ancestry, belief, language and culture of a society may affect access to labor force participation in some societies, nonetheless, the insignificance of the variable in China, Colombia and Sierra Leone indicates that ethnicity does not affect workforce participation and in Egypt no data is collected. This stands in contrast to the developed world

where minorities have lower labor participation rate than majorities.

Marital status is classified into six categories; 1 for singles, 2 for married and 3, 4, 5 and 6 for a cohabitant, widowed, divorced and separated respectively. However, I investigate the odds of the labor force participation of married, widowed and divorced compared to cohabitant/separated/singles. The estimated parameter of marriage for men and women was statistically significant in all the countries but with different signs. In China and Sierra Leone, being married is statistically significant with a positive coefficient indicating that married individuals are more likely to engage in the labor force than their counterparts. The probability of participation increased considerably by 91% and 88% respectively. On the contrary, being married is highly significant in Egypt ($p < 0.001$) with a negative sign, implying that the marriage conversely relates to the labor force participation. Likewise, the odds of the labor force participation decreased by almost 20% in Colombia. Studies have shown that married women have lower labor force participation than un-married women due to child-rearing responsibilities (Posada and Arango, 2007, Robinson, 2005) in Colombia and Egypt respectively. Conversely, studies have revealed higher labor force participation of men (Eissa and Hoynes, 2004). In Egypt, Robinson (2005) found that the impact of marriage on women's labor force participation was negative. Religious and cultural factors may impede women in Egypt to actively participate in the labor force and once they are married, the odds of labor market participation decreases. Finally, the variable location is statistically significant at the 1% level with a negative sign in China and Sierra Leone while it is insignificant in Colombia and Egypt. Rural dwellers are more likely to be in the labor force than urban dwellers. The estimates 0.299 and 0.187 indicate that the odds of participating decreased by 70% and 81% for urban dwellers, in contrast to rural inhabitants.

5.2.2 Determinants of wages: Results from OLS

The estimated equation employed in this section follow the standard earnings function developed by Mincer Mincer (1974) where the log wage rate is regressed into a set of explanatory variables capturing personal characteristics of wage earners, but also type of job and industry they belong to. While several functional form specifications of the regressand variable have been reported in

the literature, the logarithm form which measures growth of the dependent variable is considered to be the most appropriate model, "both in terms of satisfying heteroskedasticity assumption and maximizing explanatory power of the regression", (Dougherty and Jimenez, 1991) as cited in (Bhattarai and Wisniewski, 2000). Furthermore, to compare and contrast the coefficients of the explanatory variables and explain differences among countries, purchasing power parity (PPP) conversion factor is used, which converts local currencies into international dollars. Table 5.2 presents determinants of wages in China, Colombia, Egypt and Sierra Leone respectively using OLS method.

Table 5.2. ***Multiple regression of determinants of wages (log wages)***

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
GENDER	-0.165*	-0.344***	-0.345***	-0.201
	(0.08)	(0.12)	(0.10)	(0.18)
AGE	0.070*	0.050	-0.003	0.065
	(0.04)	(0.03)	(0.03)	(0.07)
AGESQR	-0.001**	-0.001	0.000	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)
HIGHEDU	0.111	0.289*	0.386***	0.364*
	(0.11)	(0.15)	(0.11)	(0.19)
WEALTH	0.171***	0.162**	0.244***	0.438***
	(0.06)	(0.06)	(0.07)	(0.09)
MARRIED	-0.108	0.208	0.120	-0.074
	(0.17)	(0.16)	(0.14)	(0.19)
WID	-0.605	0.231	0.423*	0.443
	(0.61)	(0.16)	(0.26)	(0.78)
MANUF	0.113	0.198	0.264**	0.300
	(0.15)	(0.13)	(0.12)	(0.30)
CONST	0.087	-0.290	0.158	0.202
	(0.11)	(0.36)	(0.11)	(0.20)
EDUC	0.316***	0.120	-0.050	-0.067
	(0.10)	(0.20)	(0.11)	(0.21)
PUBDEF	-0.204	-0.316	0.144	-0.011
	(0.21)	(0.38)	(0.14)	(0.22)
LOC	-0.355***	0.195*	-0.086	-0.393
	(0.12)	(0.11)	(0.12)	(0.47)
Constant	5.191***	4.842***	5.227***	3.827***
	(0.69)	(0.61)	(0.58)	(1.27)
Observations	206	127	243	88
R-squared	0.263	0.328	0.303	0.394

Prob > F	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As the table above displays, the GENDER variable is significant with the expected negative sign in all countries except in Sierra Leone where the coefficient is statistically insignificant. The coefficients -0.165, -0.344, -0.345 means that holding all other variables fixed, men earned on average more than women almost by 17%, 34% and 35% in China, Colombia and Egypt respectively. This result confirms the findings of previous research on gender wage differentials conducted in these countries see e.g. (Hoyos et al., 2010, Wang and Cai, 2008, Biltagy, 2014).

Age is presumed to influence wages positively since experience and skill acquisition is acquired over time. A number of studies have found that hourly wages of older individuals increase slightly with age (Casanova, 2012, Van Ours and Stoeldraijer, 2010). Thus, older working individuals are expected to earn higher wages than young teenagers entering to the labor market. By investigating the significance of the coefficients it is apparent that age affects wages only in China, while the coefficient is statistically insignificant in other countries.

Human capital is represented by the variable (HIGHEDU) which is the highest formal education acquired by the respondent. The coefficient of this variable can be interpreted as $\Delta(\log Wi)/\Delta(HIGHEDU) \approx \%\Delta Wi/\%\Delta HIGHEDU$. Moreover, the correlation between education and wages is biased by the presence of unobserved individual ability, which if not controlled exaggerate real returns from education. In order to resolve this problem, the literature proposes the use of instrumental variable (IV) procedure by including IQ scores in wage equations see e.g., (Card, 2001). Unfortunately, the current data does not include IQ or any variable that could be used as an IV variable; thus more likely to overstate the impact of education on schooling. According to the results in Table 5.2, the variable HIGHEDU positively and significantly affects wages in Colombia, Egypt and Sierra Leone whereas it is insignificant in China. The estimates 0.289, 0.386 and 0.364 indicate that each additional year of schooling is predicted to increase wages by almost 29%, 37% and 36% in Colombia, Egypt and Sierra Leone. Wealth positively and significantly affects wages in all countries, implying that wealthier individuals earn higher wages than others. While the impact of wealth varies greatly across countries, the impact is highest in

Sierra Leone followed by Egypt, Colombia, and China respectively. While the results indicate that Chinese rural residents had more wages than their urban counterparts, the impact is opposite in Colombia. The variable LOC was insignificant in Egypt and Sierra Leone. Finally, included in the regression are a set of dummy variables capturing type of the industry an individual belongs to. Only manufacturing and education sector variables seem to be statistically significant in Egypt and China respectively.

5.2.3 Determinants of job-related benefits: Results from Tobit model

A large number of empirical studies have examined determinants of people's willingness to pay for job-related benefits particularly health insurance. (Asfaw et al. (2008), Barnighausen et al., 2007, Dror et al., 2007, Jain et al., 2014, Onwujekwe et al., 2010). The findings of these studies suggest that socio-economic demographic characteristics such as age, gender, education, household size, employment in the formal sector and, income to be important factors that affect people's WTP. The maximum amount an individual will spend on job-related benefits will depend primarily on his income because holding other factors constant, higher income leads to higher demand for normal goods. It will also depend on the age of the individuals. Education might affect WTP because educated individuals understand the importance of job benefits particularly healthcare, pension after retirement and may be more willing to pay for it. On the other hand, households with more kids or dependents may have greater consumption requirements, leaving less money for job-related benefits; their WTP may be lower. I, therefore, include children under age 5 and household size as explanatory variables as well. I also include marital status and location as dummy variables to see whether they have an impact on WTP.

i) Determinants of willingness to pay for health insurance

Table 5.3. Tobit estimates of marginal coefficients WTP for health insurance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.033***	0.010***	0.009	0.000***
	(0.01)	(0.00)	(0.05)	(0.00)
GENDER	-0.405	-9.561	-47.657	-63.977*
	(17.46)	(19.38)	(32.96)	(33.58)
AGE	-0.710	-0.499	-0.740	-1.833

	(0.97)	(0.97)	(2.83)	(1.19)
ELEMEDU	-253.267***	79.513**	47.685	-41.974***
	(86.38)	(36.00)	(44.79)	(13.65)
HIGHEDU	-178.098***	36.024	46.138	43.138
	(33.30)	(27.84)	(32.17)	(36.55)
SIZE	24.725	84.513***	-26.657	-29.061
	(26.29)	(28.31)	(29.28)	(35.70)
KIDS	-20.120	22.823	-49.716	-10.947
	(22.66)	(35.41)	(69.02)	(25.88)
MARRIED	6.900	46.826*	39.825	-14.882
	(26.32)	(23.89)	(99.61)	(31.03)
LOC	12.100	43.161**	-21.195	41.046*
	(18.11)	(19.03)	(40.51)	(23.49)
Observations	59	42	57	42
Pseudo R-squared	0.0524	0.0978	0.0063	0.0273
Prob > F	0.0065	0.0123	0.9123	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.3 presents the estimation results of the Tobit model of maximum willingness to pay for health insurance in China, Colombia, Egypt and Sierra Leone. Tobit reveals the coefficients of the latent regression model; nevertheless in this study the marginal effect of the actual variable is presented. As seen in the table above, the estimates of the INCOME variable has the expected positive sign and is statistically significant at the 1% level in China, Colombia and Sierra Leone respectively while it is insignificant in Egypt. This result is consistent with the demand theory, which convincingly argues that there is a positive relationship between income and the demand for normal goods and an inverse relationship between income and the demand for inferior goods. The findings also further support the evidence in previous research that income is an important determinant of willingness to pay (Babatunde et al. (2012), Asfaw et al., 2008, Barnighausen et al., 2007, Dror et al., 2007) among many others. Contingent valuation results also reveal that on average, households in China, Colombia, Egypt and Sierra Leone were willing to pay a significant portion of their monthly income on health insurance (4%, 7%, 13% and 10 respectively, table 5.9). Holding all other variables fixed, as the income of the household increases by 1% maximum willingness to pay for health insurance increases by 0.033 RMB, 0.010 peso and 0.000 leone in China, Colombia and Sierra Leone respectively.

The regression estimates reveal no gender gap in willingness to pay for health insurance, except in Sierra Leone where the coefficient is significant with a negative sign, indicating that women have lower WTP for health insurance than men. Intermediate education is statistically significant at the 1% level in China and Sierra Leone and 5% level in Colombia with negative and positive signs respectively while it is insignificant in Egypt. In Colombia, education plays a statistically significant role in determining willingness to pay of the RSI respondents for the health insurance. The estimate 79.51 indicates that an additional year of education is predicted to increase demand for health insurance by almost 79 peso in Colombia. The coefficient for the household size (SIZE) is statistically insignificant in China, Egypt, and Sierra Leone and is statistically significant and positive in sign in Colombia, indicating that households with (5 and above) members increase their WTP for health insurance in contrast to households with fewer members (1-2). This result contradicts with my earlier hypothesis that extended households have greater consumption needs, leaving less money for health insurance benefits. Nevertheless, the positive effect of SIZE on WTP for health insurance in Colombia may imply that some households that have higher health expenditures are willing to pay to buffer themselves and their extended families against unforeseen health expenditures. Finally, the location variable is significant with a positive signs in Colombia and Sierra Leone respectively, suggesting that urban dwellers have higher WTP for health insurance than rural dwellers.

ii) Determinants of pension benefits

Table 5.4. Tobit estimates of marginal coefficients WTP for pension benefits

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.053**	0.009**	0.082**	-0.001**
	(0.02)	(0.00)	(0.03)	(0.00)
GENDER	-23.095	-12.969	25.858	
	(24.98)	(17.04)	(19.34)	
AGE	2.701	0.285	3.469	
	(1.65)	(0.76)	(2.29)	
ELEMEDU	-61.050	76.947**	91.000	
	(115.40)	(34.93)	(59.53)	
HIGHEDU	-39.358	43.325	40.723	86.324*
	(106.88)	(27.62)	(31.44)	(43.08)
SIZE	-82.642**	78.690***	-23.568	-108.726*

	(38.51)	(28.12)	(22.05)	(58.84)
MARRIED	55.306	39.801*	-21.441	
	(41.93)	(22.85)	(15.39)	
LOC	9.991	34.627**	-26.635	
	(21.04)	(15.43)	(16.24)	
Observations	54	43	64	25
Pseudo R-squared	0.0960	0.0760	0.0173	0.0140
Prob > F	0.0318	0.0193	0.4519	0.0431

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

According to table 5.4, INCOME is statistically significant at the 5% level in China, Colombia and Egypt with positive signs, suggesting that 1% increase in income leads to 0.053 RMB, 0.009 peso, and 0.082 pound increase in willingness to pay for pension benefits. Marginal willingness to pay is higher in Egypt than Colombia and China, which correspond to the results of contingent valuation (table 5.9). These findings are similar to the results obtained by Huberman et al. (2007) in Colombia. Nevertheless, income is significant at the 5% level and negatively related to WTP for pension in Sierra Leone. Intermediate education is significant at the 5% level with a positive sign in Colombia, implying that education significantly and positively affects WTP for pensions. This variable is insignificant in the three other countries. Tertiary education positively and significantly affects WTP for pension in Sierra Leone. Household size is significant at 5% and 10% level in China and Sierra Leone with a negative sign indicating that as the size of the household increases, willingness to pay decreases due to financial and consumption needs of the household. Conversely, the variable positively and significantly affects WTP for pension benefits in Colombia. Finally, the location variable (LOC) is significant at the 5% level in Colombia with a positive sign, indicating urban dwellers have higher WTP for pension benefits than their rural counterparts.

iii) Determinants of sick leave allowance

The purpose of sick leave allowance is to protect employees and their families from unforeseen financial burdens caused by illness. Several factors can affect WTP for sick leave allowance. As seen in Table 5.5, INCOME is statistically insignificant in affecting willingness to pay for sick leave allowance in all the countries. This shows the relative importance individuals attach to

health insurance and pension benefits than other job-related benefits. Nevertheless, the contingent valuation results of these countries indicate that respondents are willing to pay some portion of their monthly income on accessing sick leave benefits when they become ill (table 5.9). According to Table 5.5, the variable household size (SIZE) is significant in Colombia and Sierra Leone whereas it is insignificant in China and Egypt. Contrary to my hypothesis, the significance of the variable SIZE indicates that WTP for sick leave allowance increases with household size. Nevertheless, some individuals who are responsible to provide living expenses for their extended families might be willing to pay for sick leave allowance in order to protect themselves and their families from difficulties when they become ill. Location is significant at the 1% and 10% level in Colombia and Egypt with positive and negative signs respectively, indicating that urban dwellers have higher WTP for sick leave allowance than rural inhabitants in Colombia due to their knowledge and awareness of benefit and the opposite is true for Egypt.

Table 5.5. Tobit estimates of marginal coefficients of WTP for sick leave allowance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.012	0.039	0.016	0.000
	(0.03)	(0.06)	(0.03)	(0.00)
AGE	6.589**	-2.176**	0.724	-0.613
	(3.01)	(1.01)	(1.06)	(0.85)
HIGHEDU	34.428	-42.038	11.823	41.258**
	(54.10)	(25.56)	(20.94)	(15.64)
SIZE	-17.577	146.721***	-7.003	89.664**
	(45.58)	(41.50)	(23.93)	(35.92)
MARRIAGE	-215.882	20.532	-28.167	-14.620
	(138.29)	(25.27)	(17.25)	(16.50)
LOC	19.342	131.240***	-41.230*	-14.447
	(43.92)	(28.50)	(23.68)	(23.86)
Observations	26	33	24	18
Pseudo R-squared	0.0135	0.1304	0.0353	0.0902
Prob > F	0.0803	0.0027	0.4514	0.1142

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

iv) determinants of permanent contract

Given the significance of employment for economic growth, social development, and poverty reduction, having a permanent contract (i.e. job security) is an important contributor to job satisfaction. It protects employees and their families from financial losses during recessions caused by unemployment, in addition to increasing mental well-being and career stability. Employees attach a high value to having a permanent contract and when asked their willingness to pay, salaried workers in China, Colombia, Egypt and Sierra Leone would forgo 3%, 10%, 20% and 17% of their monthly income respectively to access the benefit, (Table 5.9).

Table 5.6. Tobit estimates of marginal coefficients of WTP for permanent contract

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.116***	-0.004	0.159**	0.000
	(0.03)	(0.01)	(0.07)	(0.00)
GENDER	-0.839	-13.007	-56.220	-81.901**
	(36.97)	(29.49)	(39.28)	(32.02)
AGE	7.181***	0.705	3.086	-1.731
	(2.05)	(0.73)	(3.13)	(2.05)
ELEMEDU	33.245	98.182**	72.601	-27.607
	(60.45)	(44.19)	(60.15)	(61.63)
HIGHEDU	42.806	63.798**	40.810	38.994
	(61.86)	(29.07)	(44.04)	(49.42)
SIZE	88.742**	-7.166	-66.018**	-103.254***
	(43.56)	(27.82)	(30.98)	(32.21)
MARRIED	-18.527	1.676	38.153	26.542
	(44.78)	(27.02)	(48.34)	(25.46)
LOC	-9.909	61.765**	-25.505	-46.403
	(30.08)	(27.66)	(33.49)	(37.74)
Observations	40	59	67	31
Pseudo R-squared	0.0389	0.0307	0.0205	0.0299
Prob > F	0.0007	0.0767	0.1605	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.6 reveals the estimation results of the Tobit model of maximum willingness to pay for a permanent contract. INCOME significantly and positively affects WTP for a permanent contract in China and Egypt and is significant at the 1% and 5% level with positive signs respectively**.** This finding further supports my earlier hypothesis that given the importance of having permanent work contract; individuals sacrifice a significant portion of their income to get the

benefit. Variables that reflect education (ELEMEDU and HIGHEDU) are statistically significant at the 5% level in Colombia while they are insignificant in other countries. Holding other things constant, additional year of schooling increases willingness to pay for a permanent contract by 98 and 63 Colombian peso. I expect household size to influence WTP for a permanent contract significantly and positively in all countries given the importance of job security. Household size positively and significantly affects willingness to pay for a permanent contract in China whereas it affects negatively in Colombia and Sierra Leone. The positive effect of SIZE on willingness to pay could reflect the need for individuals with extended families to secure a permanent contract to buffer against unemployment during financial crises. Finally, LOC is positive and significant in Colombia whereas it is insignificant in other countries. The higher WTP of rural residents in Colombia could imply that since the unemployment is higher in urban areas, urban residents are willing to pay for the benefit in order to secure permanent contract.

v) Determinants of housing allowance

Table 5.7. Tobit estimates of marginal coefficients of WTP for housing allowance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	-0.004	-0.018	-0.012	-0.000*
	(0.02)	(0.02)	(0.02)	(0.00)
GENDER	51.303	-46.237*	25.265	-48.629*
	(30.58)	(23.39)	(21.75)	(26.41)
AGE	1.464	1.093	0.226	-1.277
	(1.88)	(1.31)	(1.08)	(0.95)
ELEMDU	-138.945**	90.620**	-24.916	-37.975
	(52.12)	(41.07)	(17.15)	(24.20)
HIGHEDU	-98.475*	94.205***	31.376**	21.196
	(55.04)	(35.57)	(14.23)	(33.92)
SIZE	-34.561	65.403**	20.529	-26.459
	(25.47)	(30.27)	(17.20)	(23.07)
MARRIED	-8.644	19.249	-7.222	16.214
	(44.46)	(33.96)	(26.22)	(14.28)
LOC	22.927	56.802**	-16.918	19.783
	(24.42)	(24.38)	(23.57)	(21.05)
Observations	50	78	48	49
Pseudo R-squared	0.0161	0.0262	0.0143	0.0156
Prob > F	0.0411	0.0275	0.0125	0.0939

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As table 5.7 reveals, GENDER variable negatively and significantly affects willingness to pay for housing allowance in Colombia and Sierra Leone while it is insignificant in China and Egypt, indicating that women have lower willingness to pay than men. The variables that reflect education (ELEMEDU and HIGHEDU) negatively affects willingness to pay for housing allowance in China whereas it affects positively in Colombia. Tertiary education also positively and significantly affects willingness to pay for housing allowance in Egypt. The impact of SIZE on willingness to pay for housing allowance is positive and significant in Egypt ($p<0.05$) while it is insignificant in other countries. Generally, the demand for housing is higher for extended families compared to nuclear families and, therefore, the result is incontestable. Finally, the location variable (LOC) is significant at the 5% level in Colombia, indicating that willingness to pay for housing allowance is higher in urban areas than in rural areas.

vi) Determinants of transportation allowance

Table 5.8. Tobit estimates of marginal coefficients of WTP for transportation allowance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.016	0.000	0.051	0.000***
	(0.01)	(0.01)	(0.10)	(0.00)
GENDER	-15.528	-18.756	-122.554	21.702
	(16.52)	(36.29)	(94.35)	(62.62)
AGE	1.201	1.354	4.914	-0.762
	(1.21)	(1.39)	(4.37)	(1.17)
ELEMEDU	5.932	74.450	-39.079	-33.076
	(117.09)	(59.85)	(53.12)	(30.47)
HIGHEDU	55.649	75.156	-57.265	-92.283***
	(123.94)	(56.84)	(95.80)	(31.91)
SIZE	-14.439	51.299*	6.761	29.620
	(31.51)	(29.78)	(26.54)	(20.42)
MARRIED	24.084	-16.833	-164.844	75.355
	(18.05)	(38.01)	(130.63)	(46.52)
LOC	-41.313	89.496*	-34.723	-11.522
	(31.85)	(48.05)	(38.58)	(43.46)
Observations	55	51	51	33
Pseudo R-squared	0.0218	0.0507	0.0186	0.4258

Prob > F	0.1832	0.3671	0.6888	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen in table 5.8, INCOME positively and significantly affects WTP for transportation allowance in Sierra Leone whereas it is insignificant in other countries. The variable that reflects SIZE is significant at the 10% level Colombia, suggesting that household size positively affects WTP for transportation allowance. Finally, location is significant at the 10% level in Colombia with a positive sign, indicating that urban dwellers have higher WTP for transportation allowance than rural dwellers. Since no previous empirical studies have analyzed willingness to pay for transportation allowance, the findings of this result cannot be supported by previous research.

5.3 Mean willingness to pay/accept for job-related benefits

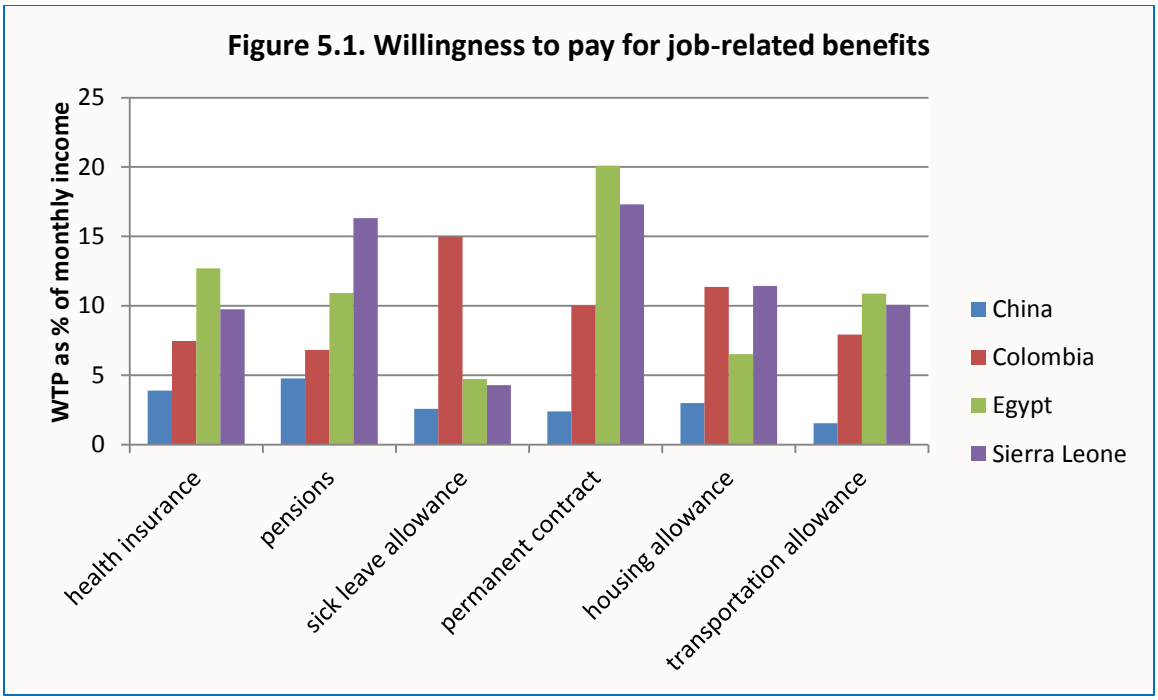
Table 5.9. Comparison of mean WTP/WTA for social security programs and other job-related benefits

Variables (WTP/WTA)	*China*	*Colombia*	*Egypt*	*Sierra Leone*
MWTP for health insurance	62	48143.86	82.94	64756.1
	(3.90)	(7.47)	(12.71)	(9.74)
MWTP for pensions	80.69	44651	77.73	126458.3
	(4.77)	(6.83)	(10.93)	(16.31)
MWTP for sick leave allowance	43.10	65272.73	40.125	40277.78
	(2.58)	(14.99)	(4.72)	(4.28)
MWTP for permanent contract	42.20	68271.19	131.62	100892.9
	(2.39)	(10.02)	(20.11)	(17.30)
MWTP for housing allowance	50	87179.49	61.81	65851.06
	(3.00)	(11.37)	(6.52)	(11.43)
MWTP for transportation allowance	24.53	52745.1	50.22	40062.5
	(1.53)	(7.92)	(10.87)	(10.08)
MWTA for health insurance	286.70	167463.4	1222	817586.2
	(14.25)	(19.05)	(130.91)	(137.74)
MWTA for pensions	713.9	148666.7	1316.66	799000

	(34.83)	(17.24)	(136.21)	(140.45)
MWTA for sick leave allowance	189.62	184615.4	738.65	390217.4
	(9.60)	(18.00)	(52.19)	(79.94)
MWTA for permanent contract	594	591206.8	1556.25	666666.7
	(36.00)	(62.93)	(151.00)	(139.64)
MWTA for housing allowance	402.5	353000	-	414166.7
	(17.70)	(51.23)	.	(63.37)
MWTA for transportation allowance	360.38	221710.5	-	690973
	(14.87)	(25.68)	-	(82.26)

Source: author's own calculation. Note: WTP/WTA are expressed in local currencies; Chinese Renminbi, Colombian Peso, Egyptian pound and Sierra Leonean Leone. WTP/WTA as percent of monthly income in parenthesis.

As seen in Table 5.9, willingness to pay for health insurance benefits goes from 4% and 7% of monthly wages in China and Colombia to 13% and 10% in Egypt and Sierra Leone. Conversely, the computed mean willingness to accept for health insurance is 287, 167463, 1222 and 817586 respectively. These amounts translate to 14%, 19%, 131% and 138% of the average monthly income of the RSI respondents. Furthermore, willingness to pay for pension benefits is valued at 5% and 7% of monthly wages in China and Colombia whereas it is 11% and 17% in Egypt and Sierra Leone. On the other hand, lower WTP values are given for transportation allowances (2, 7, 11 and 10 percent respectively), but having a permanent contract is valued even more particularly in Egypt and Sierra Leone (2, 10, 20, and 17 percent respectively). The striking result to appear from the table is that willingness to accept greatly exceeds willingness to pay for all job-related benefits. This finding contrasts with that of Willig (1976) who argue that WTP and WTA values are identical, but is consistent with the empirical research found by (Hanemann (1991), Horowitz and McConnell, 2002, Kahneman et al., 1990). The difference between WTP and WTA can be explained by psychological loss aversion (Haab and McConnell, 2002). It can also be explained because WTP is restricted by income while WTA is not.



5.4 Limitations

While interpreting the econometric results of this study, a number of important issues need to be acknowledged. Some important governmental factors, other explanatory variables as well as various unobservable factors that could explain labor force participation of individuals were missing from the data. Labor market policies including employment legislation and minimum wage regulations, as well as performance of a country's economy and presence of school-aged children are among the most important factors that could have changed the results. On the other hand, labor force participation of individuals may vary across time depending on person's characteristics, work-leisure preferences, family background, proceeding higher education. Hence, evaluating labor force participation using cross-sectional data may not explain labor force participation behavior of individuals.

The estimated OLS equation suffers from endogeneity bias. In wage equations, the endogeneity of education is due to the presence of unobserved individual ability that correlates with both wages and education. Endogeneity problem can be solved using instrumental variable approach, however, due to lack of appropriate instruments that can satisfy assumptions of instrument

validity (relevance and exogeneity); the problem of endogeneity was not resolved. Thus, the effect of education on wages is overestimated. Due to omitted variable bias caused by unforeseen individual-specific characteristics, my study suffers from *unobserved heterogeneity bias*.

There were very few observations of Tobit estimates of maximum willingness to pay for social security programs and other job-related benefits. Some regressions revealed very high p-values making the overall significance of some of the models very unreliable. Also, lack of previous empirical evidence on estimating willingness to pay for sick leave allowance, permanent contract, and housing and transportation allowances may have restricted my discussion of the findings.

Violation of Tobit maximum likelihood assumptions of normality and homoscedasticity may cause inconsistency in estimated parameters.

While these limitations could affect the reliability of the regression results, however, they do not invalidate the results of this study. A comprehensive study analyzing determinants of the labor force participation, wages, and economic valuation of social security programs in developing countries with many observations and competent researchers is recommended.

Chapter 6 Conclusions and recommendations

Employment is essential for poverty reduction and economic growth and governments/development institutions throughout the world have long been focusing on increasing labor force participation, employment and other income generating activities. The sharp rise in global unemployment which negatively affected the economies of both developed and developing countries and subsequent loss of social security programs, jobs have become a central issue in light of the global financial crises of 2008. In order to develop employment-friendly labor market policies in developing countries, understanding what determines labor force participation, wages and economic valuation of social security programs are important from a policy perspective in addressing labor market challenges. The aim of this study was to analyze and compare determinants of the labor force participation, wages, and job-related benefits in four developing countries: China, Colombia, Egypt and Sierra Leone.

While some variables turned out to be statistically significant with expected sign in all countries, the sign and impact of some variables differed between countries. The investigation of determinants of the labor force participation has shown that variables such as GENDER, AGE, AGE-SQUARED, MARRIAGE, DIFFICULT HEALTH, and HOUSEHOLD HEAD to be significant factors affecting labor force participation of all countries. Both the descriptive statistics as well as the regression results revealed that women are less likely than men to be in the labor force in all the countries. This result further supports the findings of previous empirical research that women in both developed and developing countries have lower labor force participation than men. Women's labor force participation rates varied considerably among these countries. Sierra Leone had the highest women labor force participation while Egypt had the lowest (table 5.2 & 2.1).

The results indicated that the impact of age on the probability of the labor force participation for men and women was positive and significant in all the countries. Moreover, age-squared which was included to test life the cycle hypothesis was found negatively related to the labor force participation. The estimated parameter of tertiary education positively and significantly affected labor force participation in Colombia and Egypt whereas it was insignificant in China and Sierra Leone. Globally, higher level of education is linked to higher levels of participation indicating

that well-educated individuals are less likely to become unemployed, discouraged or drop out from the labor force. As expected, poor health precludes labor force participation in all the countries. The study unsurprisingly reiterated that heads of household have much higher participation in all the countries. On the other hand, marriage only increased labor force participation in China and Sierra Leone, whereas it actually decreased in Egypt and Colombia. This is likely due to the impact of women leaving workforce after marriage. Disaggregated gender data would likely show that men's participation increased with marriage whereas women's decreased. Lastly, location plays a factor in labor force participation where urban areas had less participation due to urban unemployment in China and Sierra Leone.

The estimated OLS regression has shown that gender, wealth and higher educational attainment were main determinants of wages. The gender gap found in the developed world is also present in China. Colombia and Egypt have even wider gender wage differential reaching 34% and 35% respectively. Wealth was also found to be positively related with wages possibly because individuals with higher status are able to garner higher wages. Higher education also contributed to higher wages in all the countries except for China.

The estimated results from the Tobit model illustrated that: income, size, location, gender and education played a role in determining willingness to pay for social benefits and other job-related benefits. Individuals with higher incomes were more willing to pay for health insurance, pensions and for securing a permanent contract. These benefits have a higher impact on higher wage earners and their families, as they have most to lose. The household size had different impacts on willingness to pay for social security programs and other job-related benefits among the four countries. When household size is positively related to willingness to pay, individuals place a higher preference on protecting their family in case of sickness, retirement, job loss etc. Whereas in countries with negatively related to willingness to pay, families may not have enough disposable income to prioritize the luxury of insurance and pensions. Willingness to pay for such benefits was almost universally higher for urban residents possibly due to their better awareness of such benefits. Men were also found to have slightly greater willingness to pay for social benefits. Finally, the impact of education on willingness to pay differed among countries and the

types of benefits. Unfortunately, these variances were so great that no clear pattern could be shown.

The mean willingness to pay for job-related benefits increased with level of poverty in the four countries examined. China consistently showed a much lower mean willingness to pay between 2-5% of monthly income while Sierra Leone and Egypt had means between 4-20% of their monthly income. Same result is illustrated when comparing the mean willingness to accept of job-related benefits among the countries where Sierra and Egypt would demand roughly double of their income.

Labor force participation is extremely important in developing countries in order to lift the GDP per capita. The study has shown that some countries can do much more in encouraging and facilitating the right conditions for women to join the labor force. Education is the key to both employment potential and a higher wage therefore governments should promote schooling for all. China and Colombia have demonstrated that the investment in education pays great dividends as their labor market participation is higher than Egypt and Sierra Leone. Governments can also play a role in implementing labor and business friendly legislation which serves to increase employment and subsequent wage increases and other job-related benefits.

Finally, a further area of research can be to examine the impact of government policies and programs on labor force participation. By using a richer data set than used in our study, examining the willingness to pay of social security benefits can shed more light in assessing the importance of job benefits both in labor market participation as well as identifying the conditions for creating a productive society and increase economic welfare.

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Appendix 1- Socio-economic characteristics of households and RSIs

Table 4.2. Socio-economic characteristics of households, China

		Urban (%)	Rural (%)	Total (%)
Age	15-34	191	56	274
	35-49	804	782	1586
	50+	567	1125	1692
Gender	Male	787	1033	1820
	Female	775	930	1705
Sex of Household Head	Male	1232	1849	3081
	Female	330	114	444
Marital Status	Single	250	278	528
	Married	1028	1258	2286
	Cohabitant	3	3	6
	Widow	53	105	158
	Divorced	24	19	43
	Separated	2	1	3
Education	No School	184	777	961
	Primary or Junior Secondary	870	1074	1944
	Senior Secondary or higher	507	108	615
Household Size	1-2	236	194	430
	3-5	1110	1186	2296
	More than 5	216	583	799
Employment Status	Employed	938	1447	2385
	Unemployed	18	16	34
	Discouraged	16	20	36
	Out of labour force	388	181	569
Socio-economic status	We live well	470	317	787
	Neither rich nor poor	900	1008	1908
	We are poor	192	638	830
Wealth Index	Poor	524	654	1178
	Middle	550	664	1214
	Rich	488	644	1132

Table 4.3. Socio-economic characteristics of households, Colombia

		Urban (%)	Rural (%)	Total (%)
Age	15-34	25	325	583
	35-49	494	562	1056
	50+	947	1014	1961
Gender	Male	793	926	1719

	Female	905	974	1879
Sex of Household Head	Male	1035	1304	2339
	Female	664	597	1261
Marital Status	Single	577	515	1092
	Married	357	392	749
	Cohabitant	255	331	586
	Widow	102	94	196
	Divorced	23	15	38
	Separated	74	74	148
Education	No School	384	900	1284
	Primary or Junior Secondary	666	564	1230
	Senior Secondary or higher	622	402	1024
Household Size	1-2	192	232	424
	3-4	758	758	1516
	More than 5	749	911	1660
Employment Status	Employed	606	797	1403
	Unemployed	146	85	231
	Discouraged	57	54	111
	Out of labor force	500	425	925
Socio-economic status	We live well	1147	1101	2248
	Neither rich nor poor	387	653	1040
	We are poor	138	121	259
Wealth Index	Poor	534	598	1132
	Middle	534	599	1133
	Rich	531	599	1130

Table 4.4. Socio-economic characteristics of households, Egypt

		Urban (%)	Rural (%)	Total (%)
Age	15-34	224	551	775
	35-49	710	1009	1719
	50+	1083	844	1927
Gender	Male	981	1221	2202
	Female	1036	1183	2219
Sex of Household Head	Male	1670	2123	3793
	Female	347	281	628
Marital Status	Single	560	543	1103
	Married	803	924	1727
	Cohabitant	2	0	2
	Widow	152	97	249
	Divorced	31	17	48

	Separated	10	5	15
Education	No School	681	1352	2033
	Primary or Junior Secondary	461	269	730
	Senior Secondary or higher	873	761	1634
Household Size	1-4	1032	824	1856
	5-7	924	1353	2277
	More than 8	61	227	288
Employment Status	Employed	596	731	1327
	Unemployed	65	30	95
	Discouraged	40	31	71
	Out of labor force	854	794	1648
Socio-economic status	We live well	535	744	1279
	Neither rich nor poor	1091	1232	2323
	We are poor	382	428	810
Wealth Index	Poor	662	797	1459
	Middle	664	794	1458
	Rich	662	798	1460

Table 4. 5. Socio-economic characteristics of households, Sierra Leone

		Urban (%)	Rural (%)	Total (%)
Age	15-34	485	678	1,163
	35-49	1,188	1,346	2,534
	50+	1442	1512	2954
Gender	Male	1,498	1,715	3,213
	Female	1,617	1,821	3,438
Sex of Household Head	Male	2,314	3,215	5,529
	Female	801	321	1,122
Marital Status	Single	1,161	619	1,780
	Married	877	1,417	2,294
	Cohabitant	52	13	65
	Widow	83	100	183
	Divorced	10	14	24
	Separated	30	31	61
Education	No School	962	2,858	3,820
	Primary or Junior Secondary	614	411	1,025
	Senior Secondary or higher	1,514	227	1,741
Household Size	1-4	650	368	1018
	5-7	1,210	1,556	2,766
	More than 8	1,255	1,612	2,867
Employment Status	Employed	1,076	1,947	3,023

	Unemployed	212	39	251
	Discouraged	71	4	75
	Out of labor force	846	200	1,046
Socio-economic status	We live well	2,012	1,479	3,491
	Neither rich nor poor	848	200	1,048
	We are poor	246	1857	2,103
Wealth Index	Poor	1,027	1,162	2,189
	Middle	1,027	1,165	2,192
	Rich	1,026	1,161	2,187

Table 4.6: Socio-economic characteristics of wage-workers among the RSIs

		China			Colombia			Egypt			Sierra Leone		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Age	18-34	40	10	50	35	34	69	60	62	122	38	2	40
	35-49	94	29	123	27	22	49	46	40	86	30	5	38
	50+	17	16	33	12	14	26	24	16	40	13	1	14
Gender	Male	81	37	118	39	47	86	100	105	205	54	7	61
	Female	70	18	88	35	23	58	30	13	43	27	1	28
Sex of Household Head	Male	110	53	163	47	52	99	112	108	220	65	7	72
	Female	41	2	43	27	18	45	18	10	28	16	1	17
Marital Status	Single	22	6	28	27	23	50	37	29	66	28	0	28
	Married/Cohabitant	122	48	170	38	39	77	86	87	173	48	7	55
	Widow/Divorced/Separated	7	1	8	9	8	17	7	2	9	5	1	6
Education	No School	8	9	17	4	19	23	19	30	49	6	0	6
	Primary & Junior Secondary	67	35	102	19	13	32	11	14	25	19	0	19
	Senior Secondary or higher	76	11	87	48	37	85	100	74	174	56	8	64
Household size	1-2	28	7	35	9	11	20	17	12	29			
	3-5	114	43	157	45	37	82	66	45	111			
	More than 5	9	5	14	20	22	42	47	61	108			
Household size	1-4										43	4	47
	5-7										25	4	29
	More than 8										13	0	13
Socio-economic status	We live well	53	18	71	52	45	97	45	35	80	58	2	60
	Neither rich nor poor	81	20	101	18	18	36	65	63	128	16	0	16
	We are poor	17	17	34	3	5	8	20	20	40	7	6	13
Wealth Index	Poor	3	13	16	11	33	44	30	29	59	21	0	21
	Middle	9	23	32	28	9	37	40	37	77	22	0	22
	Rich	139	19	158	30	22	52	57	50	107	38	8	46

Table 4.7: Characteristics of wage-workers willing to pay health insurance

		China			Colombia			Egypt			Sierra Leone		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Age	18-34	12	5	17	7	11	18	16	20	36	18	1	19
	35-49	25	11	36	8	8	16	11	9	20	14	4	18
	50+	3	3	6	2	6	8	3	1	4	7	1	8
Gender	Male	20	14	34	7	18	25	26	24	50	23	5	28
	Female	20	5	25	10	7	17	4	6	10	16	1	17
Marital Status	Single	7	4	11	6	9	15	14	9	23	14	0	14
	Married/Cohabitant	30	15	45	8	12	20	16	20	36	24	5	29
	Widow/Divorced/Separate	3	0	3	3	4	7	0	1	1	1	1	2
Education	No School	1	1	2	0	13	13	7	8	15	2	0	2
	Primary or Junior Secondary	26	15	41	9	4	13	5	2	7	6	0	6
	Senior Secondary or higher	13	3	16	7	8	15	18	20	38	31	6	37
Type of Industry	Primary Sector	0	1	1	0	12	12	0	6	6	1	3	4
	Secondary Sector	11	11	22	3	3	6	7	9	16	2	0	2
	Tertiary Sector	29	7	36	14	10	24	23	15	38	36	3	39
Satisfaction on Income	Not satisfied	10	4	14	5	3	8	15	7	22	11	1	12
	Somewhat unsatisfied	13	6	19	2	9	11	8	6	14	7	2	9
	Neither	12	8	20	0	0	0	1	4	5	5	1	6
	Somewhat satisfied	5	1	6	8	12	20	4	11	15	14	1	15
	Very satisfied	0	0	0	2	1	3	2	2	4	2	1	3
Satisfaction on Job Stability	Not satisfied	7	3	10	2	5	7	14	18	32	6	1	7
	Somewhat unsatisfied	8	6	14	2	8	10	9	4	13	4	0	4
	Neither	13	4	17	0	3	3	1	3	4	2	0	2
	Somewhat satisfied	9	5	14	7	8	15	4	5	9	22	4	26
	Very satisfied	3	1	4	6	1	7	2	0	2	5	1	6

Table 4.8. Characteristics of wage-workers willing to accept health insurance

		China			Colombia			Egypt			Sierra Leone		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Age	18-34	10	1	11	8	9	17	4	4	8	15	1	16
	35-49	17	2	19	7	9	16	6	5	11	14	0	14
	50+	4	5	9	6	2	8	3	4	7	2	0	2
Gender	Male	18	6	24	16	14	30	9	11	20	21	1	22
	Female	13	2	15	5	6	11	4	2	6	10	0	10
Marital Status	Single	7	0	7	9	4	13	2	2	4	8	0	8
	Married/Cohabitant	23	8	31	10	16	26	11	11	22	22	1	23
	Widow/Divorced/Separate	1	0	1	2	0	2	0	0	0	1	0	1
Education	No School	0	2	2	0	1	1	0	0	0	2	0	2
	Primary or Junior Secondary	5	4	9	5	3	8	0	0	0	6	0	6
	Senior Secondary or higher	26	2	28	15	15	30	13	13	26	23	1	24
Type of Industry	Primary Sector	3	1	4	1	2	3	0	0	0	1	0	1
	Secondary Sector	1	3	4	3	3	6	4	3	7	3	0	3
	Tertiary Sector	27	4	31	17	15	32	9	10	19	27	1	28
Satisfaction on Income	Not satisfied	5	2	7	4	1	5	4	2	6	5	0	5
	Somewhat unsatisfied	11	0	11	4	1	5	5	2	7	10	1	11
	Neither	10	4	14	1	0	1	0	0	0	0	0	0
	Somewhat satisfied	3	2	5	10	9	19	3	8	11	16	0	16
	Very satisfied	2	0	2	2	9	11	1	1	2	0	0	0
Satisfaction on Job Stability	Not satisfied	0	1	1	0	2	2	2	0	2	2	0	2
	Somewhat unsatisfied	3	0	3	2	0	2	1	0	1	2	0	2
	Neither	8	2	10	1	0	1	0	0	0	4	0	4
	Somewhat satisfied	11	5	16	14	7	21	6	7	13	17	1	18
	Very satisfied	9	0	9	4	11	15	4	6	10	6	0	6

Table 4.10. Descriptive Statistics of Variables Used in the OLS Regression

	China	**Colombia**	**Egypt**	**Sierra Leone**
VARIABLES	Mean (STD)	Mean (STD)	Mean (STD)	Mean (STD)
LOG(WAGES)	6.106	6.119	5.825	5.326
	(0.622)	(0.726)	(0.748)	(0.855)
GENDER	0.4272	0.4014	0.1734	0.3181
	(0.4958)	(0.491)	(0.379)	(0.468)
AGE	40.26	37.74	36.43	37.17
	(10.30)	(12.39)	(11.40)	(10.54)
HIGHEDU	0.4223	0.6058	0.7016	0.7159
	(0.495)	(0.4904)	(0.458)	(0.453)
WEALTH	0.5766	0.2953	0.2135	0.9825
	(0.939)	(1.029)	(1.030)	(1.054)
MARRIAGE	0.8252	0.5328	0.6975	0.625
	(0.380)	(0.500)	(0.460)	(0.486)
WIDOW	0.0388	0.1094	0.0362	0.0568
	(0.193)	(0.313)	(0.187)	(0.232)
MANUF	0.1456	0.1021	0.0967	0.0340
	(0.353)	(0.304)	(0.296)	(0.182)
CONST	0.1942	0.0364	0.1693	0.0227
	(0.3965)	(0.188)	(0.375)	(0.149)
EDUC	0.1359	0.0583	0.1653	0.1136
	(0.343)	(0.235)	(0.372)	(0.319)
PUBDEF	0.0728	0.0519	0.0161	0.0909
	(0.260)	(0.220)	(0.126)	(0.289)
LOC	0.733	0.5036	0.5241	0.9090
	(0.443)	(0.501)	(0.500)	(0.289)
Sample size	**206**	**137**	**248**	**88**

Table 4.11. Descriptive Statistics of Variables Used in the Tobit Regressions

	China	**Colombia**	**Egypt**	**Sierra Leone**
VARIABLES	Mean (STD)	Mean (STD)	Mean (STD)	Mean (STD)
WTP HEALTH	105.25	48.142	82.94	59.88
	(81.91)	(85.81)	(187.9)	(104.34)
WTP PENSIONS	153.90	44.651	77.734	121.8
	(125.54)	(85.63)	(133.32)	(195.9)
WTP SICK LEAVE	154.42	65.272	40.125	38.21
	(198.38)	(141.1)	(53.82)	(42.5)
WTP PERMANENT	169.87	68.271	131.62	93.12
	(177.76)	(126.26)	(198.4)	(139.2)
WTP HOUSING	136.70	87.179	61.812	61.96
	(111.14)	(137.5)	(64.59)	(108.6)
WTP TRANSPORT	95.27	52.745	96.294	895.25
	(85.35)	(145.6)	(332.0)	(5064)
GENDER	0.4237	0.4047	0.1578	0.377
	(0.498)	(0.496)	(0.367)	(0.490)
AGE	38.64	38.21	32.66	38.04
	(10.58)	(11.89)	(9.44)	(10.90)
ELEMEDU	0.694	0.309	0.1228	0.1333
	(0.464)	(0.476)	(0.331)	(0.343)
HIGHEDU	0.2711	0.3571	0.6315	0.8222
	(0.448)	(0.484)	(0.486)	(0.386)
SIZE	0.1355	0.2857	0.4210	0.0888
	(0.345)	(0.457)	(0.498)	(0.287)
MARRIAGE	0.762	0.4761	0.5790	0.6444
	(0.429)	(0.505)	(0.498)	(0.484)
LOC	0.677	0.404	0.526	0.8666
	(0.471)	(0.496)	(0.503)	(0.343)
Sample size	**59**	**42**	**57**	**42**

Table 5.1a: Logit regression of labor force participation

VARIABLES	(1) China	(2) Colombia	(3) Egypt	(4) Sierra Leone
GENDER	-0.547***	-1.529***	-2.708***	-0.243**
	(0.14)	(0.11)	(0.16)	(0.10)
AGE	0.366***	0.206***	0.426***	0.330***
	(0.04)	(0.02)	(0.03)	(0.02)
AGESQR	-0.005***	-0.003***	-0.005***	-0.004***
	(0.00)	(0.00)	(0.00)	(0.00)
ELEMEDU	-0.238	-0.036	-0.189	-0.647***
	(0.22)	(0.17)	(0.17)	(0.15)
INTEDU	-0.125	-0.218	-0.219	-0.617***
	(0.23)	(0.20)	(0.19)	(0.14)
HIGHEDU	0.321	0.601***	0.543***	0.177
	(0.26)	(0.18)	(0.14)	(0.15)
SLIGHT	0.225	-1.039***	-1.223***	-0.480
	(0.35)	(0.32)	(0.33)	(0.31)
DIFF	-2.247**	-0.667*	-1.257***	-0.926**
	(1.10)	(0.35)	(0.30)	(0.40)
HHEAD	0.830***	0.534***	1.163***	0.680***
	(0.20)	(0.14)	(0.19)	(0.19)
SIZE	-0.338*	0.104	0.096	0.102
	(0.20)	(0.18)	(0.11)	(0.14)
DEP	-0.508	-0.006	0.078	0.065
	(0.36)	(0.07)	(0.07)	(0.06)
KIDS	0.086	-0.001	0.271*	0.047
	(0.16)	(0.13)	(0.15)	(0.10)
WEALTH	-0.139	-0.240***	-0.101	-0.400***
	(0.09)	(0.07)	(0.09)	(0.06)
ETHNI	0.936	-0.166		0.069
	(0.77)	(0.69)		(0.11)
MARRIED	0.649***	-0.229*	-1.120***	0.634***
	(0.25)	(0.13)	(0.22)	(0.13)
WID	0.118	-0.172	-1.270***	-0.132
	(0.46)	(0.30)	(0.36)	(0.33)
DIVORCE	0.725	-0.316	-1.631***	1.228
	(0.81)	(0.39)	(0.48)	(0.88)
LOC	-1.208***	-0.149	-0.241	-1.678***
	(0.18)	(0.12)	(0.17)	(0.16)
Constant	-4.887***	-1.763***	-6.004***	-3.492***
	(0.99)	(0.44)	(0.55)	(0.38)
Observations	2,542	2,108	2,868	3,989
Pseudo R-squared	0.238	0.165	0.389	0.343
Prob < chi2	0.000	0.000	0.000	0.000

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 2: Estimation results of determinants of WTP of job-related benefits using OLS

Table 5.3a: OLS estimates of WTP for health insurance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.033**	0.008*	0.005	0.000***
	(0.01)	(0.00)	(0.07)	(0.00)
GENDER	-1.213	-5.013	-68.620	-81.382*
	(19.68)	(24.67)	(55.55)	(47.07)
AGE	-0.649	0.312	-1.272	-1.900
	(1.08)	(0.98)	(4.59)	(1.54)
ELEMEDU	-253.963***	75.633**	62.585	-29.374
	(89.20)	(34.61)	(62.08)	(27.33)
HIGHEDU	-261.811***	35.258	79.391	62.923
	(89.43)	(23.33)	(53.37)	(66.88)
SIZE	21.697	78.810**	-43.353	-26.424
	(28.24)	(30.25)	(47.12)	(51.45)
KIDS	-15.059	35.424	-71.962	0.969
	(23.53)	(42.53)	(113.65)	(35.87)
MARRIED	5.446	60.599*	70.637	-12.942
	(29.73)	(32.00)	(166.40)	(40.05)
LOC	11.112	42.009**	-34.775	68.681
	(19.90)	(19.12)	(64.10)	(43.77)
Constant	310.806***	-76.934	103.899	49.209
	(108.38)	(58.10)	(87.70)	(38.93)
Observations	59	42	57	42
R-squared	0.435	0.522	0.087	0.229
Prob > F	0.0083	0.0514	0.9392	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.4a: OLS estimates of WTP for pension benefits

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.057**	0.007	0.108**	-0.002
	(0.02)	(0.00)	(0.05)	(0.00)
GENDER	-24.134	-4.481	32.268	
	(29.13)	(26.39)	(25.57)	
AGE	2.918	0.882	4.530	
	(1.87)	(0.82)	(3.38)	
ELEMEDU	-67.592	76.331**	109.374	
	(122.95)	(34.75)	(74.08)	

HIGHEDU	-47.097	42.108*	59.124	136.735
	(121.47)	(24.52)	(51.53)	(84.08)
SIZE	-96.652*	81.072**	-34.162	-105.974
	(54.55)	(32.60)	(33.68)	(143.13)
MARRIED	57.314	53.398*	-24.655	
	(50.96)	(29.61)	(20.68)	
LOC	10.269	37.670**	-38.836*	
	(24.32)	(17.19)	(22.07)	
Constant	-25.589	-93.346	-155.648	45.680
	(149.62)	(59.70)	(154.52)	(70.44)
Observations	54	43	64	25
R-squared	0.338	0.443	0.194	0.154
Prob > F	0.1502	0.0255	0.5456	0.3084

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.5a: OLS estimates of WTP for sick leave allowance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.009	0.039	0.028	0.000
	(0.04)	(0.09)	(0.03)	(0.00)
AGE	6.620	-2.178	0.477	-0.903
	(3.84)	(1.42)	(1.32)	(0.81)
HIGHEDU	38.293	-52.229	2.403	46.202
	(74.86)	(41.48)	(23.76)	(26.00)
SIZE	-26.546	158.752***	0.620	80.957**
	(66.75)	(53.34)	(29.71)	(33.42)
MARRIED	-219.264	53.604	-32.980	-10.888
	(159.34)	(34.31)	(22.26)	(16.90)
LOC	-7.064	126.749***	-39.748	-10.546
	(52.19)	(40.34)	(26.53)	(24.81)
Constant	54.998	34.809	35.048	30.499
	(236.99)	(53.08)	(37.90)	(48.72)
Observations	26	33	24	18
R-squared	0.136	0.543	0.265	0.557
Prob > F	0.0465	0.0187	0.5131	0.1200

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.6a: OLS estimates of WTP for permanent contract

VARIABLES	(1) China	(2) Colombia	(3) Egypt	(4) Sierra Leone
INCOME	0.122***	0.002	0.193**	0.000
	(0.04)	(0.00)	(0.09)	(0.00)
GENDER	-9.160	-12.571	-55.996	-91.112*
	(46.72)	(42.15)	(51.22)	(45.85)
AGE	7.573***	0.711	3.800	-1.916
	(2.52)	(1.00)	(4.15)	(2.96)
ELEMEDU	46.576	95.847**	87.839	-20.440
	(71.52)	(37.63)	(70.35)	(81.13)
HIGHEDU	62.694	49.421*	61.636	27.060
	(74.33)	(26.55)	(63.43)	(67.97)
SIZE	116.209*	-8.318	-93.865**	-99.582**
	(65.20)	(31.50)	(41.83)	(42.22)
MARRIED	-33.070	10.967	58.131	61.708
	(51.51)	(35.09)	(65.22)	(44.82)
LOC	-6.827	61.868*	-49.312	-63.235
	(37.03)	(32.08)	(39.92)	(46.21)
Constant	-481.574***	-31.186	-116.540	197.411*
	(168.25)	(54.19)	(170.81)	(101.76)
Observations	40	59	67	31
R-squared	0.385	0.176	0.239	0.198
Prob > F	0.0012	0.0016	0.1849	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.7a: OLS estimates of WTP for housing allowance

VARIABLES	(1) China	(2) Colombia	(3) Egypt	(4) Sierra Leone
INCOME	-0.004	-0.001	-0.015	-0.000***
	(0.02)	(0.01)	(0.02)	(0.00)
GENDER	52.898	-42.027	28.784	-66.195
	(33.69)	(28.14)	(25.88)	(41.10)
AGE	1.774	1.704	0.149	-1.929
	(2.20)	(1.93)	(1.34)	(1.44)
ELEMDU	-153.163**	83.890**	-29.848	-50.370
	(64.57)	(34.39)	(25.46)	(43.29)
HIGHEDU	-115.396	95.372**	42.899**	32.275

	(69.17)	(40.39)	(19.93)	(55.05)
SIZE	-42.254	58.172*	21.893	-23.089
	(30.60)	(31.32)	(21.34)	(31.30)
MARRIED	-10.019	26.474	-5.548	18.080
	(51.54)	(47.22)	(31.30)	(18.57)
LOC	29.404	48.134*	-20.847	28.456
	(27.93)	(26.52)	(28.22)	(35.35)
Constant	179.426	-80.574	36.360	115.310**
	(114.17)	(73.72)	(29.44)	(53.69)
Observations	50	78	48	49
R-squared	0.181	0.163	0.153	0.162
Prob > 65	0.0795	0.0041	0.0294	0.0740

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.8a: OLS estimates of WTP for transportation allowance

	(1)	(2)	(3)	(4)
VARIABLES	China	Colombia	Egypt	Sierra Leone
INCOME	0.016	0.006	0.088	0.000***
	(0.02)	(0.01)	(0.17)	(0.00)
GENDER	-15.511	-21.971	-161.949	40.811
	(19.41)	(62.08)	(132.23)	(68.78)
AGE	1.012	2.946	6.694	0.011
	(1.30)	(2.09)	(6.73)	(1.25)
ELEMEDU	-14.142	77.429*	-55.096	-10.526
	(120.97)	(43.94)	(91.05)	(36.76)
HIGHEDU	40.859	88.416	-74.705	-94.959**
	(128.46)	(65.09)	(141.82)	(38.98)
SIZE	-17.663	48.865*	-7.275	11.540
	(36.79)	(26.67)	(47.28)	(26.44)
MARRIED	32.422	-14.111	-219.161	67.727
	(21.06)	(58.46)	(181.75)	(54.00)
LOC	-48.636	98.394*	-68.154	-16.327
	(35.90)	(54.08)	(66.76)	(50.56)
Constant	31.688	-155.047*	128.856	-102.598
	(137.49)	(83.84)	(104.14)	(75.09)
Observations	55	51	51	33
R-squared	0.236	0.226	0.215	1.000
Prob > F	0.2343	0.4955	0.6939	0.0000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 3: Regression Diagnostics

Part I: Model specification for OLS regression

There are several procedures to detect model specification errors. The link test and ovtest (Ramsey RESER test) are among them. The link test for model specification is used to determine whether a regression model is correctly specified. Specification error can occur due to omitted variable bias, inclusion of irrelevant variables or problems of functional form. If the model is correctly specified "**_hat"** should be significant and **_hatsq** should not be significant. As seen in Tables A.3-1-A.3-4, our models are properly specified.

Table A.3-1: Linktest for Model Misspecification, China

Number of obs	206
F(2, 203)	= 37.64
Prob > F	= 0.0000
R-squared	= 0.2705
Adj R-squared	= 0.2633
Root MSE	= .53394

lnwage	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	4.132935	2.235912	1.85	0.066	-.2756554	8.541525
_hatsq	-.2643463	.1884011	-1.40	0.162	-.6358203	.1071276
_cons	-9.247123	6.629062	-1.39	0.165	-22.31777	3.823523

Table A.3-2: Linktest for Model Misspecification, Colombia

Number of obs	127
F(2, 124)	= 32.43
Prob > F	= 0.0000
R-squared	= 0.3435
Adj R-squared	= 0.3329
Root MSE	= .57122

lnwage	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	6.57372	3.252651	2.02	0.045	.135813	13.01163
_hatsq	-.4605959	.2685843	-1.71	0.089	-.9921996	.0710077
_cons	-16.78831	9.820249	-1.71	0.090	-36.22533	2.648714

Table A.3-3: Linktest for Model Misspecification, Egypt

Number of obs	243
F(2, 240)	= 53.17
Prob > F	= 0.0000
R-squared	= 0.3070
Adj R-squared	= 0.3013
Root MSE	= .63019

lnwage	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	-1.617576	2.302376	-0.70	0.483	-6.15302	2.917869
_hatsq	.2224137	.1954556	1.14	0.256	-.1626138	.6074411
_cons	7.662682	6.758013	1.13	0.258	-5.649911	20.97527

Table A3-4: Linktest for Model Misspecification, Sierra Leone

Number of obs	88
F(2, 85)	= 28.34
Prob > F	= 0.0000
R-squared	= 0.4001
Adj R-squared	= 0.3860
Root MSE	= .67009

lnwage	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	-1.051231	2.137203	-0.49	0.624	-5.300564	3.198101
_hatsq	.1890182	.1965534	0.96	0.339	-.2017826	.579819
_cons	5.509355	5.773664	0.95	0.343	-5.970236	16.98895

Part II: Heteroskedasticity test for OLS

If the error terms do not have constant variance, they are said to be heteroskedastic. Heteroskedasticity does not cause bias and inconsistency in parameter estimates. It is corrected using robust standard errors. The Breusch-Pagan test is one of several ways designed to detect any linear form of heteroscedasticity. The results are as follows:

Table B.3-1: Heteroskedasticity test, China

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of lnwage

chi2(1) = 48.58

Prob > chi2 = 0.0000

Table B.3-2: Heteroskedasticity test, Colombia

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of lnwage

chi2(1) = 17.52
Prob > chi2 = 0.0000

Table B.3-3: Heteroskedasticity test, Egypt

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of lnwage

chi2(1) = 6.93
Prob > chi2 = 0.0085

Table B.3-4: Heteroskedasticity test, Sierra Leone

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of lnwage

chi2(1) = 1.13
Prob > chi2 = 0.2875

Part III: Multicollinearity test for OLS model

Table C.3-1: Multicollinearty test, China

vif

Variable	VIF	1/VIF
MARRIED	2.33	0.429779
WEALTH	2.18	0.458173
AGE	1.88	0.531310
LOC	1.74	0.575354
WID	1.66	0.595735
HIGHEDU	1.66	0.602322
CONST	1.58	0.631414
AGESQR	1.44	0.696460
EDUC	1.35	0.742563
GENDER	1.29	0.775603
MANUF	1.28	0.782159
PUBDEF	1.18	0.844526
Mean VIF	1.63	

Table C.3-2: Multicollinearity test, Colombia

vif

Variable	VIF	1/VIF
AGE	1.84	0.543148
MARRIED	1.69	0.592674
WEALTH	1.67	0.600272
HIGHEDU	1.59	0.628339
AGESQR	1.52	0.659204
WID	1.39	0.720947
GENDER	1.26	0.792250
LOC	1.21	0.823276
EDUC	1.21	0.824808
MANUF	1.11	0.898138
PUBDEF	1.07	0.932368
CONST	1.05	0.949840
Mean VIF	1.38	

Table C.3-3: Multicollinearity test, Egypt

vif

Variable	VIF	1/VIF
WEALTH	3.26	0.306547
LOC	2.67	0.374312
AGE	2.26	0.442817
MARRIED	1.95	0.513707
WID	1.57	0.637926
GENDER	1.57	0.638127
EDUC	1.53	0.654523
HIGHEDU	1.44	0.694746
AGESQR	1.37	0.728184
CONST	1.17	0.855714
MANUF	1.10	0.912008
PUBDEF	1.06	0.944276
Mean VIF	1.74	

Table C.3-4: Multicollinearity test, Sierra Leone

vif

Variable	VIF	1/VIF
WID	1.85	0.540491
AGE	1.62	0.616976
MARRIED	1.52	0.659472
AGESQR	1.50	0.664532
LOC	1.43	0.699969
WEALTH	1.42	0.702389
HIGHEDU	1.42	0.704876
GENDER	1.23	0.814083
EDUC	1.14	0.875956
MANUF	1.12	0.893760
CONST	1.10	0.907131
PUBDEF	1.05	0.950725
Mean VIF	1.37	

Part IV. Testing normality of residuals, OLS

There are several procedures to check the normality assumption of OLS. In this study, I use kernel density estimate (kdensity) and a standardized normal probability (P-P) plot (pnorm).

Figure A.3-1: kernel density estimate and standardized normal probability (P-P) plot, China

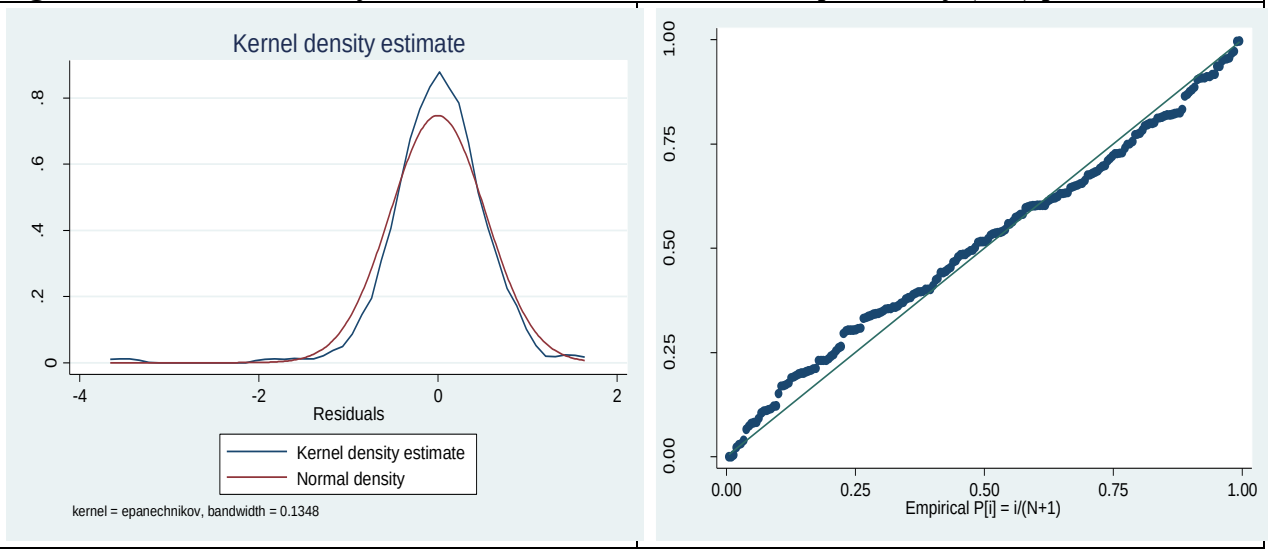


Figure A.3-2: kernel density estimate and standardized normal probability (P-P) plot, Colombia

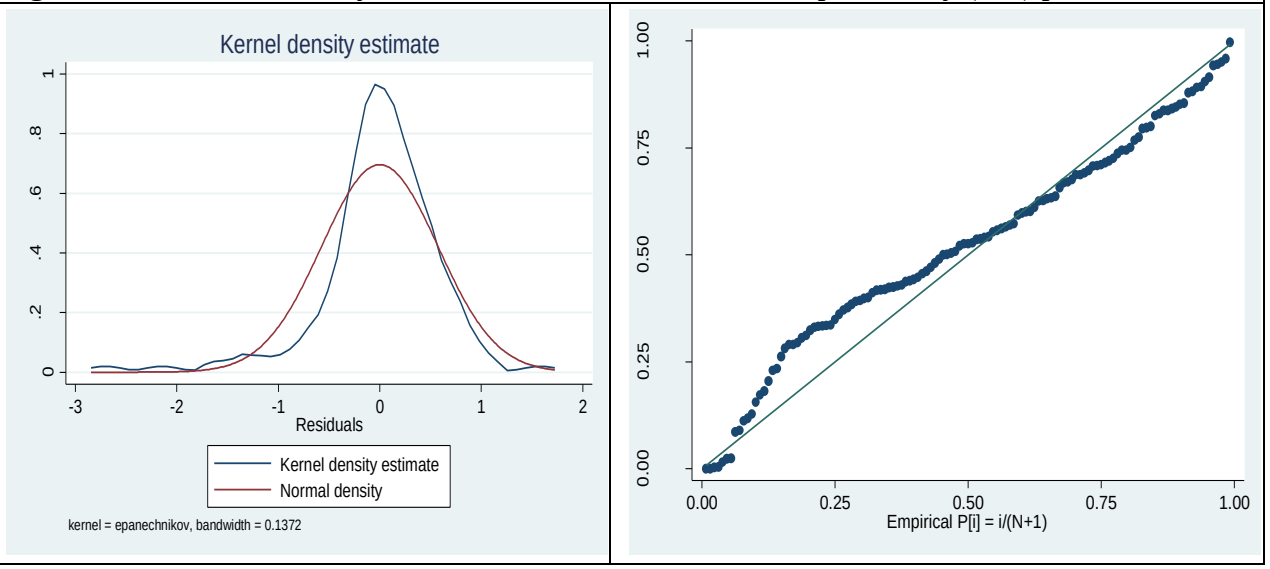


Figure A.3-3: kernel density estimate and standardized normal probability (P-P) plot, Egypt

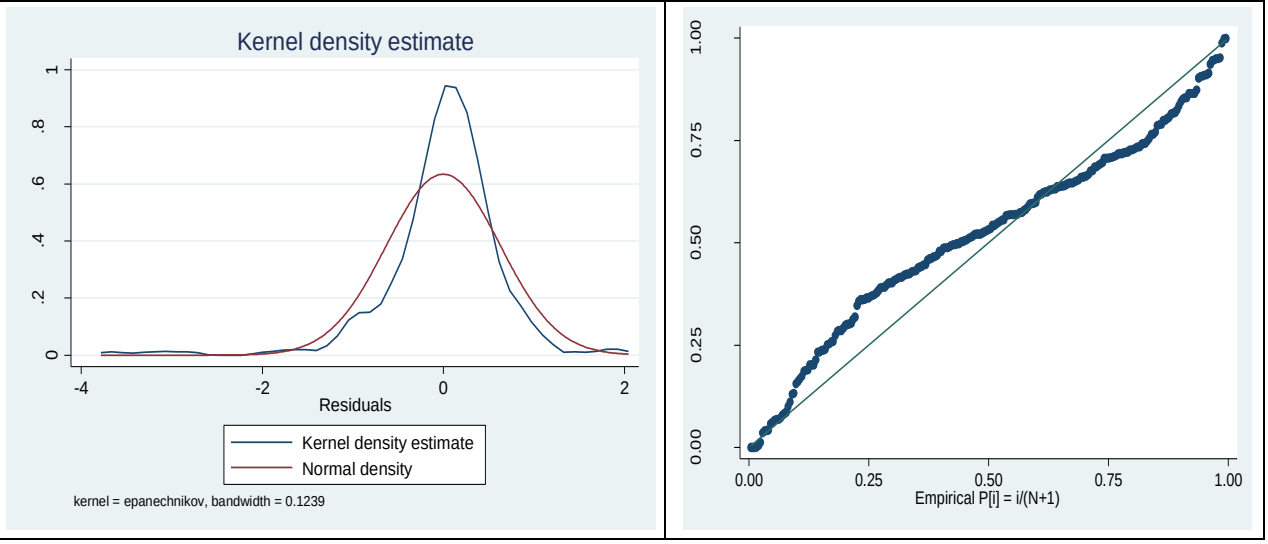
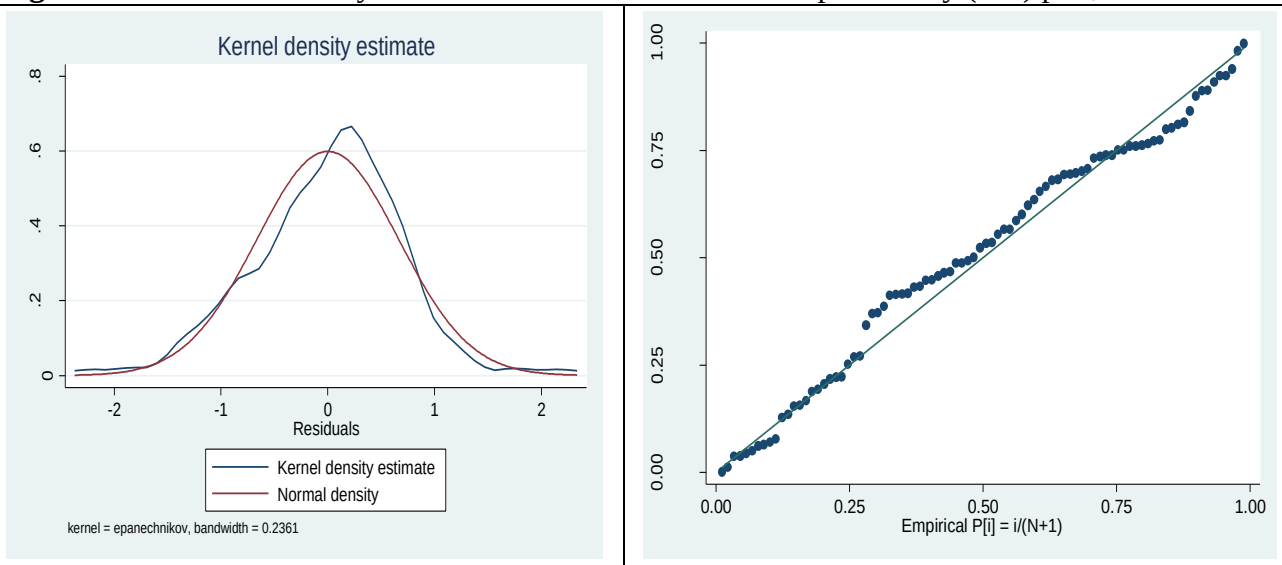


Figure A.3-4: kernel density estimate and standardized normal probability (P-P) plot, Sierra Leone



Part V: Checking influential observations, Logistic model

Figure B.3-1: Pearson standardized residuals, China

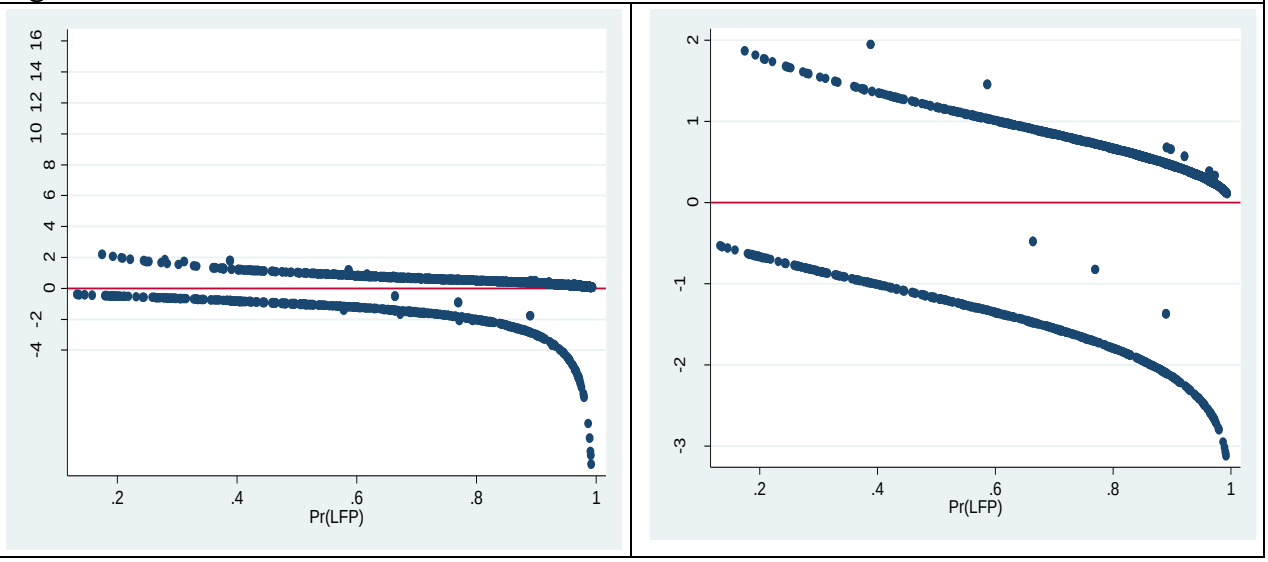


Figure B.3-2: Pearson standardized residuals, Colombia

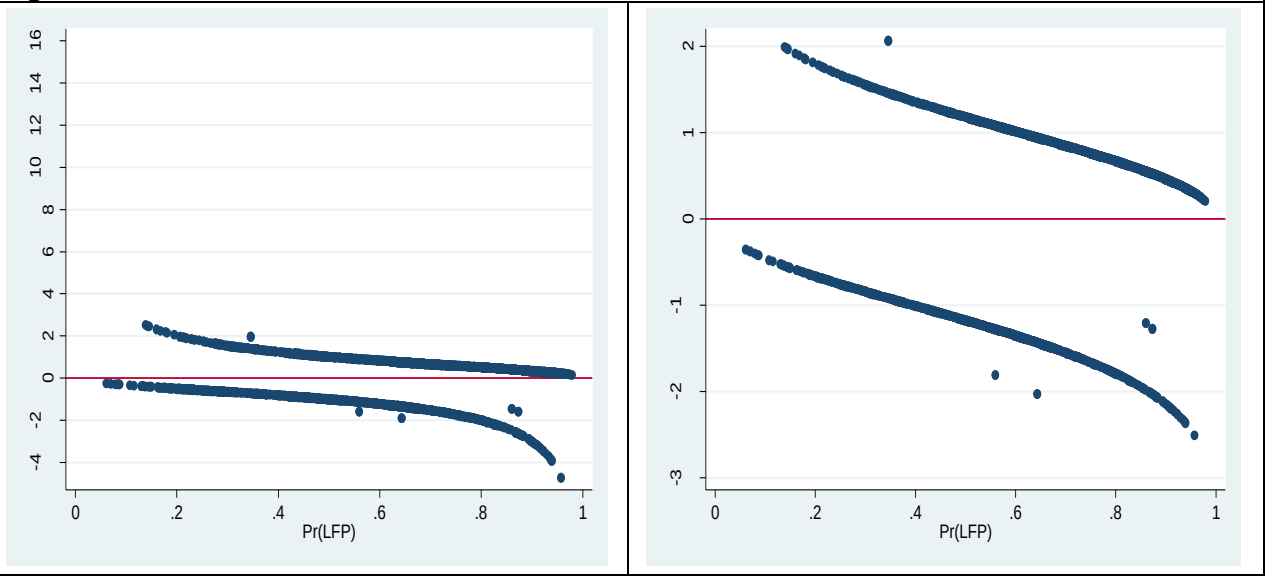
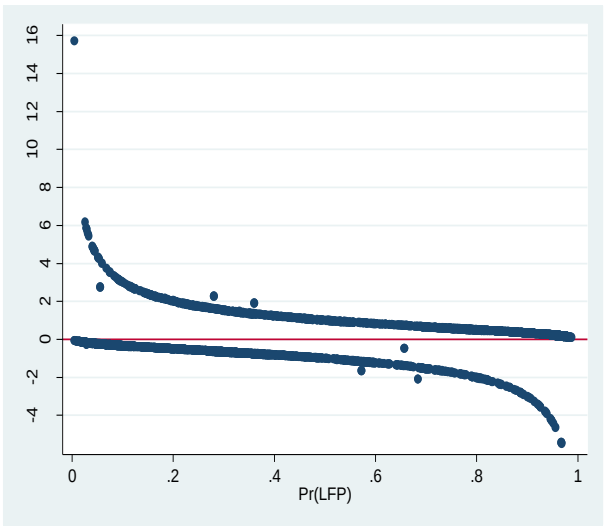


Figure B.3-3: Pearson standardized residuals, Egypt



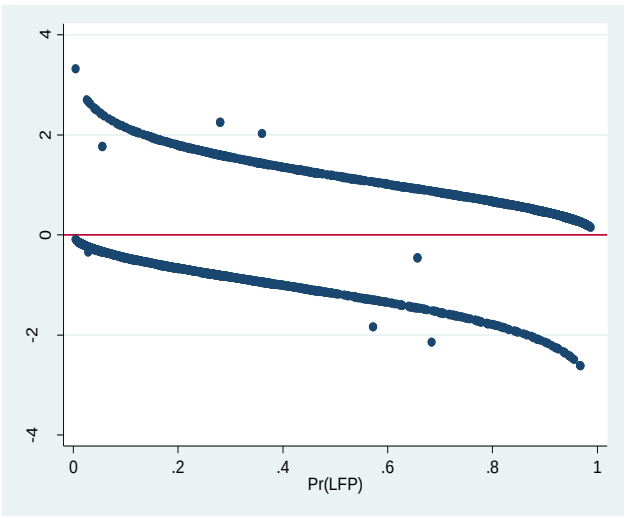
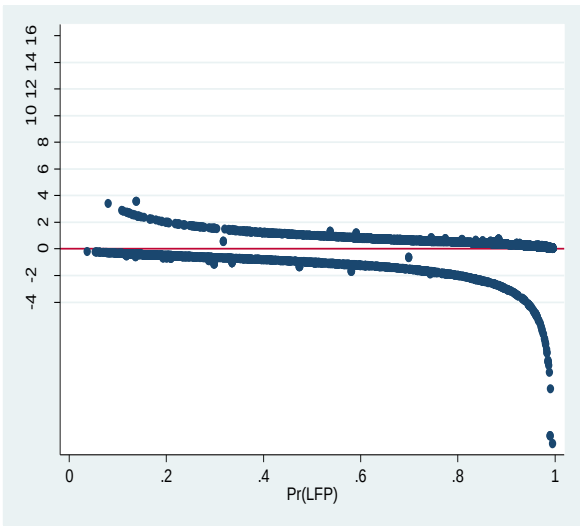
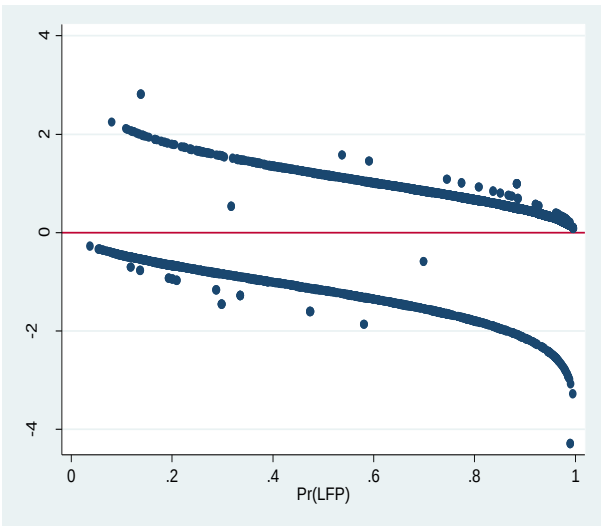


Figure B.3-4: Pearson standardized residuals, Sierra Leone





Part VI: Multicollinearity test for Logistic model

Table D.3-1: Multicollinearity test, China

```
. collin LFP GENDER AGE AGESQR ELEMEDU INTEDU HIGHEDU SLIGHT ///
> DIFF HHEAD SIZE DEP KIDS WEALTH ETHNI MARRIAGE WID DIVORCE LOC
(obs=2542)

  Collinearity Diagnostics

                      SQRT                   R-
  Variable      VIF     VIF    Tolerance    Squared
----------------------------------------------------
       LFP      1.26    1.12    0.7956      0.2044
    GENDER      1.42    1.19    0.7059      0.2941
       AGE     74.13    8.61    0.0135      0.9865
    AGESQR     64.79    8.05    0.0154      0.9846
   ELEMEDU      1.75    1.32    0.5716      0.4284
    INTEDU      2.32    1.52    0.4304      0.5696
   HIGHEDU      2.51    1.58    0.3983      0.6017
    SLIGHT      1.08    1.04    0.9299      0.0701
      DIFF      1.01    1.01    0.9866      0.0134
     HHEAD      1.63    1.28    0.6149      0.3851
      SIZE      1.21    1.10    0.8272      0.1728
       DEP      1.16    1.08    0.8607      0.1393
      KIDS      1.20    1.09    0.8340      0.1660
    WEALTH      2.43    1.56    0.4113      0.5887
     ETHNI      1.01    1.00    0.9918      0.0082
  MARRIAGE      3.16    1.78    0.3166      0.6834
     WIDOW      1.34    1.16    0.7470      0.2530
   DIVORCE      1.25    1.12    0.8012      0.1988
       LOC      2.32    1.52    0.4311      0.5689
----------------------------------------------------
  Mean VIF      8.79

                        Cond
        Eigenval        Index
---------------------------------
    1     9.3744          1.0000
    2     1.7021          2.3468
    3     1.1281          2.8827
    4     1.0284          3.0192
    5     1.0127          3.0424
    6     0.9709          3.1074
    7     0.8966          3.2335
    8     0.8913          3.2431
    9     0.7709          3.4872
    10     0.6862          3.6960
    11     0.4046          4.8134
    12     0.3460          5.2053
    13     0.2310          6.3699
    14     0.1937          6.9568
    15     0.1271          8.5891
    16     0.1070          9.3587
    17     0.0897         10.2251
    18     0.0364         16.0482
    19     0.0019         71.0626
    20     0.0010         99.1914
---------------------------------
 Condition Number        99.1914
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix)    0.0004
```

Table D.3-2: Multicollinearity test, Colombia

```
. collin LFP GENDER AGE AGESQR ELEMEDU INTEDU HIGHEDU SLIGHT ///
> DIFF HHEAD SIZE DEP KIDS WEALTH ETHNI MARRIAGE WID DIVORCE LOC
(obs=2108)

  Collinearity Diagnostics

                       SQRT                  R-
  Variable      VIF     VIF    Tolerance    Squared
----------------------------------------------------
       LFP      1.24    1.11    0.8087      0.1913
    GENDER      1.25    1.12    0.7999      0.2001
       AGE     43.04    6.56    0.0232      0.9768
    AGESQR     41.91    6.47    0.0239      0.9761
   ELEMEDU      1.73    1.31    0.5786      0.4214
    INTEDU      1.82    1.35    0.5486      0.4514
   HIGHEDU      2.54    1.59    0.3938      0.6062
    SLIGHT      1.05    1.02    0.9526      0.0474
      DIFF      1.04    1.02    0.9654      0.0346
     HHEAD      1.39    1.18    0.7191      0.2809
      SIZE      1.17    1.08    0.8543      0.1457
       DEP      1.31    1.15    0.7612      0.2388
      KIDS      1.29    1.13    0.7781      0.2219
    WEALTH      1.56    1.25    0.6393      0.3607
     ETHNI      1.01    1.00    0.9922      0.0078
  MARRIAGE      1.27    1.13    0.7861      0.2139
     WIDOW      1.13    1.06    0.8871      0.1129
   DIVORCE      1.05    1.02    0.9554      0.0446
       LOC      1.29    1.14    0.7743      0.2257
----------------------------------------------------
  Mean VIF      5.69

                         Cond
        Eigenval         Index
---------------------------------
    1     8.7916          1.0000
    2     1.4222          2.4863
    3     1.2192          2.6853
    4     1.0643          2.8740
    5     1.0091          2.9517
    6     0.9470          3.0468
    7     0.9350          3.0664
    8     0.9187          3.0934
    9     0.8140          3.2864
    10     0.6537          3.6673
    11     0.6190          3.7687
    12     0.3738          4.8497
    13     0.3351          5.1218
    14     0.2926          5.4818
    15     0.2306          6.1749
    16     0.1911          6.7825
    17     0.1182          8.6246
    18     0.0539         12.7752
    19     0.0089         31.4505
    20     0.0020         66.5750
---------------------------------
 Condition Number        66.5750
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix)    0.0020
```

Table D.3-3: Multicollinearity test, Egypt

```
. collin LFP GENDER AGE AGESQR ELEMEDU INTEDU HIGHEDU SLIGHT ///
> DIFF HHEAD SIZE DEP KIDS WEALTH MARRIAGE WID DIVORCE LOC
(obs=2868)

  Collinearity Diagnostics

                       SQRT                   R-
  Variable      VIF     VIF    Tolerance    Squared
----------------------------------------------------
       LFP      1.80    1.34    0.5543      0.4457
    GENDER      2.45    1.57    0.4075      0.5925
       AGE     65.88    8.12    0.0152      0.9848
    AGESQR     56.60    7.52    0.0177      0.9823
   ELEMEDU      1.38    1.18    0.7230      0.2770
    INTEDU      1.65    1.28    0.6062      0.3938
   HIGHEDU      1.95    1.40    0.5118      0.4882
    SLIGHT      1.07    1.04    0.9310      0.0690
      DIFF      1.09    1.05    0.9150      0.0850
     HHEAD      2.74    1.66    0.3644      0.6356
      SIZE      1.21    1.10    0.8279      0.1721
       DEP      1.84    1.36    0.5438      0.4562
      KIDS      2.00    1.41    0.4997      0.5003
    WEALTH      2.83    1.68    0.3529      0.6471
  MARRIAGE      4.25    2.06    0.2353      0.7647
     WIDOW      2.73    1.65    0.3664      0.6336
   DIVORCE      1.25    1.12    0.8020      0.1980
       LOC      2.52    1.59    0.3961      0.6039
----------------------------------------------------
  Mean VIF      8.63

                         Cond
        Eigenval         Index
---------------------------------
    1     7.6478          1.0000
    2     1.5997          2.1865
    3     1.3880          2.3473
    4     1.2108          2.5133
    5     1.0115          2.7497
    6     0.9970          2.7696
    7     0.9653          2.8147
    8     0.8922          2.9278
    9     0.8353          3.0258
    10     0.6330          3.4759
    11     0.5908          3.5978
    12     0.3750          4.5162
    13     0.2509          5.5213
    14     0.1809          6.5026
    15     0.1663          6.7812
    16     0.1384          7.4349
    17     0.0741         10.1565
    18     0.0416         13.5554
    19     0.0015         70.3268
---------------------------------
 Condition Number         70.3268
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix)    0.0001
```

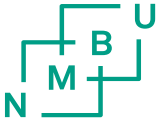
Table D.3-4: Multicollinearity test, Sierra Leone

```
. collin LFP GENDER AGE AGESQR ELEMEDU INTEDU HIGHEDU SLIGHT ///
> DIFF HHEAD SIZE DEP KIDS WEALTH ETHNI MARRIAGE WID DIVORCE LOC
(obs=3989)

  Collinearity Diagnostics

                       SQRT                  R-
  Variable      VIF     VIF    Tolerance    Squared
----------------------------------------------------
       LFP      1.50    1.22    0.6681      0.3319
    GENDER      1.39    1.18    0.7192      0.2808
       AGE     42.52    6.52    0.0235      0.9765
    AGESQR     37.53    6.13    0.0266      0.9734
   ELEMEDU      1.36    1.17    0.7343      0.2657
    INTEDU      1.59    1.26    0.6289      0.3711
   HIGHEDU      1.87    1.37    0.5360      0.4640
    SLIGHT      1.04    1.02    0.9570      0.0430
      DIFF      1.03    1.02    0.9696      0.0304
     HHEAD      1.83    1.35    0.5456      0.4544
      SIZE      1.18    1.09    0.8443      0.1557
       DEP      1.61    1.27    0.6194      0.3806
      KIDS      1.49    1.22    0.6719      0.3281
    WEALTH      2.66    1.63    0.3755      0.6245
     ETHNI      1.37    1.17    0.7301      0.2699
  MARRIAGE      2.07    1.44    0.4839      0.5161
     WIDOW      1.33    1.15    0.7544      0.2456
   DIVORCE      1.04    1.02    0.9599      0.0401
       LOC      2.79    1.67    0.3590      0.6410
----------------------------------------------------
  Mean VIF      5.64

                         Cond
        Eigenval         Index
---------------------------------
    1     8.7796          1.0000
    2     1.8562          2.1748
    3     1.3133          2.5856
    4     1.0902          2.8379
    5     1.0085          2.9505
    6     0.9984          2.9654
    7     0.9358          3.0630
    8     0.8790          3.1605
    9     0.7838          3.3468
    10    0.5183           4.1159
    11    0.4553           4.3911
    12    0.2860           5.5406
    13    0.2518           5.9049
    14    0.2022           6.5899
    15    0.1747           7.0890
    16    0.1553           7.5200
    17    0.1504           7.6412
    18    0.1241           8.4117
    19    0.0350          15.8390
    20    0.0023          61.7620
---------------------------------
 Condition Number        61.7620
 Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
 Det(correlation matrix)    0.0004
```



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