Economic Impact of Rural-Urban Migration on Income and Poverty of Migrant Sending Rural Households: With Evidences from Southern Ethiopia

A Dissertation Submitted in Fulfillment of the Requirements for the PhD Degree in International Development Studies to the Institute for Development Research and Development Policy (IEE), Ruhr University of Bochum

BY

Beneberu Assefa Wondimagegnhu

Supervised by

Prof. em. Dr. Dieter Bender
&
Prof. Dr. Wilhelm Loewenstein

December, 2012
Bochum
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III. Acknowledgement

First and foremost, I am highly grateful to my first supervisor Prof. em. Dr. Dieter Bender and my second supervisor Prof. Dr. Wilhelm Loewenstein for their priceless comments, academic support and guidance through out the completion of the program. I would like also to extend my deepest gratitude to Prof. Dr. Werner Voss for his useful comments on my questionnaire and other statistical issues. My deepest gratitude also goes to Prof. Dr. Katja Bender, the former coordinator of the PhD in International Development Studies program, for her unforgettable administrative and academic support. I am also highly indebted to Dr. Gabriele Baecker and Dr. Anja Zorob for their amicable administration support. In general, I am thankful to all the staffs and colleagues at the Institute of Development Research and Development policy (IEE). The South African-German Center for Development Research and Criminal Justice (SA-GER CDRCJ) deserve official recognition for providing scholarship to undertake the PhD program. My gratitude also goes to the research school of Ruhr University Bochum for providing additional funds for research and organizing several trainings and workshops.

My special thanks are also forwarded to the Shebedino district Agricultural and Rural Development bureau, Ethiopia particularly to Mr. Leta and Tsegaye seifu for providing information as well as arranging logistics and assistants during the data collection periods. I am grateful for Mrs. Bayush Bekele, Mr. Temesegen Musse and Mr. Sanja Sadewo from Taramessa village; Mr. Dawit Merassa, Mr. Firew Atomsa, and Mr. Mesfin Zerihun from Mederegenet village; Mr. Gizachew Kebede, Mr. Mesfin Tsegaye and Mr. Abraham Shuramo from Furra village; Mr. Argaw Megerssa, Mr. Asrat Gemeda, and Mr. Zegeye Denbello from Dobonegasha village of shebedino district who participated in the data collection process. In addition, I would like to express my gratitude to the Southern region agriculture and rural development bureau, Shebedino district health and education bureaus, Langano Lily commercial farm, Awassa Green wood PLC and Hawassa textile factory for their cooperation in providing data and information. In addition, my special appreciation is reserved for all respondents and key informants in Shebedino district for their cooperation in providing information.
IV. Declaration

I hereby declare that this dissertation is my own work and there, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

Further, the “Guidelines for Good Scientific Practice” according to §9, Para.2 are adhered to throughout the whole study.

Beneberu Assefa Wondimagegnhu

Bochum, December 2012
V. Acronyms

CSA: Central Statistical Authority
EEA: Ethiopian Economic Association
EPRDF: Ethiopian People’s revolutionary Democratic Front
ETB: Ethiopian Birr
FDRE: Federal Democratic Republic of Ethiopia
HCl: Head Count Index
HT: Harris-Todaro
IFAD: International Fund for Agricultural Development
IFPRI: International Food Policy Research Institute
ILO: International Labor Organization
LCU: Local Currency Unit
Ln: Natural Logarithm
LRF: Lewis-Ranis Fei
NELM: New Economics of Labor Migration
PA: Peasant Association
PASDEP: Plan for Accelerated and Sustainable Development to End Poverty
PGI: Poverty Gap Index
PRSP: Poverty Reduction Strategy paper
SCFCU: Sidama Coffee Farmers Cooperative Union
SDARDB: Shebedino District Agriculture and Rural Development Bureau
SNNPR: Southern Nations and Nationalities Peoples’ region
SPGI: Squared Poverty Gap Index
STCP: Sustainable Tree Crops Program
TPLA: Total Product of Labor in the Agriculture sector
UNECA: United Nation Economic Commission for Africa
UNFAO: Food and Agriculture Organization of the United Nations
UNIDO: United Nations Industrial Development Organization
VIF: Variance Inflating Factor
WB: World Bank
Chapter One

Introduction

1.1. Background

Rural-urban migration has been historically connected with industrialization, urbanization and economic growth (Bhattacharya, 1993). Rural-urban migration eases inter-sectoral factor mobility and plays a vital role for structural changes. Moreover, migration has also been a key livelihood and survival strategy for many poor groups across the developing world, particularly in Africa. In Africa, migration has been considered as a way of life where the people migrate from place to place due to political, socio-economic and demographic reasons. Rural-urban migration has contributed for half of the urban population growth in Africa in 1960s and 1970s and about 25% of urban growth in 1980s and 1990s (Waddington & Sabates-Wheeler, 2003; Adepoju, 1977; Lall et al, 2006). Concentration of investment in industries, commerce, and social services in towns has been the causes for regional inequalities and differences in economic opportunities. In addition, the productivity of the rural and agricultural sector has remained low and leading to rural out-migration to urban and industrial sectors (Adepoju, 1977).

In many development research publications, it is argued that rural-urban migration leads to industrialization and economic growth taking to account the experiences of the developed world in 19th and early 20th century. However, certain questions remained ambiguous and did not get comprehensive and empirical explanations particularly with respect to the case of Sub-Saharan Africa. The economy of Sub-Saharan Africa heavily depends on agriculture sector contributing for an average 20% of the GDP, livelihood for 60% of the labor force and dominated by small-scale farming. The agriculture sector is characterized by its low productivity and affected by environmental degradation and increased population pressure (IFPRI, 2004). As a result of the absence of insurance markets in the agriculture sector in least developed countries, small scale farmers are
unable to transfer their risks and they adopt risk coping strategies to circumvent against production losses. To mention some, they allocate their land to diversified crop varieties or grow less risky crops as a risk management strategy (Fafchamps, 1992; Bezabih & Sarr, 2010). In the same vein, rural families also use rural-out migration for work as an alternative strategy to diversify their source of income and livelihood. In this regard, the effect of rural-urban migration on the agriculture sector remained a controversial issue. In one hand, it involves the removal of production factors such as labor and capital (due to migration costs) from the rural sector and on the other hand, it promotes agricultural investment via the inflow of remittances from migrants. Many migration studies have their own boundaries and argue either towards the positive or negative effects of migration on household income without suggesting any rational decision making point of migration and without taking to account the demographic and socio-economic contexts of Sub-Saharan Africa that can possibly affect their conclusions.

The connection between rural-urban migration and poverty is a recent discussion subject and the effect of rural-urban migration on poverty of households (from the perspectives of migrant sending regions) has not received thorough attention particularly for Sub-Saharan African countries. The impact of rural-urban migration with respect to either aggravating or relaxing the incidence and intensity of household poverty remained a core research area. Thus, the research contributes in filling the gap of empirical research by taking the Ethiopian case in particular. Ethiopia is one of the countries in Sub-Saharan Africa experiencing high level of population pressure, population redistribution and rural-out migration (Mberu, 2006). Despite the fact that rural-urban migration has a long history in Ethiopia, research on the nexus between rural-urban migration and development is highly hampered by empirical evidences both from the perspective of migrant sending regions (rural and agricultural regions) and from migrant receiving regions (industries and urban centers). This has led to poorly designed migration and population policies as well as to ill-conceived rural and urban development policies. The current expansion of commercial farms and agro-processing industries in Ethiopia and the prevalence of rural out-migration of labor as a result pave an important opportunity to undertake a research on the role and possible effects of rural-urban migration on rural
income of farmers and the multiplier effects on poverty. The concluding remark in chapter two (section 2.6) summarizes the research gaps and contributions regarding the research area.

1.2 Basic concept of Migration

Migration is a multifaceted phenomenon which in general involves the movement of people from one place to the other. Migration is a change of residence either permanently or temporarily. Migration can be defined in terms of spatial boundaries as internal and international. Internal migration is the movement of individuals within a country whereas international migration involves the flow of individuals between countries where national boundaries are crossed. The UN (1970:2) defines migration as:

“… a move from one migration defining area to another (or a move of some specified minimum distance) that was made during a given migration interval and that involves change of residence.” A migrant is also defined as:

“a person who has changed his usual place of residence from one migration-defining area to another (or who moved some specified minimum distance) at least once during the migration interval” (UN, 1970:2).

The focus of the research is on internal type of migration flows specifically on rural-urban migration. Rural-urban migration is a movement of a rural resident(s) to an urban destination for different reasons. The area of origin (departure) is a place from which a move is made whereas area of destination (arrival) is a place where the move is terminated (UN 1970:2). Rural-urban migration can also be made either permanently or temporarily. Temporary migrants are rural family members who migrate to destination locations for a specific period of time and coming back to their origin. Permanent migrants are migrants who left their region of origin and start to reside in the destination region in permanent basis. In this research, a rural household is called a migrant sending household if at least one of its family member migrates to destination location to earn wage income either in temporary or permanent basis.
1.3 Objectives of the research

In general, the research aims to assess and measure the impacts of rural-urban migration on income and poverty of rural households. The research is conducted from the perspective of migrant sending rural families of Ethiopia; in this case in Shebedino district, Southern Ethiopia. The specific objectives of the research are as follows:

- To identify and measure the extent, channels and patterns where rural-urban migration can influence the income of rural households.
- To identify the conditions where rural-urban migration can be a rational and acceptable decision in the study area.
- To identify and measure the nexus between rural-urban migration and poverty with respect to incidence, depth and severity of poverty.
- To determine factors influencing remittance income
- To discuss and evaluate the classical and contemporary migration models and link them to the Ethiopian context.
- To suggest policy recommendations on ways of making rural–urban migration compatible with development.

1.4 Research Questions

The following are the main research questions of the study:

- To which extent and through which migration patterns, channels and conditions does rural-urban migration affect the income of rural households?
- How can rural-urban migration be an acceptable condition in rural Ethiopia?
- Does rural-urban migration affect poverty and subject rural households for income volatility? and How?
1.5 Organization of the thesis

The research paper is structured in to seven chapters. Next to the introduction part in chapter one, chapter two discusses both the classical and contemporary migration models, their empirical evidences and concludes by pointing out research gaps regarding the research topic. Chapter three discusses the characteristics of labor market, rural-urban linkages and patterns including the historical trends of migration in Ethiopia. Chapter four presents the theoretical framework and research methodology including the description of the study area. The theoretical framework part conceptualizes how rural-urban migration influence the income of rural families left behind as well as the linkage between determinants of rural-urban migration and possible effects taking to consideration mainly the concept of the New Economics of Labor Migration (NELM) model. The methodology part includes the research design, describing the study area, sampling techniques, data sources and types, method of data collection and analysis. Chapter five analyses the effect of rural-urban migration on agricultural income. The chapter examines the effect of migration in two steps: in the first step on production factors and the second step on farm income via its effect on the production factors. The chapter also analyzes the effect of labor and capital intensity per unit of land on per capita farm income. In each sub section, econometric models are specified. The chapter also discusses the possible cases where rational migration decisions can be made based on the estimations made. Chapter six discusses the impact of rural-urban migration on poverty and household expenditure pattern. The chapter estimates the effect of rural-urban migration on poverty taking to account the FGT classes of poverty measurements namely, the headcount index, poverty gap index and squared poverty gap index. Finally, chapter seven concludes, identifies future research areas and draws some policy recommendations.
CHAPTER TWO

Rural-urban Migration, Model Reviews and Empirical studies

Economic growth and development has long been associated with rural-urban migration in many economic publications. From the historical point of view, the current developed world in 19th and early 20th century have undergone different patterns of migration, predominantly rural-urban migration attributing to the process of industrialization and economic development. In addition, the percent of population living in the urban areas has grown rapidly and urbanization has been fueled by rural-urban migration (Bhattacharya, 1993; Waddington & Sabates-Wheeler, 2003 and Greenwood & Hunt, 2003).

This chapter reviews migration models, critiques, extensions and empirical works done on rural-urban migration. In addition, it reviews some empirical works with particular focus on Sub-Saharan Africa. The first and second sections of the chapter review the early Ravenstein ‘Laws’ of migration and the surplus labor assumption of the Lewis Ranis and Fei (LRF) Model with the empirical evidences, respectively. The third section deals with the Harris-Todaro (HT) explanations of the linkages between rural-urban migration and urban unemployment with empirical works and extensions. The fourth section discusses the new nexus between rural-urban migration and development with particular focus on the assumption of the New Economics of Labor Migration (NELM) model. The fifth section reviews some studies conducted on rural-urban migration studies in Sub-Saharan Africa. The final section concludes the chapter.
2.1 The 1880s classic study of Ravenstein on the ‘laws’ of migration

Explanation of rural-urban migration theoretically has a long history dating since 1880 when Ravenstein (1885) explained the ‘laws’ of migration. Most of the classical and neoclassical models later on tend to be modifications or elaborations of Ravenstein’s laws (Mears, 1997:599).

2.1.1 The concept and implications

Ernst George Ravenstein developed a series of migration ‘laws’ in the 1880s that laid a foundation stone for the modern migration theories. E G Ravenstein¹ (1885) in his work on ‘laws of migration’ described the scale and direction of migration and explained migration movements in relation to opportunities and constraints. Ravenstein's basic laws continue to serve as the starting point for almost all models of migration patterns. For his migration study, Ravenstein compared census data gathered in 1871 and 1881, the most recent tabulations available at that time to determine patterns of movement. Ravenstein explained that migrants move from areas of low opportunity to areas of high opportunity. The choice is regulated by distance and destination location; i.e. short distance destinations are preferable and migrants from the rural areas tend to move to the nearby towns first, and then towards large cities (step by step). Ravenstein, in his law of migration, also explained that the major causes of migration are economic and in the direction from agricultural areas to industrial and commerce areas (Ravenstein, 1885).

The Ravenstein’s laws of migration can be summarized as follows.

- Most migrants only proceed to a short distance, and there takes place consequently a universal shifting or displacement of the population, which produces ‘currents of migration’, set in the direction of the great centers of commerce and industry that absorbs the migrants.

- As a result of absorption, inhabitants move to rapidly growing towns and the gaps left in rural population are filled up by migrants from more remote districts, creating migration flows that reach to ‘the most remote corner of the kingdom.’

¹ Ravenstein (1885:196-199) used data from Scotland, Ireland, UK, England and Wales for his explanation of the ‘laws’ of migration.
• The process of dispersion is inversely proportional to that of absorption.
• Each main current of migration produces a compensating counter-current.
• Migrants proceeding long distances generally go by preference to one of the great centers of commerce or industry.
• The natives of towns are less migratory than those of the rural parts of the country.
• Females are more migratory than males.

2.1.2 Critiques, extensions and some empirical evidences of the model

The Ravenstein’s laws of migration have been criticized as individualistic, historical and they have ignored government restrictions. In Ravenstein’s fifth map of migration on the currents of migration, the map was not designed in such a way to determine patterns of movement, which made comparison of population insufficient and the study focused mostly on local moves. In the same vein, the laws of migration were criticized for its difficulty for computer programming to produce the map using the kinds of the current statistics available (Castles & Miller, 1993 in Tobler, 1995).

The other criticism towards the Ravenstein’s laws of migration is that the laws were not explained in mathematical or algebraic terms and only used the simplest forms of arithmetic in most of his papers (Dorigo & Tobler2, 1983). In addition, Ravenstein’s paper only focused on information gathered from surveys within the surroundings of the United Kingdom, and then the seven laws of migration were formulated by generalizing his observations (Tobler 1995; Corbett, 2001).

The Ravenstein’s laws of migration have been discussed and further extended by different scholars. Macisco and Pryor (1963) reviewed the Ravenstein’s laws of migration in the context of United States. The authors argued that the Ravensteins’s explanation on the differences of migration behavior among females and males was also

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2 Dorigo, G. & Tobler, W. (1983:1-13) in their works on ‘Push Pull laws of migration’ formulated a mathematical specification for Ravenstein’s laws of migration, which was based on census tables only.
consistent with the internal migration patterns of the United States, especially with respect to rural-urban migration streams. The consistency of the findings in US, which were related with Ravenstein’s law of migration include, (1) for rural-urban streams, females are more migratory than males; (2) women predominate in short-distance moves; (3) most migrants are generally younger than non-migrants; and (4) female migrants are younger than male migrants.

As argued in the works of Tobler (1995), Ravenstein’s laws re-explained the patterns of migration that he already identified for the case of Europe and North America. He described that people are more willing to travel long distances to occupy unsettled land than they would in a country more fully settled, as was the case in the United Kingdom. Ravenstein’s laws of migration and spatial interaction were later expanded in terms of ‘push’ and ‘pull’ factors of migration.

Other studies such as Lawton (1968) also re-used Ravenstein’s methods to explain the trends of population change in England and Wales as a result of external migration. Lawton provided a detailed analysis of the effect of regional variations on the net migration and distribution of population to see the population growth and the factors underlying it in the nineteenth century.

Dorigo & Tobler (1983) transformed the Ravenstein’s laws of migration in mathematical terms. They modeled the movement of migrants as a resultant sum of the ‘pushes’ and ‘pulls’ factors during a specific time interval and place; i.e.

\[ M_{ij} = \frac{(R_i + E_j)}{d_{ij}}, \quad i \neq j, \]

where

- \( M_{ij} \) is the extent of the movement from place \( i \) to place \( j \) in a specific time interval, and
- \( d_{ij} \) is the distance between \( i \) and \( j \); the variables \( R_i \) and \( E_j \), are the ‘pushes’ in place ‘\( i \)’ and the ‘pulls’ in place ‘\( j \)’ respectively, and discounted for distance effects.

The gravity model of migration as described by Lowry (1966) and Lee (1966) also takes the two important variables, i.e. distance and population size as the main determinants of migration which have been listed in Ravenstein’s laws of migration. Similarly,
Greenwood and Hunt (2003) argued that the Ravenstein’s laws of migration are the basis for the explanation of spatial interactions in the gravity model. The Ravenstein’s laws of migration have explained the role of spatial differentials on relative economic opportunities. Based on this concept Lee\(^3\) (1966) extended the model by introducing economic and other explanatory variables; namely factors associated with the area of origin and destination, intervening obstacles and personal factors.

### 2.2 Rural-Urban labor migration and dualistic labor-surplus economies

#### 2.2.1 Lewis Model: concept and implication

The process of economic development has been usually seen as a transformation from the rural agricultural sector to the urban manufacturing sector. This process in the two sectors is driven by labor migration and capital accumulation.

W. Arthur Lewis in his work on ‘Economic development with unlimited supplies of labor’ (1954) analyzed the labor market dualism and the structural difference between the subsistence sector and capitalistic sector in developing economies. The two sectors in the Lewis model were named as subsistence and capitalistic sectors originally and then they were renamed as traditional and modern sectors. Afterwards, the Lewis model was formalized and extended by John Fei and Gus Ranis in 1961 and the combination is named as the Lewis Ranis and Fei (LRF) model. The model, which takes to account the context of developing countries, explains a dual economy model of economic development with an assumption that there exists surplus labor in the traditional (agricultural) sector which is to be re-allocated to fill the rising modern (urban) sector labor demands. This means that the loss of labor in the traditional agriculture sector does not reduce agricultural production as a result of migration of labor to the modern sector. The traditional agricultural sector is characterized by low wages and very

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\(^3\) Lee (1966:47-57) in his paper on ‘a theory of migration’ summarized and extended the Ravensteins laws of migration with the introduction of other variables in origin and destination locations. Some of the responsible factors described as ‘good climate’ and ‘bad climate’ for migration include marital status, health, education, and family responsibility.
low/zero marginal productivity of workers. Each family member in the traditional agriculture sector earns an average product of labor, i.e. the wage in agriculture ($W_A = TPL_A / L_A$) (total product of labor in the agriculture sector ($TPL_A$) divided by the total agricultural labor of the rural population ($L_A$)).

The labor in the modern manufacturing sector has a positive marginal product and because of incentives in the modern sector individuals in traditional sector are motivated to migrate to the modern manufacturing sector. As a result of cheap surplus labor, the modern manufacturing sector accumulates capital leading to saving and investment. Saving and investment over time leads further to capital accumulation and then triggering economic growth with no change in agricultural output and in industrial wage rate.

The dual economy model, thus, suggests that agriculture provides the necessary resources for industrialization. The model also describes that rural-urban migration facilitates investments in modern labor-intensive industries, to make use of the rural labor and circumvent disguised unemployment in the traditional sector. The model in general explains the importance of labor at initial stage of economic development in developing economies (because of assumed scarcity of capital and the abundance of labor). The model points out the importance of surplus labor in generating inter-sectoral shift of employment and then triggering economic growth with out increase in real wages in the formal sector. As pointed out by Ranis (2004), the dual economy model continued to be relevant and an important policy guide for labor abundant countries with heavy population pressure and scarcity of cultivable land.

### 2.2.2 Critiques and empirics

Although the LRF model has a profound explaining power of economic development in the field of development economics, there have been still some vagueness especially with respect to the concept of surplus labor, wage determination and the dynamics of labor

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4 Ranis (2004:13) recommended the Lewis model as a valuable guide to policy for countries such as China, India, Bangladesh, Central America and some parts of Sub-Saharan Africa.
flows between the traditional agricultural sector and the modern manufacturing sector (Wang & Piesse, 2009). Wang and Piesse (2009) argued that the specific meaning and concept of surplus labor should be defined especially in technical terms. Ranis (2004) argued that surplus labor in Lewis model was explained in terms of available human beings rather than man-hours, and labor is assumed to be excess in supply with an existing wage rate. In addition, the model points out the existence of surplus agricultural labor in traditional sector with zero marginal productivity (ibid). Taylor and Martin (2001) pointed out the research evidences of Gregory (1986) that surplus labor exist most of the year in developing economies; however, still seasonal labor shortages prevailed in rural locations leading the marginal product of labor positive and the opportunity cost of rural-out migration non-zero. In addition, the profits accumulated by the modern manufacturing sector can be re-invested in labor saving capital technologies and resulting low demand of labor.

The evidence of the 1960s and early 1970s in developing nations witnessed that a substantial migration of their rural populations into urban areas resulted urban unemployment (Todaro, 1980). Todaro criticized the Lewis’s assumption of rationality, full employment, perfect information and unlimited capital formation in industry. Conversely, he pointed out the existence of high unemployment in modern urban sector. The assumption of the model to relate the existence of surplus labor in agriculture with zero marginal productivity and remuneration at per capita product in the traditional agriculture sector is a controversial issue (Todaro, 1980). Similarly, the assumption that labor market in the modern manufacturing sector guarantees the existence of real urban wages up to the point where the supply of rural surplus labor is exhausted is not realistic. According to Todaro’s argument wage rise over time as a result of institutional factors such as civil service scales, trade union lobbying and other factors in most of least developed countries (ibid).

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5 Wang & Piesse (2009:3-29) critically reviewed and extended the Lewis model. They extended the model by i) identifying two types of surplus labor, namely ‘the laborers with positive but negligible marginal productivity’ and ‘laborers with zero or even negative marginal productivity of labor’. They defined the subsistence level of consumption taking to account to the pattern of production and population growth in the agriculture sector. They also explained wage determination mechanism in modern sector and the dynamics of surplus labor and labor transfer.
As argued by Taylor (2001), the LRF model is not sufficient to explain every causes and consequences of migration in developing countries. Rural-urban migration can occur despite the increasing levels of urban unemployment. Fay and Opal\textsuperscript{6} (2000) also found out that urbanization as a result of labor migration from rural to urban areas can continue even during periods of negative growth. This depicts that economic growth should not be necessarily preceded by urbanization. The case is true particularly for most Sub-Saharan African countries. Moreover, the model doesn’t take into account the context of least developed countries where the removal of labor from the traditional agricultural sector especially at peak periods can cause for loss of production unless technologies which increase production are used at the same time (Kirsten et al, 2002). The model also neglects agricultural development as it only advocates capital accumulation in urban sector and industrialization. In the same vein, Ranis (2004) pointed out that it is empirically incorrect to assume that there is no capital accumulation in the agriculture sector and every investment goes to the non-agriculture sector.

The LRF model has been empirically tested and extended by different authors for various countries and the empirical evidences of the LRF model vary from countries to countries. The study done by Fei and Ranis (1975) regarding the economic development in Taiwan and Korea showed the importance of labor migration which is towards the support of the Lewis model. There is also a historical evidence for some countries such as England (1780-1840), for Japan (1870-1920) and for Taiwan (1980-1970) that they realized economic growth as a result of surplus labor (Minami, 1968; Kazushi, 1965; Ranis, 2004).

Yang et al (2007) described the Lewis model with respect to the case of China. The authors argued the case in two directions; in one side the expansion of agricultural commercialization as a result of considerable decline in population growth rates, and on the other side, increase in the wage of rural migrants which resulted from the exhaustion

\textsuperscript{6} Fay and Pal (2000:2-27) explained the determinants of urbanization across countries particularly the experience of African countries with respect of the process of urbanization and sustainable growth.
of agricultural labor and the likelihood of labor scarcity in Chinese economy. Knight (2007) disproved this argument by explaining that the growth in real wages was not necessarily as a result of labor scarcity. Knight argued that there still exist surplus labor in rural areas (particularly in inland provinces) and labor is not scarce yet. These studies show that the empirical tests of the model on the Chinese economy have come out with different results.

Ercolani & Wei (2010) used the LRF model to explain the economic growth of China from 1965 to 2002. The result showed that the economic growth of China was linked with the development of the industry and service sector as a result of rapid labor migration and capital accumulation.

2.3 Rural-Urban Labor Migration and Urban Unemployment

2.3.1 Harris-Todaro (HT) model: concept and implications

The issue of urban unemployment was raised by Todaro (1969) and then by Harris and Todaro (1970). Rural-urban migration of labor continued in developing countries although there was a high and increasing level of unemployment and underemployment in urban areas in 1960s & 1970s. The expected income model of migration was designed in HT model in the presence of labor market imperfections and an assessment of the probability to get an urban job.

The HT model argues that rural-urban migration is stimulated primarily by individual rational economic calculations of relative benefits and costs. Todaro\(^7\) (1969) proposes that individual migration decisions are based on the difference between the discounted expected income in urban and rural areas net of migration cost. In other words, individuals migrate if,

\(^7\)Todaro (1969:138-147) on his work on ‘A model of Labor Migration and Urban unemployment in less developed countries’ extended the simple ‘wage differential approach’ of rural-urban migration in to a ‘probabilistic approach’ taking to account the determinants of urban labor demand and supply and urban unemployment.
\[ V(O) = \sum_{t=0}^{n} [p(t) Y_u(t) - Y_R(t)] e^{-it} dt - C(O) \] is positive, where

\[ V(O) = \text{discounted present value of the net expected urban-rural income stream over the migrant’s time horizon; } Y_u(t) \text{ and } Y_R(t) \text{ are the average real income of individuals employed in the urban and the rural economy at a given point of time, respectively; } n \text{ is the number of time periods in the migrant’s planning horizon; } i \text{ is the discount rate reflecting the migrant’s degree of time preference; } C(O) \text{ is cost of migration, and } p(t) \text{ is the probability that a migrant will have a secured urban job in period } t \text{ (Todaro, 1969:142 and Todaro 1980:368). The main contribution of Todaro’s framework is to link urban unemployment and migration flows. Only few migrants with certain human capital have better opportunities to get employed in the formal sector especially in a labor market where the rate of unemployment is high.} \]

In the Harris–Todaro model, more workers search for formal sector jobs than are hired. Migrants who are not hired end up entering the urban informal sector or remain unemployed. Mathematically, the expected wage in urban area is given by:

\[
E(W_u) = W_u \times \left( \frac{\lambda E_u}{E_u + U_u} \right)
\]

(2.1)

Where,

\[ W_u = \text{urban wage rate; } \]
\[ U_u = \text{Urban unemployed labor} \]
\[ E(W_u) = \text{expected urban wage (which depends on } W_u \text{ and } P), \]
\[ \lambda E_u = \text{the number of job creation (employed labor in the formal urban sector) } \]
\[ \lambda = \text{the rate of job creation-i.e. the number of additional urban jobs} \]
\[ \frac{E_u}{E_u + U_u} = P; \text{ the probability of finding a job; } \]

The amount of rural-urban migration (M) in period \( t \) is a function of the urban-rural expected wage differential; i.e.,
\[ M_t = f (E(Wu) - Wr); \quad (2.2) \]

i.e. \[ M_t = f \left( Wu^* \left( \frac{\lambda E_u}{Eu + U_u} \right) - Wr \right) \quad (2.3) \]

Where, \( Wr \) = rural wage rate

Rural-urban migration occurs when the urban-rural expected wage differential is positive or

\[ E(Wu) > Wr \]

i.e. \( Wu^* \left( \frac{\lambda E_u}{Eu + U_u} \right) > Wr \quad (2.4) \)

The rural-urban equilibrium expected wage condition is then,

\[ E(Wu) = Wr; \]

which becomes

\[ Wu^* \left( \frac{\lambda E_u}{Eu + U_u} \right) = Wr \quad (2.5) \]

The probability of urban employment plus urban unemployment is one.
Thus, the Harris-Todaro model equilibrium for urban unemployment rate is given by:

\[ 1 - \left( \frac{\lambda E_u}{Eu + U_u} \right) \quad (2.6) \]

OR \[ \text{it is given by} \]

\[ 1 - \left( \frac{Wr}{Wu} \right) \] \[ \text{Since } Wu^* \left( \frac{\lambda E_u}{Eu + U_u} \right) = Wr \text{ as in (2.5)} \quad (2.7) \]

The Todaro paradox occurs when the increase in labor supply is greater than the increase in labor demand. In conditions where the elasticity of urban labor supply with respect to the income differential between urban and rural areas is greater, an increase in job creation will generate an increase in the number of unemployed workers. This is because migrants will be more attracted and induced to migrate to the urban centers as a result of job creation in urban destination (Todaro, 1980). Todaro supported his argument by relating with the case that happened in Kenya in 1964. The Kenyan government and the
private sector increased the level of employment by 15 percent but such measures attracted new migrants to cities which aggravated the unemployment rate. For such contexts, the Chinese policy of rural development and rural industrialization served as an example of restricting migration.

As illustrated in the book of Todaro & Smith (2006:342), the basic HT model can be explained graphically as follows (in Figure 1).

**Fig. 1** Graphical explanation of the HT model
Where,

AA' = the demand for labor in agriculture
$\text{MM}' = \text{Labor demand in manufacturing (reading from right to left)}$

$\text{O}_A \text{O}_M = \text{the total labor force}$

$qq' = \text{the curve indicating locus of each points of indifference}$

$W_M^* = W_A^*$ is an equilibrium wage in a neoclassical, flexible wage, and full employment market economy, with $\text{O}_A \text{L}_A^*$ workers employed in agriculture and $\text{O}_M \text{L}_M^*$ workers employed in urban manufacturing sector (i.e. in Lewis’s assumption). In HT model, $W_M$ (wage in the manufacturing sector) is institutionally determined (inflexible downward) at a level $\overline{W_M}$, and $\text{O}_M \text{L}_M$ workers would get urban jobs, and the rest, $\text{O}_A \text{L}_M$ would have to settle for rural employment at $\text{O}_A W_A^{**}$ wages (below the free-market level of $\text{O}_A W_A^*$). So now we have an urban-rural real wage gap of $\overline{W_M} - W_A^{**}$, with $\overline{W_M}$ -institutionally fixed.

As $L_M \text{O}_M / L_{\text{US}} = \text{probability of securing formal job; and}$

$(L_M \text{O}_M / L_{\text{US}}) (\overline{W_M}) = \text{urban expected income.}$

Thus, the condition:

$W_A = L_M \text{O}_M / L_{\text{US}} (\overline{W_M})$ causes a potential migrant to be indifferent between rural and urban job locations. The locus of each points of indifference is given by the qq’ curve in the above figure.

The new unemployment equilibrium now occurs at point $Z$, where the urban-rural actual wage gap is $\overline{W_M} - W_A^*$.

$\text{O}_A \text{L}_A$ workers are still in the agriculture sector, and $\text{O}_M \text{L}_M$ of the workers have modern (formal) sector jobs paying $\overline{W_M}$ wages.

The rest $\text{O}_M \text{L}_A - \text{O}_M \text{L}_M$, are either unemployed or engaged in low income informal sector activities. This explains the existence of urban unemployment and the private economic rationality of continued rural to urban migration despite the high unemployment rate.

The H-T model is applicable to least developing countries or to countries at their earlier stages of development with a significant urban unemployment rate. One implication in the H-T model is that job creation in the urban sector can worsen the situation because more rural migration would be induced as a result of job creation. The HT model shows also the importance of contacts in urban areas in affecting cost of migration and then the
decision making process to migrate. Migrants having contacts in destination areas have 
better information about the labor market and job opportunities which can also determine 
the migration decision making process. In addition, the model recommends that migrants 
should rationally analyze not only the wage differential in urban and rural areas but also 
the probability of getting employment in urban formal sector, i.e. the expected rural-
urban income differential, before making migration decisions (Todaro, 1980 and Todaro 
& Smith, 2006).

2.3.2 Critiques, extensions and major empirical works

The HT model has been criticized by different authors where the main criticism came 
from the founders of the New Economics of Labor Migration (NELM) model. Stark and 
Bloom (1985) and Hoddinott (1994) argued that migration is not the result of a decision 
made by an isolated individual (as explained in HT model) but it is part of a family 
strategy. In addition, the HT model only focuses on urban labor markets and gives little 
emphasis about rural areas which play a vital role for the overall national employment. 
The HT model hardly describes about rural unemployment and the possibility to search 
an urban job from the rural area (without mobility is made). In addition, the probability of 
urban employment and the duration of stay in urban destination are not clearly explained 
in the HT model. This is because the probability of finding a job can vary with respect to 
different length of stay (Khandker and Rashid, 1995). The root causes for rural-urban 
migration is not only the existence of wage differential but also as a result of poorly-
functioning capital markets in rural areas. Even with respect to wage differentials, the HT 
model describes only the inter-sectoral wage differential whereas the intra-sectoral wage 
differentials (such as inter-industry wage differentials) are not specifically considered in 
the model (Beladi and Naqvi\(^8\), 1988).

\(^8\) Beladi and Naqvi (1988: 365-375) on their works on ‘Urban unemployment and non-immiserizing 
growth’ reviewed the Harris-Todaro assumption to show the implication of economic expansion for urban 
unemployment and sectoral output.
As it is argued in the works of Katz and Stark (1986), migration can occur even when the urban expected income is below the rural income, which is clearly inconsistent with the income differential approach explained by the HT model. According to Katz and Stark, migrants can make a rational decision to migrate to urban area if the return on investment in rural area increases with the level of productive investment regardless of the expected wage differential analysis. This is because of the assumption that earning an additional small amount of remittance from urban jobs could facilitate a profitable investment in rural areas even with a lower wage income. Moreover, the New Economics of Labor Migration model rejects the HT hypothesis which argues migration occurs only from regions with a low production potential. Migration can occur in regions with high production potential but with imperfect capital market (ibid). In the same vein, the studies conducted by Banerjee and Kanbur (1981) in Indian case and Garrison (1982) in Mexico showed that expected positive income differential could not be the only reason to induce migration. This implies that other influential elements which play a vital role in the migration decision process are ignored in the HT model. In the same line, the availability of sufficient means of production should be considered as an important factor that motivate workers to migrate to urban centers rather than considering the expected income differential as the only reason for migration decision (Williamson, 1988).

The HT model failed to explain the multiplier effects of remittances for rural development, its role in increasing productivity and allowing linkages with urban areas. The model has no place for remittance income from migrants to their place of origin including what determines migration in the first place. The HT model recommends the restriction of labor migration to the manufacturing urban center with the premise that job creation in migrant destination region induces more migration rather than reducing the unemployment rate. Such restriction of labor migration may prevent developing countries from launching labor-intensive industries which could, in turn, affect the process of economic growth (Taylor, 1999).

The other side of argument on HT model is regarding the phenomena of return migration. In the dual economy model, return migration is viewed as a failure due to the fact that
migrating individuals are assumed to be rational decision makers either to migrate or not without assuming the possibility of returning back. However, return migration after temporary stay in destination region can be viewed as a success story. The duration of stay out of the origin region would be calculated with reference to the need of the household, in terms of insurance, purchasing power and savings. Once such needs are fulfilled, return migration can occur (Taylor and Martin, 2001; Taylor, 1999).

The HT model has been empirically tested and extended by different authors in different times. Fields\textsuperscript{9} (1975:185) was the first to make extensions and modifications. The extension tended to reduce the unemployment rate predicted by the HT model. Fields argued that if migrants have the opportunity to search urban jobs from their area of origin, it becomes a means to manage the motivation for excess migration and thereby reduce open unemployment. In the same vein, the introduction of transitional informal sectors facilitate as a bridge for migrants to work there while searching for a modern job in the urban sector. On the latter work of Fields (2005), he analyzed some policies such as traditional sector job creation (rural development policy), modern sector job creation, and modern sector wage limitation policy on the HT model to see the effects on income and inequality. Fields\textsuperscript{10} made inequality changes by using Lorenz comparisons and wage ratios. He constructed Lorenz curves for different labor market policies in the HT model and analyzed how inequality changes as a result of these policies. The first labor market policy was modern sector enlargement (MSEN L) policy. As indicated in Fig 2 below, MSEN L policy increases both the manufacturing employment at wage $W_M$ and the amount of unemployment at wage zero. The increment of the manufacturing employment ($E_M$) moves $K_2$ leftward whereas the increment in unemployment moves $K_1$ rightward. In the figures illustrated below, the superscript ‘O’ with the dashed lines denote for the original curve and the superscripts with MSEN L and solid lines denote for the new curve.

\textsuperscript{9} Fields (1975:165-186) investigated unemployment and underemployment situations in least developed countries by extending the Harris-Todaro model. The extension includes a job search behavior, urban traditional sector, hiring based on education level as well as incorporating the issues of labor turn-over.

\textsuperscript{10} Fields (2005:132-136) illustrated the change of inequality as a result of different labor-market policies in the Harris-Todaro model using the Lorenz curve. These policies are the ‘modern sector enlargement’ policy (MSEN L), the ‘traditional sector enrichment’ policy (TSEN L), ‘modern sector wage restraint’-MSWR with inelastic demand of labor and ‘modern sector wage restraint-MSWR with elastic demand of labor.
Therefore, as a result of MSENL policy, the Lorenz curve is $OK_1^{MSENL} K_2^{MSENL} P$ lies partly below the original Lorenz curve ($OK_1^O K_2^O P$). This shows that income inequality increases as a result of the modern sector enlargement policy.

The second policy is the traditional sector enlargement policy (TSENL). The results showed that job creation in the traditional sector has unambiguously led inequality to fall. As a result of the rise of $W_A$ and fall of $L_U$, $K_2^{TSENL}$ lies above $K_2^O$ producing the new Lorenz curve $OK_1^{TSENL} K_2^{TSENL} P$ lying partly above the original Lorenz curve (as illustrated in Fig.3 below). Therefore, the traditional sector enlargement policy is found to reduce income inequality.

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11 Lorenz curve lies along the 45° line when the distribution of income is perfectly equal and it lies along the bottom and right axes in the case of perfectly unequal distribution of income.
The third policy is modern sector wage restraint (MSWR) policy. This policy is analyzed in two cases depending on the wage elasticity of demand for labor in the modern sector. Case 1 is with inelastic demand for labor and Case 2 with elastic demand for labor. The results of the cases in the third policy have produced mixed results on income inequality.

Case 1 is the condition when $W_M$ falls and leading $E_M$ to rise a little and causing $W_ME_M$ to fall. As a result $L_U$ falls and moves $K_1$ to the left where the original $E_M$ people now have lower wages and thus smaller wage share than before (in this regard $W_A$ is unchanged). Thus, as indicated in Fig. 4 below, the new Lorenz curve ($OK_1^{MSWR}$ $K_2^{MSWR}$ P) lies above the original curve $OK_1^O$ $K_2^O$ P. This indicates that the modern sector wage restraint policy lowers the inequality of income when the demand for labor in the modern sector is sufficiently inelastic.
Case 2 is the condition when $W_M$ falls and producing sufficiently large rise in $E_M$ and also resulting rise in $W_M E_M$. As a result $L_U$ rises and then moves $K_1$ to the right. Thus, the new curve becomes above the original curve at $K_2 O$ and by continuity the two curves cross in between as shown in Fig. 5 below. This shows that the income share of the poorest (with lower wages) show an increase in income inequality whereas the share of the richest (with higher wages) show a decrease in inequality of income. Therefore, modern sector wage restraint policy with sufficiently elastic demand of labor produces mixed results on inequality of income (Fields, 2005).
As cited in the works of Todaro (1980), Johnson in 1971 modified the basic HT model. The author introduced variables for the rate of labor turn-over in the urban modern sector and the existence of family networks to facilitate the share of income from the urban employed to unemployed ones. Similarly, Cordon and Findlay (1975) extended the HT model by including perfect capital mobility between the urban and rural sectors and with external determination of commodity prices in an open economy. In the same line, Beladi and Naqvi (1988) introduced capital mobility in the Harris-Todaro model explaining that imbalances of capital to labor ratio between the agriculture and manufacturing sector is one of the factors responsible for migration. According to the authors, capital is fully utilized and workers move to places where capital is more productive. If land is scarce in agriculture, capital accumulation leads the rate of urban unemployment to fall and the unemployment rate can rise as a result of rising labor supply.

Fig.5 Lorenz curve with ‘modern sector wage restraint policy’ (elastic demand of labor)
Quinn\textsuperscript{12} (2006) added household, individual and demographic variables on the basic concept of the HT expected wage differential approach to explain the Mexican migration to U.S.

Vishwanath\textsuperscript{13} (1991) incorporated the importance of information flow and the dispersion of urban wage in an individual model of rural-urban migration decision. According to the author, migration can occur even when the average urban wage rate is less than that of the rural income flow and the spread of the urban wage distribution has been shown to alter the migration behavior. Moreover, Vishwanath argued that migration is viewed as ‘spatial relocation’ which might occur as an integral part of finding jobs or income situations through a continuous life time program of search unlike the case of the HT model where migration is independent of the time factor.

Different studies have shown the importance of non-economic variables in determining migration decision; however, many studies have confirmed that economic incentive is one of the major motivations for migration decision. The HT hypothesis on ‘expected’ wage variable (combination of wage rate and job probability variable) has been tested by different researchers as the most important explanatory variable in the process of migration decision making. As cited in the works of Todaro (1980:381), the case studies done for countries such as Kenya (House and Rempel, 1976), Colombia (Fields, 1979) and Venezuela (Levy and Wadycki, 1972) confirmed that expected wage has independent statistical significance and adding for the overall explanatory power of migration decision model. Moreover, the variables such as migration networks and distance\textsuperscript{14}, which are hypothesized to have correlations with migration decisions in Todaro’s framework, are also tested in different migration studies. Networks (Massey et al., 1993; Fields 1975; Todaro, 1980; Boyd, 1989) and distance as described in some works (such as Schultz

\textsuperscript{12} Quinn (2006:140-15) added household and individual variables such as age, sex, education level, household size, and contacts in U.S. on his empirical studies on ‘relative deprivation, wage differentials and Mexican migration’.

\textsuperscript{13} Vishwanath (1991:313-334) found out the effect of information flow and urban wage dispersion on Harris-Todaro model. The author particularly focused on job-search models, on the mechanisms how urban wage dispersion affect migration behavior and confirmed the existence of rural-urban migration despite negative wage differentials.

\textsuperscript{14} Networks and distance are also the main determinant variables in gravity model of migration.
1976 and Todaro, 1980) determine the costs/risks of migration and then influencing migration decision eventually. The existence of networks reduces costs and risks of mobility and thereby raising the net returns of migration as well as raising the motivation of migration among potential future migrants (Mendola, 2006). Cost of migration, which is explained as a determinant variable for migration decision in HT model, has been identified as a barrier of movement limiting potential migrants from gaining benefits of migration particularly in African context (Lipton¹⁵, 1980 and Lucas, 2006). As it is well described in Todaro (1980), the HT model explains many of the most important labor market interactions between rural and urban sectors. However, the above critics and empirical evidences reveal that the HT model is not adequate to explain all the influential causes that motivate individuals to migrate. In addition, it failed to describe the effects of migration for rural development in migrants’ place of origin and it has a misleading assumption of temporary and return migration as lack of success.

2.4 New linkages between rural-urban migration and development

2.4.1 The New Economics of Labor Migration model

In the previous section, we have discussed the HT model which bases its concept on the expected wage differential approach between the rural agriculture sector and the urban manufacturing sector but without taking to account the impacts of migration and remittances to rural development. As argued by Taylor¹⁶ (1999) the previous models of migration assumed migrants as individual decision makers. In addition, they analyzed the indirect effects of migration, i.e. through the analysis of labor markets, rather than on remittances and their impacts within the context of the households and communities that produce send migrants. Such description has provided very limited insight into the importance and impact of remittances on migrant sending regions. Oded Stark and David E Bloom in 1985 realized the concept of the New Economics of Labor Migration

¹⁵ Lipton (1980:9) classified costs as: urban food and housing costs (which discourage migration among poor families, cost of education (to succeed in the job markets), psychic cost(such as cultural disorders) and information costs for instance as a result of lack of experience and unavailability of contacts.

¹⁶ Taylor (1999:63-81) provided a due emphasis on the role of remittances in the process of migration and its potential for development.
(NELM) model which provides a new insight by shifting the way how migration decision is made and by linking rural-urban migration with development as described below.

The NELM model shifts the focus of migration model from individual to mutual affair where migration decisions are influenced by other actors, i.e. by households or families. Decision to migrate is a collective action done by the migrants themselves and their families, where the head of the family takes a lead in the decision making process. According to the model, variables in the characteristics of a household and its members can potentially affect the earnings of household members as well as the motivations of migrants to remit part of their earnings to the household (Stark and Bloom, 1985).

The NELM model rejects the assumption that migration occurs from regions with a low production potential. Migration can occur in regions with high production potential but with capital market imperfections. Rural-Urban migration takes place to lessen risks as a result of market failures and incomplete capital markets as well as to maximize the income of households especially in unstable and least developed economies (Katz & Stark, 1986 and Taylor et al, 1996). In NELM model, migrants and their families left in the place of origin are bound together by mutually beneficial and informal contracts, including a cooperative agreement to provide income insurance to one another (Taylor, 1999). This is to mean that migrants send remittances to household members left in the origin and the household members in turn take care and run the investments of migrants taking place in their place of origin. In addition, before sending out migrants, a household decides simultaneously about the present labor situation and other input factors which potentially affect its short and long term production and investment (De Brauw et al, 2001).

The rural areas in developing countries are typically characterized by risky production systems and by lack of access to credit and risk insurance. In such conditions, rural-urban

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17 Taylor (1999:75) noted the existence of informal contracts while discussing the motives for remitting.
18 De Brauw, Taylor and Rozelle (2001:1-21) analyzed the impact of migration and remittances on China’s rural economy. They used the NELM model as a framework and simultaneous equation econometric models for estimation.
migration works as a risk management strategy and/or as a way to ease the liquidity constraint of the household in the absence of access to insurance and credit markets. Sending out migrants is part of a strategy for households to diversify income sources, obtain capital for local investment and provide insurance against production and income risks for non-migrating household members in the origin. Remittances obtained from migrants help to introduce new production technologies, purchase inputs and boost overall production (Taylor 1999; Rosenzweig 1988). This paves a way to switch from the familial production system to the commercial one (De Brauw et al, 2001).

As argued by Taylor (1999), the NELM model not only focuses on the determinants of migration decision but also its impacts on migrant sending regions. The other concept of the NELM model is regarding return migration. In the neoclassical model, return migration is considered as a failed experience, miscalculation of the costs and returns of migration and inability to maximize expected earnings in the receiving region. However, in the NELM model, return migration can be taken as a success story where migrants return back to their origin after the calculated objectives of migration (for example accumulation of saving, insurance and purchasing power) are successfully accomplished (Dustmann, 1997). The NELM model elaborates the connection between migration and development by pointing-out the role of remittances as financial intermediaries to overcome production constraints and diversify income sources of households (Taylor, 1999; 2001).

According to Rozelle et al (1999) and de Brauw et al (2001), the NELM focuses on the following summarized points regarding the multiplier effects of remittances.

- Remittances have multiplier effects in migrant sending villages or communities through investment. An additional income is created by consumption expenditure from remittance receiving households, which generate demand for locally produced goods and services, thus boosting the incomes of others in the villages.
- Through intraregional trade, the impact of remittances on local economies is transferred to other parts of the country.
The multiplier effects of remittances on income in migrant sending areas appear to depend on local production activities. The effects are smaller when agricultural supply is inelastic. This highlights the importance of policies to remove technological constraints on production, promote investment, and develop markets as a means to make remittances more productive in migrant sending economies.

Migration may compete with local production for scarce resources, especially family labor resources, at least in the short run, leading to a re-scheduling of tasks. The effects of migration on rural poverty and inequality depend critically on how remittances as well as the losses and gains of human resources are distributed across poor and non-poor villages and households. In addition, the effects depend on production constraints facing different household groups and on expenditure linkages with the rural economy.

2.4.2 Critiques and empirical works

Although the NELM model has brought a new direction in migration research, it has been criticized by some scholars. As described in the works of Cortes (2007) as well as Folbre\(^\text{19}\) (1986), the household model emphasized on the strong cooperative bonds among household members and considers households as a single unit but neglecting the conflicts and inequalities of power existing within a household.

The other phenomenon is regarding migration networks. Distorted information about the host region, which is transmitted via networks in the destination, can mislead potential migrants. Absence of networks and contacts in destination region can also make potential migrants not to access the right information and also to depend entirely on their families for transportation and adjustment costs. This in turn increases the cost of migration and then affecting the decision to migrate. Such phenomena are not incorporated in the

\(^{19}\)Folbre (1986:5) particularly identified significant differences between the economic position of men, women and children in a household calling for a structured analysis of gender and age inequalities rather than taking a household as a single representative unit.
NELM model. In addition, networks can be responsible for large scale out-migration leading to the exhaustion of labor in the origin areas. Moreover, migration brokers can use networks for illegal human trafficking which leads to exploitation of migrants. On the other hand, structuralists criticize the NELM economists for their strong emphasis on the economic determinants of migration decision and ignoring the social and institutional determinants (Portes, 2006 and Ghosh, 2000 as cited in Cortes, 2007).

Although the empirical tests of the NELM model are few in the literature compared to other migration models, the following are some empirical evidences on the NELM model especially with respect to the connection between remittances and local development. Lucas and Stark (1985) brought empirical evidence from Botswana that migrants have a self-enforcing agreement with their families and they send significantly more remittances to households who are at risk of temporary income loss. Similarly, Stark and Rosenzweig (1989) reported that in rural India and Botswana households send their members to the labor market in times of local farm income constraints.

Taylor (1992) analyzed the relation between migration and local production for rural Mexico. According to the study, the impact of migration on farm production was initially negative. However, six years later; the marginal impact of remittances on income from local production was significant and positive confirming the hypothesis of the NELM model. Rozelle et al. (1999) analyzed that lost labor due to migration has brought a negative impact on maize production in China; however, the remittance sent to households were able to compensate the losses. The authors concluded that lack of capital and insurance markets in the rural areas motivated households to migrate out of their origin. In the same vein, Lucas (1987) provided empirical evidence for South African case that in the short run farm production among migrant sending families’ has fallen as labor is withdrawn from the sector (lost labor effects). Nevertheless, farm production and productivity has increased in the long run as a result of remittance sent from migrants. The increment of productivity through remittance has come from investing in productivity enhancing technologies, through diversification of the sources of income and

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averting potential production risks in local production process. The positive effects of remittance are determined by the profitability of investments in production activities and on existing favorable conditions (such as government policies, market constraints, etc.). The rural Mexican case study analyzed the multiplier effects of remittances for farm production. Livestock production was identified as a feasible investment in generating income for rural households because of the accessibility of pasture land, transportation and marketing facilities (Taylor and Martin 2001). Similarly, Stark and Rosenzweig (1989) reported empirical findings in support of the NELM hypothesis. The authors found that migration is partly a family response to income risk, with migrants playing the role of an income insurance policy for their households of origin. Moreover, De Brauw, et al (2001) argued that migrants have economic incentive to enhance the livelihoods of households left behind via sending remittances or returning back to source communities with savings. The above empirical evidences show how remittances increase the total income of households directly or indirectly through stimulating investment on production and how it could compensate the lost labor. Nevertheless, it has been argued that the micro impacts of migration and remittances on agriculture production and productivity are complex, little explored and the topic has been a growing area of research on agricultural and development economics (Taylor and Martin, 2001).

A study conducted by Adams (2005) for Guatemala found that households remaining at rural origin spend less for consumption and allocate the majority of remittance on investment such as on education and construction of buildings; and such remittance allocations stimulate further investments. Another research conducted by Edwards and Ureta (2003) in El Salvador confirmed that the remittances sent at home have been used to pay for school; and children in migrant sending households have lower school drop outs. Conversely, it has been reported in some cases that households entirely depend on remittances and ignore their involvement in productive activities such as cultivation. Such cases have been true especially for families who have well paid migrants at the destination and receive remittances in considerable amount (Mendola, 2006). The author cited the case studies done in some countries such as Mali (Gubert, 2000), Morocco
(Glytsos, 2002) and Albania (Germenji and Swinnend, 2004) to support her argument regarding the undesirable effect of remittances.

The impact of migration and allocation of remittances at place of origin remained a controversial issue and the effect on rural development at migrant sending region is vague and hampered by lack of diversified empirical evidences. The NELM approach in general depicts the shift of migration phenomenon from the independent individual aspect (as in HT model) to a mutual affair (as in NELM model). In addition, the NELM model sought migration from a broader perspective including both the determinants of migration and possible effects on migrant-sending regions whereas the previous neoclassical models focus only on the determinants of migration.

Therefore, the NELM model paves a way in connecting migration with its multiplier effects on development which go beyond the neoclassical economics assumptions. The NELM model produced a favorable condition in structuring the complex phenomena of the links between migration and economic development.

2.5 Rural-Urban Migration, Poverty and Development in Sub-Saharan Africa

Migration has been an important livelihood and survival strategy for many poor groups across the developing world, particularly for Sub-Saharan Africa. Migration, specifically rural-urban migration (the dominant type of migration in contemporary Africa), has long been taken as a way of life in Africa. African societies have gone through different era of colonization and this makes the process, patterns, motivation and consequences of migration different from the experience of the western world. In the pre-colonial, colonial, and post-colonial era, the African historical migration process has been characterized by its diversity and continuity which lays a foundation stone to deal with contemporary migration studies (Adepoju, 1977). The following sections describe some studies done regarding the relationships between rural-urban migration and the livelihoods of population in Sub-Saharan Africa
2.5.1 Determinants of rural-urban migration in origin and destination regions

In the previous sections, some of the determinants of migration decisions have been discussed from the perspective of different models and empirical evidences. This section further summarizes the determinants that affect rural-urban migration with special reference to Sub-Saharan Africa.

Sub-Saharan Africa has experienced a noticeable increasing rate of migration in recent years (Naude\textsuperscript{21}, 2010). The increment in the rate of migration is associated with so many interrelated factors that determine the decision to move. According to Greenwood (1985), some of the responsible factors for migration are classified based on regional differences between sending and receiving regions and on individual characteristics of migrants. In the same line, Naude (2010) and Ivan\textsuperscript{22} (2008) classified the determinants that affect the migration decision of individuals and families in sub-Saharan Africa as: economic determinants, demographic determinants, gravity variables, labor market determinants, conflict and environmental determinants. According to a report from Marchiori, et al (2010), climate variation has been responsible for a displacement of 2.55 million people over the period of 1960-2000 in Sub-Saharan Africa. The problem is particularly severe for countries that depend on the agriculture sector and have lead to rural-urban migration as well as shift from agricultural to non-agricultural sector. Thus, it means that climate change is one of the responsible factors for the growth of African cities and a determinant factor for urbanization of the continent (Barrios et al\textsuperscript{23}, 2006).

Exaggerated expectations of high quality city life also motivate and pull rural residents out of their locality. The study done in northern Ghana by Gugler and Flanagan (1978)


\textsuperscript{22} Ivan (2008:1-20) reviewed literatures on the determinants of internal migration from macro and micro perspectives.

\textsuperscript{23} Barrios, S.,Bertinelli,L. and Strobl,E. (2006:1-28) analyzed the role of climate changes on rural-urban migration and urbanization in Sub-Saharan Africa. The authors have taken 78 developing countries for comparison purposes out of which 36 of them belong to Sub-Saharan African countries.
depicted that the exaggeration is conveyed especially by returned migrants who need to have a positive image about themselves in the minds of others. Such movements are done to seek a better economic incentive in urban destinations.

Another study conducted in South-East Nigeria show that one of the responsible factors for rural out-migration of people has been related to the land tenure system. Land is controlled by a common ancestor where it is only claimed by indigenous households belonging to a decent from a certain ancestor. Such conditions paved a way for the landless to migrate (Tacoli, 2002).

The gravity determinants of out migration mainly refer to distance and size of population. The closer the distance is between the rural and urban area, the higher the rate of out migration from the rural origin (Greenwood & Hunt, 2003; Ivan, 2008). In this regard, a survey done in remote densely populated region of South-East Nigeria showed that road and transport facilities have a negative effect on the transportation of farm produces and this has induced migration of small scale farmers in seeking urban wage employment (Tacoli, 2002). Similarly, the higher the population size in rural origin leads to more inclination to migrate to cities in order to circumvent competition over a given resource such as land in origin. In addition, unpredictable precipitation and climate, market prices of agricultural products, ethnic tensions, civil disturbances and war have been also reported among the determinants for migration decision in Sub-Saharan Africa (Bryceson and Jamal, 1997 cited in Fay and Opal, 2000).

A survey conducted in Burundi, Ghana, Kenya, Mali, Nigeria, Senegal, Togo and Uganda has considered education, marital status, age, ethnicity and number of births as determinates of rural out-migration (Brockerhoff and Eu, 1993). The survey concluded that more schooling increases the likelihoods of rural-urban migration depicting a strong relationship between education and migration. In addition, long-term migration is more prevalent among rural women with less number of children. On the other hand, age has been identified as a determinant factor for migration. A survey conducted in four towns of Mali and for a 90% of out-migrants from the river valley of Senegal depicted that the
majority of rural-out migration occurs within the age range of 25 or older (ibid). Ethnicity has been also identified as a factor influencing out-migration in West Africa particularly for female migration. In this regard, for example, Serere and Diola women are more autonomous than Peul and Soninke women to seasonally migrate to cities. With respect to the relationship between marital status and migration, no generalization can be drawn despite some cases that African women leave their rural origin to join their husbands in the urban cities with secured job. The survey also indicated that poor economic opportunities of rural areas has been a considerable factor for out-migration taking to account the case of Northern Ghana where migration towards the prosperous coastal towns is prevalent (ibid).

2.5.2 Rural-urban migration and agricultural development in the region

Agriculture still remains as a primary activity among African rural population. The changes occurring as a result of rural-urban interactions have also implication on the transformation of the agriculture sector (Tacoli, 2002). In Sub-Saharan Africa, Goldsmith et al, (2004) confirmed the Lewis assumption that rural-urban migration has been activated as a result of the emergence of modern economy. In Sub-Saharan Africa, rural regions have population pressure relative to their ability to feed themselves; and making the productivity of labor to be low and then inducing migration to urban regions.

Surveys conducted on the impact of rural-urban migration on the development of local economies in Sub-Saharan Africa show different results and the direct and indirect effects vary from country to country. On one hand, some studies such as Lipton (1980) depicted that migration is often observed among the most productive group of the population and leading to lack of labor that eventually reduce rural production. In addition, the amount of remittance sent to the remaining rural families hardly enables to use labor saving technologies and most of the portion of remittances is spent for day to day consumption. The average amount of remittances sent to rural villages were reported to be low and families of the migrants face difficulties to spend the money on agricultural investment.
due to high prices of production inputs such as chemical fertilizers, livestock breeds and hired labor. On the other hand, studies such as Taylor (1999), de Brauw et al (2001), Rosenzweig (1988), Taylor et al (1996) and Gubert (2000) depicted that remittances sent by migrants relax the credit constraints particularly among the poor rural farmers leading to the use of improved technologies. Remittances in the rural origin can be used for different purposes either for consumption or for capital expenditure or to insure rural households against volatile incomes or for investment on farming tools, inputs and hired labor. In food insecure areas, remittances have played a vital role in ensuring food security and diversify risks. The average agricultural productivity in Sub-Saharan Africa measured in output of cereal per hectare is far below the average productivity in other regions. One of the reasons for this problem has been low investment on land fertility (SESRTCIC\textsuperscript{24}, 2007).

In Sub-Saharan Africa, rural out-migration of male labor has different impacts on agricultural production in different places depending on some factors such as the availability of substituting labor and with respect to efficient allocation of remittances on output increasing technologies. A study undertaken in central Mali revealed that the absence of young working men from the rural areas led to negative effect on rural output and the remittance sent by the migrants hardly substitute the lost labor and farm experience. The condition became worse in places where farm activities are undertaken by hand and where labor is the most determining factor in production. In the same vein, in Northern Tanzania, young rural women are likely to migrate and engage in petty trading as a form of primary or secondary job given the fact that they rarely inherit farm land and farming is carried-out with unpaid family labor (Tacoli, 2002).

On one hand, out-migration of labor could restrict the process of farm intensification particularly in places where labor is scarce. On the other hand, agricultural intensification would be stimulated if the remitted money allows rural households to invest efficiently in physical capital and technologies such as farm equipments, draft animals and labor

\textsuperscript{24} (SESRTCIC, Statistical, Economic and Social Research and Training Center for Islamic countries, 2007:6-34) analyzed the poverty in Sub-Saharan Africa; with an emphasis on OIC member countries in Sub-Saharan Africa
employment. In addition, migrants would come up with ideas and knowledge that could improve and change farming practices and introduce new technologies which eventually trigger intensive farming. In such circumstances, rural households make a decision on whether investments from remittances on agricultural production and intensification could be productive or risky (McDowell & de Haan, 1997 and David, 1995).

A study conducted in Northern Tanzania has shown that rural farmers with proximity to urban locations are able to commute for a part time employment without leaving their farming whereas rural residents from mountainous regions where land and transport access are not efficient abandon their farming and migrate to cities permanently. A case study in Mali, on the other hand, shows that wealthier urban residents control the means of farm production such as tractors and mills and then access rural land via market transactions. This leads small scale farmers to sell their plot of land and search for a wage labor employment particularly among the young generation (Tacoli, 2002).

The effect of migration on agriculture and livelihoods of rural households in less developed regions in general depends on different factors. To mention some, the pattern of migration, the length of time spent out of the farm activities, available assets and farm enhancing inputs and other institutional and socio-cultural setups (that allow women to perform farm activities which have been reserved for men and household heads previously) can be mentioned (McDowell & de Haan, 1997).

2.5.3 Rural-urban migration and urbanization in the region

More than half of the world population lives in urban regions in recent times though the number differs among developed and developing countries. Least developing countries are experiencing increasing number of urban population and rural-urban migration takes the front position for the causes of this increment. Although the rate of urbanization is not coincided with the improvement of economic development in Sub-Saharan Africa,

25 McDowell & de Haan (1997:3-21) discussed the relations between migration and sustainable livelihoods with cases from Ethiopia, Bangladesh and Mali.
26 David (1995:2-156) compiled the research surveys done in Senegal, Burkina Faso, Mali and Sudan
the rate of growth between 1960, and 1990s was ten times greater than OECD countries
(Barrios et al, 2006). African countries are experiencing a rapid rate of urbanization in
recent times, which is the highest in the world. It is projected that the number of African
urban residents rises by more than 300 million between 2000 and 2030 (Kessides, 2005).
Rural fertility level is getting higher leading to natural population growth rates in rural
regions that pave a way for migration to urban locations. However, the increment in the
rate of urbanization has increased the level of urban unemployment. Apart from
increasing population growth rate in the region, rural-urban migration has been
responsible for over fifty percent of urban growth (Hogan & da Cunha, 2001; Byerlee,
1974 and Barrios et al, 2006).

Rural-urban migration has been considered as a prerequisite for urbanization and also in
the process of rural development (through remittances and adoption of technologies). The
contribution for rural development can also be either via investment in education or other
productive investments or through increasing consumption of rural inhabitants.
A study by Kessides (2005) found out that poverty is not necessarily correlated with
urbanization in Africa where the poorest are not always the least urbanized. In addition,
rural-urban migration in Sub-Saharan Africa overcrowded cities even though most cities
do not have the right capacity to absorb the pressure and to provide the necessary public
resources for the increasing population. Such condition has created conducive
environment for the expansion of slum locations and criminal activities. In addition, the
increase in the flow of population to urban areas has created inequalities between rural
and urban areas. As a result, some governments have adopted policies to restrict rural-
urban migration (Lall et al, 2006).

Structural, socio-cultural and geographic aspects such as distance between urban-rural
locations have played a fundamental role for the mobility of people and for the process of
urbanization. The number of formal and informal employment opportunities in urban
labor markets, the expansion of information and technologies and the creation of demand
for unskilled people in urban locations were reported to attract migrants from rural areas
and have become some of the responsible factors in facilitation of the urbanization
process in the region. However, different governmental and non-governmental international organizations have reported social, environmental and economical concerns as a result of the rapid growth of urban population in the region and the phenomenon has become one of the priority areas for policy makers and demographic researchers (Hogan and Cunha, 2001).

2.5.4 Poverty, income inequality and links with rural-urban migration in the region

Sub-Saharan Africa is a region where the proportion of the poor is the highest and having the lowest per capita income and saving rate. On average, 45 percent of the population in the region lives below one US dollar a day. Moreover, the region is characterized by its highest level of intra-regional poverty and the poverty indicators remained unchanged over a decade compared to other regions of the world (SESRTCIC, 2007). Although, the proportion of population in Sub-Saharan Africa living below $1.25 a day reduced from 55.7 in 1990 to 50.3 percent in 2005, the number of people living in extreme poverty grew by 100 million as a result of population growth in the region. The region is also at risk of food insecurity, vulnerability to climate shock, conflicts, and diseases such as HIV/AIDS, malaria and tuberculosis. This has shown that the development indicators still remained below acceptable standards (UN, 2008). In Sub-Saharan Africa, poverty has not only widespread but also got deeper and deeper. In addition, Sub-Saharan Africa ranks second with respects to income inequality after Latin America. The overall result showed that inequality has been rising as income declining and vice versa (Go et al, 2007). Based on a data on income, Bigsten and Shimelis (2003) have reported that there exist a strong positive correlation between long term growth and preliminary income inequality in Africa. Although the region shows a positive economic growth, the majority of the population is not benefiting from the growth. Income inequality in the region has been reported to be high and changes frequently over a short period of time. One of the reasons described has been that the GDP of most of the middle income African countries has

27 The United Nations report on the Millennium Development Goals in 2008 analyzed the Sub-Saharan African progress towards anti-poverty goals
28 Go, Nikilin, Wang and Zou (2007:252-302) analyzed the poverty and inequality situation in Sub-Saharan Africa
been improved as a result of their mineral and mining industries and has been characterized by high income inequality initially. On the other hand, post conflict economies have also experienced increasing income inequality as a result of economic recovery. As described in the works of Okojie and Shimeles (2006), the case is true especially for countries such as Mozambique, Tanzania, Uganda and Ethiopia. These countries would have been in a position to reduce their poverty levels if the level of income inequality had not been rising as a result of the economic growth.

With respect to the connection between migration, poverty and income inequality, migration play an important livelihood diversification strategy for the poor as well as for the better off population in least developed nations (Waddington and Sabates-Wheeler, 2003).

Case studies from Botswana, Burkina Faso, Ethiopia, Gambia, Kenya, Lesotho, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania and Zimbabwe have shown that risky environments of Sub-Saharan Africa, food insecurity, low farm productivity and income shocks as a result of drought has been reported to be determinant factors for poverty of rural poor that lead to non-farm income diversification strategies. The share of non-farm income has been found to be substantial particularly to the vulnerable poor groups. Poor rural families send out excess labor not only to gain additional non-farm income but also to insure themselves against shocks and get financial resources for investment (Reardon, 1997). On the other hand, it has been found that migration is not an option available for all poor people in the region particularly for the poorest of the poor and those who are not moving from their locality due to social exclusion. The poor have limited access to and control over resources and therefore, poorer migrants could not afford to borrow at high interest rates to finance the


30 Reardon (1997:738) presented a table showing the share of non-farm income among the poor-and non-poor rural households in Sub-Saharan Africa. The countries represented in the case study include Botswana, Burkina Faso, Ethiopia, Gambia, Kenya, Lesotho, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania and Zimbabwe.

The empirical literatures on the links between migration, poverty and income inequality have also shown mixed results and there is still no consensus on the distributional effects of migration on rural areas (Stark et al 1986; Cortes, 2007 and Black et al, 2005). This is because migration can either improve or get worse the livelihoods of migrants and the non-migrating families. For example, migrants who have networks in destination would enjoy benefits from migration whereas other migrants and their sending households would get more impoverished and vulnerable as a result of the economic and social costs of migration (Waddington and Sabates-Wheeler, 2003). In this regard, a research survey conducted by Haan et al (2002) found that migrants from Mali rural villages have benefited from mobility as a result of migrant networks from the neighboring regions. Other studies in Egypt and Ghana depicted that migration helped the poor groups of the population to move out of poverty (Sabates-Wheeler et al, 2005). Nevertheless, the study showed that the past poverty condition of the population was a responsible factor for the current poverty status of these countries emphasizing the presence of poverty traps.

With respect to gender and access to non-farm employment opportunities, a survey conducted in Southern Tanzania has shown that non-farm employment opportunities have strong gender bias. Rural women and widows are excluded from access to non-farm employment particularly where physical strength (such as in construction and transport sectors) is required and then leading them to destitution (Tacoli, 2002). The patterns of migration and selectivity of migrants for instance, whether a migrant is high skilled or low-skilled; or whether a migrant is an international or internal migrant have been reported to have its own effect on poverty (Taylor et al 1996; de Haas, 2007). In general, the link between migration and income inequality should be taken to account with different considerations. These include factors such as the types of migration, the time periods with respect to the history of migration in migrant sending regions as well as the selectivity of migration (i.e. including the type of work, the destination region, migration costs etc) (Stark et al, 1988).
2.6 Concluding Remarks

Rural-urban migration research particularly with respect to least developed countries has been an important and growing area of research in development economics. In addition, the linkages between population growth and economic development has been given due attention. Although there have been many ongoing research on migration in general and on rural-urban migration in particular, certain research questions have not yet been answered or got clear and comprehensive answers.

The effect of rural-urban migration on agricultural production still remained a controversial issue. On one hand, it involves the removal of production factors such as labor and capital (due to migration costs) and on the other hand, it promotes agricultural investment via the inflow of remittances to migrants’ families. Many migration studies have their own boundaries and argue either towards the negative effects of migration on agricultural income or towards the positive effects without providing any room in-between and without taking to account the different demographic and economic contexts of least developed countries that can possibly affect their conclusions. The study finds out to which extent and to which conditions rural-urban migration can be an acceptable phenomenon in Sub-Saharan Africa, particularly with respect to the Ethiopian context. This provides the opportunity to evaluate the development implications of the LRF, HT and the NELM models in rural Ethiopian context. The research mainly analyzes what will happen on the agricultural production and total income of rural households when there are changes in production factors as a result of migration and remittance flows. Almost all studies analyze the effect of migration and remittance flows directly on the outcome variable, i.e. on production or income. In addition, the study explores the effects of migration on intensity of farm inputs and with respect to per capita farm income. For the analysis, the study adopts the Cobb-Douglas production function as its methodological approach to see the effect of rural-urban migration on production/income via its effect on production factors (done in two stages as explained in model specification sections of the empirical part). This provides its own methodological contribution in dealing with the effect of migration on production and income.
The other contribution of the research is with respect to suggesting the conditions needed for making rational migration decision points by combining the concepts of the HT model and the NELM approach. The research uses the mathematical explanation of the HT model but with incorporation of the NELM concept where the HT model is criticized for missing it.

The nexus between poverty and rural-urban migration would be another topic of discussion. The effect of rural-urban migration on poverty level of households remained ill-studied area and it is only recently that the questions on the effects of migration on poverty and inequality started to be raised. The research contributes to the existing limited studies on the debates whether rural-urban migration exacerbates or relaxes the poverty level of households in the origin; and whether rural-urban migration insures against the volatility of households’ income in Sub-Saharan Africa in general and in Ethiopia in particular. In this case, the research analyzes the impacts of migration not only among the poor and non-poor groups in general but also takes to account the inequalities existing within the poor groups, i.e. it assesses the incidence, depth and severity of poverty in connection with the effect of rural-urban migration.

Migration is often considered as synonymous with international migration and many migration researches have been done at macro level and on the effect of formal international remittance flows on national economies. Other studies on internal rural-urban migration particularly in least developed regions, focused on the livelihoods of the migrants themselves based on urban centers as a result of inaccessibility of facilities in remote villages of least developed countries. This research analyzes the multiplier effects of migration from the perspective of the livelihood of migrant sending households in rural areas, and therefore contributing on the studies of the subject matter from the perspective of rural villages. The research not only focuses on individual and household characteristics (such as age, education level, marital status) as determinants for remittance income (as many migration researches do), but in addition test empirically the simultaneous effects of ‘migration duration’, ‘number of migrants per household’ as well as ‘pattern of migration’ while discussing the determinants of remittance behavior. The
simultaneous analysis in this research plays an important role in getting a clear picture of the impacts of rural-urban migration on production and income of rural households. Moreover, the poverty reduction strategy document of the country contains contrasting ideas on migration: on one hand, it discourages rural-urban migration and; on the other hand, discusses on the importance of rural-urban linkages, development of towns and structural changes. Therefore, the research suggests appropriate policy guidelines and on the ways of making migration acceptable and compatible with development.
CHAPTER THREE

Rural-Urban Linkages, Labor Markets and Migration in Ethiopia

3.1 Brief Historical trends of migration in Ethiopia

Migration has become an important phenomenon and policy issue in Ethiopia. This section attempts to assess the trends and characteristics of migration in Ethiopia in three successive governments i.e. in the Emperor Hailesellassie’s regime (1941-1974), in the Socialist Derge era (1974-1991) and in the current EPRDF\textsuperscript{31} government (1991- to date). Although Ethiopia experienced migration of people before the 19\textsuperscript{th} century, the following category in three important political periods has been set for ease of presentation and discussion.

3.1.1 The trend in Emperor Hailesellassie’s regime (1941-1974)

From the historical point of view, one of the factors inducing migration in Ethiopia has been linked with a mechanism to escape from shortage of land. In Emperor Haile sellassie’s administration, most of the agricultural land was cultivated by communities that belong to a common ancestry system called *rist*\textsuperscript{32}. Land was transferred from one generation to the other by family and individual *rist* holders who benefited by virtue of being members of the respective lineage. Hence, land remained an important asset and main source of conflict in Ethiopia. The expansion of the Ethiopian kingdom from north to south in the late 19\textsuperscript{th} century has significantly promoted the migration of population from northern highlands to southern lowlands. In addition, the establishment of Ministry of Land reform and administration in 1966 created an opportunity for resettlement programs as a five year plan. The resettlement program had an intention to settle northern

\textsuperscript{31} EPRDF: The Ethiopian People’s Revolutionary Democratic Front is the current governing party of Ethiopia

\textsuperscript{32} *Rist* means tenure referring to the communal ownership of land right. The term is no longer used in contemporary periods.
Ethiopians to south. However, the resettlement program was not carried out on empty lands and movement of people to the south had resulted violence and conflict of the local population. The reason for the resettlement program was not only to lessen the shortage of land but also for controlling mechanism of occupied areas and to expand the revenue base of the Empire via increasing the number of tax paying farmers (Nogo, 1973; Olika, 2006).

According to Pankhurst\(^{33}\) (1992), about seven thousand households were migrated in twenty resettlement sites in the south, and about five percent of the households were spontaneous migrants in this particular period. In general, the imperial administration resettlement program of the 1970s was characterized by lack of centralized coordination and planning and high operational costs.

The establishment of industrial enterprises, commercial centers, building of roads, had direct impacts for rural-urban migration and for the expansion of commercial towns in Ethiopia. The establishment of commercial farms in 1950s and 60s (for example sugar cane plantation and processing factory by a Dutch firm in Upper Awash) facilitated a considerable rural-urban migration. In addition, the growth of the agricultural sector and urban services in areas such as Wolayita and Arsi, supply of fertilizers and veterinary services in Shashemene town, the introduction of mechanized farming and the development of transportation system in Rift valley regions of the country also attracted seasonal and permanent laborers and peasants. Natural disasters and environmental degradation was also reported for the migration of labor from the northern part of Ethiopia at that time. In the imperial regime, the development of towns and the expansion of economic sectors and services attracted not only laborers but also traders, civil servants, construction workers, domestic workers and even women migrants to work as prostitutes (Tadele et al\(^{34}\), 2006).

\(^{33}\) Pankhurst (1992:27-32) also reviewed the views of farmers about the famine and resettlement programs as well as survival strategies

\(^{34}\) Tadele, F., Pankhurst, A., Bevan, P.,Lavers, T.,(2006) also surveyed factors affecting the dynamics of rural-urban linkages in two urban and five rural regions of Ethiopia, i.e. Addis Ababa, Shashemene, korodegaga, Turufe kecheme, Dinki, Yetmen, Imdibir Haya Gasha
3.1.2 The Socialist Derg era (1974-1991)

The Derg regime brought radical reforms. The land reform proclamation in 1975 nationalized all land resources and allowed the intervention of the state in land ownership. The reform changed the pattern of land distribution and ownership and the state was the sole owner and distributor of land. In addition, the reform included official registration of both rural and urban population and set eligibility criteria\(^{35}\) to obtain land in rural areas. In addition, checkpoints and pass system were introduced in the main highways (Tadele et al 2006; Crewett, et al.\(^{36}\), 2008).

The Derg regime established some agencies to undertake resettlement programs. These were ‘Relief and Rehabilitation Commission’ in 1974 and ‘Settlement Authority’ in 1976. These agencies facilitated for the resettlement of hundred thousands of people in eighty four settlement sites. As a result of the famine in 1984, the regime resettled one and half a million people from the famine affected regions of Wollo and Tigray to non-affected areas, particularly to the South-western part of Ethiopia. The resettlement program, which was not based on voluntary basis, was criticized on its negative effects on settlers, on the environment and on the host population. The program resulted for excessive death and family separation as it was undertaken by force. The government cleared forest lands to resettle people that eventually resulted devastation of the natural environment and wild life. Although the socialist regime resisted the critics initially, latter acknowledged that the resettlement program was poorly designed and executed (Pankhurst, 1992).

The land reform policy, which limited access to land for only registered permanent members of peasant association, forced rural inhabitants to confine themselves in their locality than migrate to urban areas. This was because land belonging to absent people for more than a year was redistributed for the local people. Other reasons that

\(^{35}\) One of the criteria to obtain land in the regime was to be a permanent resident of the peasant associations, established in the reform.

\(^{36}\) Crewett, Bogale and Korf (2008) made their analysis particularly for land tenure systems in northern and central Ethiopia
discouraged the free mobility of rural migrants in the Derg era were: the need for an official pass letter to travel to cities, the need to register in urban dwellers association as well as the expansion of civil war and ‘Red Terror‘ (Desalegn, 1994 as cited in Tadele et al 2006).

3.1.3 The post 1991 Period (the current EPRDF\textsuperscript{38} government)

The resettlement program of the Derg regime was criticized by the current EPRDF administration for its negative impacts on settlers, host population and the environment. In EPRDF regime, mobility of people has been made on voluntary basis and resettlers were provided the right to retain their land rights at their origin and the right to return back to their home villages whenever they want to. With in three years of period from December 2003 to May 2006, the government resettled 2.2 million people (440,000 households) from chronically food insecure areas to the southwestern and western areas of the country. The reasons given for choosing these destinations were because of the existence of under utilized natural resources and sparse population (the same reason justified by the previous two regimes (Benjamin, 2004; Abeshu, 2008)

The EPRDF government has introduced ethnic federalism and regions\textsuperscript{39} have been identified based on ethnicity in the Ethiopian constitution since 1991. According to the Federal constitution (Art.40/3), the ownership right of land belongs to the regional state and land can not be transferred through sale or other means of exchange by anyone except the regional state that administers and has power over it. The justification given by the government regarding the land ownership rights of the regional state has been to protect farmers from possible loss of their irreplaceable asset. Private ownership of land

\textsuperscript{37} Red Terror is the deadly and violent campaign that took place in Ethiopia and responsible for the deaths of thousands of people in the Derg socialist era (Tareke, 2008)

\textsuperscript{38} EPRDF: The Ethiopian People’s Revolutionary Democratic Front is the current governing party of Ethiopia

\textsuperscript{39} Based on the federal constitution of Ethiopia, 9 regions and 2 city administration are identified. The regions are: Tigray, Afar, Amhara, Oromia, Southern Nations, Nationalities and People’s Region (SNNPR), Gambela, Beneshangul-Gumuz, Harari, and Somali. The two city administrations are Diredawa and Addis Ababa. For a map of regions of Ethiopia please refer Annex1.

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might force poor farmers to sell their land as a result of poverty and end up becoming
landless and poorer. The land tenure system has influenced the dynamics of migration. A
survey conducted by the Central Statistical Authority (CSA) of Ethiopia on the national
labour force in 1999 depicted that intra-regional migration of labor was prevalent in the
regions and inter-regional migration was very limited. The reasons assumed for very
limited inter-regional migration has been the implementation of ethnic based federalism
and its consequences on the preference of people to confine themselves in their home
regions where they can speak the language well and share the culture. The five years
Poverty Reduction Strategy Paper (PRSP)\textsuperscript{40}, i.e. the PASDEP\textsuperscript{41} of the country has
contrasting arguments about the needs for rural-urban migration (Tadele et al, 2006). The
document argues on the negative aspects of migration and considers rural-urban
migration as a cause for urban poverty, widespread of HIV/AIDS and for expansion of
crime in cities. According to the document, rural-urban migration increases the flow of
people from rural areas leading to the increase of pressure on urban services and facilities
as well as for the increase of unemployment rate. In addition, the paper argues on the
strategy of discouraging rural-urban migration with a premise of maximizing the utility of
rural labor in the agricultural sector. These premises have been assumed to be achieved
via labor-intensive agricultural development strategies and proper utilization of
agricultural land. On the other hand, it documented the existence of small land holdings
of rural households (even as low as 0.25 hectare for some regions\textsuperscript{42}). In addition, it has
pointed out the needs for inter-linkages of the primary sector with secondary and tertiary
sectors, development of small towns and creation of employment opportunities in urban
areas. The arguments have been contrasting to each other and do not thoroughly take to
account, the size of land holdings of the majority rural households as well as the positive

\textsuperscript{40} Poverty Reduction Strategy Paper (PRSP) of Ethiopia designed for 2005/06-2009/10 (pp. 67-108)
explained on the rural and agricultural development policies and strategies. The paper argues on the
negative outcome of rural-urban migration on urban development (p.161). However, the paper (pp151-156)
pointed out strategies on industrial development and inter-sectoral linkages. In addition the paper (pp161-
171) described strategies on urban development including promotion of rural-urban linkages, and small
town development as well as creation of urban jobs and promotion of labor intensive urban work programs
(p162)

\textsuperscript{41} PASDEP: the Plan for Accelerated & Sustainable Development to End Poverty.

\textsuperscript{42} The paper (p169) documented high population density and increasing human and livestock pressure on
arable land, particularly for northern, central and southern regions.
developmental outcomes of rural-urban migration. In general, the current patterns of population movement in Ethiopia are highly hampered by empirical studies.

3.2 Rural-urban Linkages and labor market in Ethiopia

3.2.1 Linkages between labor supply and patterns of migration

3.2.1.1 Characteristics of labor market in Ethiopia

Developing countries are characterized by high level of unemployment and disguised unemployment. This can be explained with demand and supply side barriers to employment opportunities. The demand side factors, for instance, include lack of absorbing capacity of the economy or incapability to create new jobs. The supply side can include lack of proper education and training of labor, and lack of experience that hinders the poor to assimilate in the labor market (Osmani, 2003). The case is also true for Ethiopian labor market like the case of other developing countries. The Ethiopian labor market is characterized by its inefficiency and under-development. The supply of labor exceeds the demand and excess labor is absorbed by the informal sector (Buckley, 2003). The informal sector has been an important source of income for many people across the world. It has been reported that 60% of the urban labor force in Africa and Latin America is employed in the informal sector. However, the informal sector is characterized by poor working conditions, low and irregular labor standards as well as lack of social security system (EEA, 2006:155). A report from the Economic Commission for Africa (2005) depicted that employment in informal sectors worsened poverty in Sub-Saharan Africa as a result of low wage payment for labor. Individuals evaluate their alternative they have and compare the formal and informal jobs based on the marginal returns to labor. In Ethiopia, the importance of informal sector employment differs from region to region (Heckman & Sedlacek, 1985; EEA, 2006).

Ethiopia is the second populous country in Africa next to Nigeria. The population of the country was 35.5 million in 1980 and it is more than 85 million in 2011. According to the

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EEA-Ethiopian Economic Association (2006) reviewed the unemployment challenges and prospects in Ethiopia in its fifth report on the Ethiopian Economy
estimation for 2011, the average annual population growth rate of the country has been 3.2% (CIA world fact book, 2011). The labor market in Ethiopia can be categorized as formal and informal employment, as private and public job markets, as wage employment and self employment, as well as urban and rural labor market. Many of the formal employment opportunities are found in urban areas whereas agricultural workers in rural areas are informal workers and self employed (EEA, 2006).

The working age population of Ethiopia has been reported to be 10 to 64 (CSA 44, 1999, 2007). Fig. 6 below depicts the trends in the size of the working age population in Ethiopia comparing the case between the year 1999 and 2007.

Fig. 6 Size of the Ethiopian working age population in years 1999 & 2007

Computed from data source of CSA, 1999 & 2007

The working age labor participation has in general increased for all age groups except the older working age groups that showed only little difference. As it is shown in the above

44 CSA: is the Central Statistical Authority of Ethiopia responsible for undertaking population census, and various socio-economic surveys in Ethiopia.
chart, between 1999 and 2007, the highest working age population increment in Ethiopia has been registered for age groups 10-14 and 15-19 followed by age groups 20-24, 25-29 and 30-34. The share of working age population for age groups 10-14 compared to the total population was 11.2% in 1999 and 13.24% in 2007. Likewise, the share of working age groups between 15 and 49 was 36.9% and 43.14% for the years 1999 and 2007, respectively. The increasing growth rate of the working age population in the early age groups has been higher than the latter age groups between the years 1999 and 2007.

Similarly, the rural working population has a larger number of the younger age groups compared to the older ones (as the trend shown in Fig. 7). The estimated rural population in Ethiopia was 83% in 2007 where as it was more than 85% in 1999. The proportion of urban population in Ethiopia has been smaller compared to most African countries. However, the growth rate of urban population in Ethiopia is increasing currently. The UNDP report in 2004 noted that the urban population of the country might reach 29 percent by 2020 and rural-urban migration has been the main cause for the growth of urban population in this regard (Tadele et al. 2006).

Fig. 7 The Ethiopian working population in rural and urban areas

Computed from data source of CSA, 2007:48
Like the case of other least developed countries, child labor in Ethiopia has been reported to be increasing. Various factors have been responsible for the engagement of children in the labor force and all are related to the prevalence of poverty directly or indirectly (UNECA, 2006). Statistical labor survey data shows that the participation of labor among children in rural Ethiopia far exceeds that of urban children. About 90% of children in Ethiopia who are economically active are found in the agriculture sector, which is the dominant employer of labor in the country. The cost of labor in the country’s manufacturing sector is relatively low compared to other developing countries. For example, the wage of manufacturing sector is three times greater and productivity of labor is five times greater in Chinese manufacturing sector than in Ethiopia. Although productivity of labor has declined in the sector, there have been wage increases in real terms (EEA, 2006).

3.2.1.2 Patterns of Migration and the supply of labor

Only little information is documented on the relationship between migration and labor market in Ethiopia as a result of data scarcity on migration (EEA, 2006). According to the CSA (2007:299), the different patterns of migration in Ethiopia have a direct effect on the distribution of the population and have in turn interaction with other socio-economic and demographic changes. In addition, the patterns of migration change over time as a result of urbanization and development. The migration status of the Ethiopian population has been dominated by rural-urban pattern and followed by rural-rural and urban-urban flows of people. In Ethiopia, large regions such as Oromia, Amhara and SNNPR, experience higher intra-regional migration than inter-regional migration where as smaller regions such as Harai and Afar have mainly inter-regional migrants (Tadele et al, 2006).

The national labor force survey (CSA, 2007) indicated that female migrants are higher in number than their male counterparts in Ethiopia particularly for age groups between 15 and 29 (as indicated in Fig.8 below).
Most migrants are at their young and productive age while making the movement. Apart from job opportunities for women in hotels, restaurants and private houses in Ethiopian cities, young girls have social and family pressures to get married at their early ages, and these have induced more migration for women. Women particularly migrating for certain reasons such as marriage arrangements, divorce or family integration mainly migrate permanently. Migration with the aim of searching for a job has been prevalent for men than for females. The high population density in rural areas particularly for some regions such as SNNPR region, and the expectation of better living condition in urban locations have been the major responsible factors for migration. The case is true particularly for rural-urban migration pattern, which has been documented as a dominant migration stream in Ethiopia. (World Bank, 2007; EEA, 2006)

The World Bank report (2007), pointed out that the pace of migration from rural areas increased between 1999 and 2005 although there is lack of recent data to confirm the assessment of internal migration flows in Ethiopia. The report predicted that migration to
urban regions would further increase as a result of population pressures on land, inequalities between regions with respect to employment opportunities, environmental degradation, improved infrastructure such as transportation and communication networks as well as the progress in the process of development itself. In this regard, smaller cities play a vital role serving as a ‘step migration’ towards bigger cities. In addition, intra-regional migration from rural regions mainly within short distances accounted about 79% of the mobility (ibid).

3.2.2 Productivity of labor in the agriculture sector

The foundation of the Ethiopian economy bases on the agriculture sector. Agriculture accounts for half of the total GDP, 84% of the export and for a livelihood of more than 80% of the population in Ethiopia. The performance of other sectors, i.e. the industry and service depend on the performance of the agriculture sector. The sector provides food for domestic consumption and raw materials for local manufacturing industries (FDRE45).

Although the agriculture sector plays an important role for the Ethiopian economy and livelihood of the majority, it is characterized by its subsistence farming and periodic drought. The performance of the sector is poor, underdeveloped, and subjected to risk as a result of erratic weather conditions, price fluctuations and the recurrent occurrence of pests and diseases. Most subsistent farmers use backward farm technologies, and their farming mainly depend on rainfall. Environmental degradation and high population growth also aggravated the problem and reduced the performance of the sector. Despite all these constraints on the sector, the country has immense resources. The country has plenty labor resource, underutilized water resources and only 5% of its potentially irrigable fertile land has been used so far in the country (Makombe, et al 2007; Kumbi & Berg, 2006).

In general, the productivity of labor resource in the agriculture sector is considered to be low and changes with respect to the variability in weather conditions that affect the performance of the sector (EEA, 2006). The agriculture sector is unable to allow for efficient use of all household labor particularly during agricultural off-seasons. Low productivity of labor as well as its risky income from the sector has led small scale farmers to search for an alternative non-farm income (Kumbi & Berg, 2006). The survey done by EEA (2006) show that between 1997 and 2000, agricultural labor productivity slowed down in Ethiopia as a result of low agricultural production due to crop failure and the borderer war between Ethiopia and Eritrea which lasted for two years (1998-2000). The productivity of labor was lower by 13% in 1998, 6% in 2003 and 15% in 2004. In 2005-2006, productivity has improved to 16%. Despite the fact that agricultural employment expanded at 5.5 % on average, the marginal productivity of labor declined resulting for low progress of the agriculture sector and underemployment. Currently, the rural population in Ethiopia is rising at a faster rate than the farm income and the productivity of labor is estimated to be less than one fifth of the average for Sub-Saharan Africa. In general low yield, low soil fertility, fragmentation of land and rising rural population have been reported to be the main responsible factors that have led the productivity of farm labor to be low. As a result, it is one of the reasons for the widespread of poverty in the country. This calls for some measures such as improving the productivity of land, introducing labor productivity enhancing technologies, expansion of non-farm sectors as well as easing the obstacles of migration of labor (Demeke et al 2003).

### 3.2.3 The rural-urban linkages in Ethiopia

In previous studies, rural and urban regions were considered as two distinct and stagnant entities and regarded only from a single perspective, i.e. in terms of population, environment and job types. The dynamic changes occurring between rural and urban regions as well as changes from the perspective of migrants were not taken to account. The contemporary perspectives on rural and urban regions have started to consider rural and urban entities as two ends but with same ‘continuum of social life’ connected by
migration. In Ethiopia, it has been documented that the relationship between urban and rural areas can be considered in multiple dimensions. From the perspective of economic dimension, towns appeared around rural markets to facilitate the trading process and then towns expanded to effectively administer rural regions. Technology played an important role in making complex towns and center for advanced economic systems. From geographical and political point of view, towns in Ethiopia were emerged as a result of the rail way construction between Ethiopia and Djibouti and towns served as seats for administrative officials (Haile & Mansberger, 2003). Although rural-urban linkages have been instrumental for the socio-economic development of Ethiopia, poor infrastructure of the country has been documented as a barrier. A study done by Woldeselassie (1995) as cited in Tadele, et al (2006) in West Shewa zone of Ethiopia revealed that the reason for the poor rural-urban linkage particularly with respect to market linkages has been because of the occurrence of poor infrastructure. Baker (1996) also noted the importance of rural-urban linkages for economic development of the country in providing socio-economic services despite poor accessibility. Others studies described that Ethiopian towns including the capital city, Addis Ababa have been shaped by rural regions and played a vital role in the urbanization process of the country (Woldemariam (1995) as cited in Tadele, et al, 2006). The effects of rural-urban linkages have been reflected in different policies of the government on the agriculture sector and on land tenure policies (Haile & Mansberger, 2003).

The manufacturing sector in Ethiopia is linked with agricultural products for its raw materials. The manufacturing sectors have been predominated by textile, leather, tobacco, food and beverage producing plants. However, the agriculture sector of the country could not produce marketable surplus and provides only few inputs for the manufacturing sector. Only 10 % of the agricultural products are used as raw material inputs for the manufacturing industries, 10% for export and the remaining 80% of the agricultural produces used for domestic consumption. The manufacturing sector imports 45% of its raw materials from abroad as a result of poor and subsistence nature of the agriculture sector (Zewdu and Malek, 2010). In addition, the poor performance of the agriculture sector has affected the markets for goods and services produced by the manufacturing
sector. This is because rural inhabitants bring and sell only few products to the market and could not afford buying the manufactured outputs produced by the manufacturing sector. In general, poor infrastructure such as poor transportation and communication systems, inefficient markets, poor performance of the agriculture sector and land policy of the country have been documented as some factors affecting the linkages between rural and urban areas and flow of goods and services in Ethiopia (ibid; Demeke, et al. 2003).
CHAPTER FOUR

Theoretical Framework and Research Methodology

4.1 Theoretical Framework

The theoretical framework of the research has benefited from various migration models. Although the main theoretical framework of the research bases on the New Economics of Labor Migration (NELM) model, concepts from some models such as the Lewis-Ranis-Fei (LRF) and Harris-Todaro (HT) model are reflected in the framework. The reason for including the LRF model is because the research is partially interested to depict how the growth of labor-intensive industries in Ethiopia has been facilitating the migration of labor from the rural areas and to identify the inter-sectoral links between the traditional agricultural sector and the modern manufacturing sector as well as to evaluate the Lewis model assumption of surplus labor in the traditional agricultural sector with respect to the Ethiopian case. Likewise, the HT model explains the role of rural-urban ‘expected wage differential’ to elucidate the behavior of migration. Moreover, the HT model contributes to the theoretical framework of the research in explaining the importance of contacts and networks that determines the cost of migration as well as on migration decision making process.

The NELM model is taken as the main theoretical framework of the research because it simultaneously explains the determinants of migration decision (stressing on the importance of household characteristics) and their possible impacts. The model illustrates how rural-urban labor migration and flow of remittances alter the total household income and local investments in rural areas. This eventually helps to connect migration with rural development. The NELM model implies how remittances have key potential for development and contribute to broad based income growth in migrant sending regions. The NELM model argues that migration and remittances influences local production and standard of living particularly in least developed countries where credit and risk constraints are severe (Taylor 1999).
Migrants obtain a total income \((Y_j)\) from destination region. \(Y_j\) can be consumed and saved in different proportions in destination region. The consumption and saving rate is shaped by individual and household characteristics. Migrants invest part of their savings in urban destination region where they work and portion of it would be sent to their families left behind at rural origin (as remittances).

Therefore,

\[
Y_j = C_j + S_j \quad (4.1)
\]

\[
S_j = s_j Y_j \quad \text{and} \quad C_j = c_j Y_j \quad \text{s} j \text{ and } c_j \text{ are rates of saving and consumption, respectively, by a migrant at urban destination-} j \quad \text{and}
\]

\[
S_j = I_j + Y_R \quad (4.2) \quad \text{or}
\]

\[
Y_R = S_j - I_j
\]

Where:

\(Y_j\) is the total gain from migration in destination

\(C_j\) is consumption by a migrant family member (s) in the destination

\(S_j\) is savings of migrant (s) in destination

\(I_j\) is investment of the migrant (s) in destination

\(Y_R\) is remittance to be sent to families in the rural origin.

Therefore, if a family member migrates to destination and send remittances, the total income of migrant sending rural households at origin \((Y_i)\) would be the sum of income from farm business and an additional income from remittances; i.e.

\[
Y_i = Y_F + Y_R \quad (4.3)
\]

Where:

\(Y_F\) = Farm income of migrant sending households at origin, and

\(Y_R\) = Remittance income obtained from a migrant member (s)
Total income of migrant sending households at rural origin ($Y_i$) is also consumed and saved/invested at origin, i.e.

$$Y_i = C_i + S_i$$  \hspace{1cm} (4.4)

$S_i = I_i$ ; where $I_i$ is investment at origin made by migrant sending households

$S_i = s_i Y_i$ and $C_i = c_i Y_i$ : where $s_i$ and $c_i$ are rates of saving and consumption, respectively.

Then,

$$S_i = s_i (Y_F + Y_R)$$  \hspace{1cm} (4.5) \text{ by incorporating Eq. (4.3)}

As a result of remittances ($Y_R$), total household income ($Y_i$) of migrant sending families at origin is expected to change and that leads to change in consumption and saving/investment of migrant sending households at origin. Remittances can directly contribute for changes in total household income-$Y_i$ or indirectly via investment on farm capital stock that changes the farm income ($Y_F$), and thereby changes $Y_i$. Out-migration and remittances influence farm income of migrant sending families via affecting factors of production as follows:

Farm income of rural households at origin ($Y_F$) is a function of production factors, i.e.

$$Y_F = Y_F(K, L, L_d)$$  \hspace{1cm} (4.6)

Where:

- $K = \text{capital stock used for farm production}$
- $L = \text{Labor force available in the household}$
- $L_d = \text{Farm land holding}$

Rural out-migration and flow of remittances affect labor and capital inputs, respectively and thereby influencing farm income ($Y_F$) as well as per capita farm income ($y_F$) at origin.

To begin with the labor input, rural out-migration reduces labor force and leads to change the total labor available in migrant sending rural households, i.e.

$$\Delta L = -M_N$$  \hspace{1cm} (4.7)
Where $M_N$ is the number of out-migrants to urban destination.

The amount of labor input available for farm activities is not only determined by the number of out-migrants but also by additional household characteristics, i.e.

$$L = L (M_N, Z_{HH})$$  \hspace{2cm} (4.8)

Where $Z_{HH}$ is household characteristics that influence the availability and allocation of labor for farm production. These include characteristics such as household size and number of dependents.

On the other hand, the investment on capital stock would be explained as result of the savings, which is in turn explained as a resultant effect of the savings from farm income, remittances and migration cost (MC). MC is incurred by migrant sending households while sending migrants to urban destination. MC is implicitly assumed as part of investment by migrant sending households with the expectation of remittances afterwards, i.e.

$$S_i = s_i(Y_F + Y_R) - MC = \Delta K$$  \hspace{2cm} (4.9)

Three scenarios can be drawn for the causes of change in capital stock. The first one is the case at the initial periods of sending migrants where $Y_R = 0$. If the savings from farm income are completely used to sponsor the cost of migration (MC), future investment on capital stock would be restricted for a given point of time till migrant sending households gain additional savings from their farm businesses or from remittances at later stages of sending migrants. In this point of time, there would be no change on available capital stock, i.e.

$$\Delta K = s_i Y_F - MC,$$  \hspace{2cm} (4.10)

Where $\Delta K = 0$
If the cost of migration is sponsored by friends or relatives from origin or destination region (i.e. at initial stage of sending migrants where \( Y_R = 0 \)), the volume of investment on capital stock depends on the savings obtained from farm income \( (s_i Y_F) \). Thus,

\[
\Delta K = s_i Y_F \tag{4.11}
\]

The second scenario (still the condition at initial stage of sending migrants) is where there is no savings from farm income \( (s_i Y_F = 0) \); and when migrant sending households have no other alternatives to sponsor the cost of migration except selling out some of their physical capital to sponsor the cost of moving. In this case, out-migration has a negative effect on the available capital stock and therefore,

\[
\Delta K = -MC \tag{4.12}
\]

The third scenario is in later stage of migration (where \( MC = 0 \) and \( Y_R > 0 \)). In this case, the volume of investment on capital stock depends on the savings from remittances and farm income. In this regard, out-migration would be considered to have a positive effect on capital stock, i.e.

\[
\Delta K = s_i (Y_F + Y_R), \text{ where } \Delta K > 0 \tag{4.13}
\]

In general, farm income, remittances and cost of migration are some of the determinant factors that affect investment on capital stock. Remittance income-\( Y_R \), which is sent by migrants, is also determined by the duration since migration started \( (M_D) \), the number of out-migrants in a household \( (M_N) \), patterns of migration \( (M_P) \) as well as set of household characteristics including: characteristics of migrants and their families as well as locational characteristics that can potentially shape remittance behavior. The New Economics of Labor Migration (NELM) model emphasizes that household characteristics play an important role in migration decision and on remittance behavior despite the fact
that there is no systematic and comprehensive theory of remittance behavior as noted by Lucas & Stark (1985). Thus,

$$Y_R = Y_R(M_N, M_D, M_P, Z_{HH})^{46}$$  \hspace{1cm} (4.14)

Where $Z_{HH}$ include characteristics of migrants, households and locational characteristics: such as age of the migrant, education level and marital status of the migrant, per capita farm income of the household, household size, age of the household head and region of destination.

As it is already explained above, out-migration and remittances affect labor and capital inputs of migrant sending households and thereby affects their farm income. In the same vein, the effects of migration and remittances on labor and capital stock also influences the intensity of labor and capital per unit of land and thereby affecting the per capita farm income of migrant sending households\(^47\).

The effect of out-migration and flow of remittances on total income of rural households at origin-$Y_i$ also affects the poverty status of households (i.e. with respect to the incidence, depth and severity of poverty). Taking to account the FGT\(^48\) classes of poverty measurements as formulated in Foster et al. (1984), the effect on total income of rural households at origin would affect the poverty indices explained by head count index, poverty gap and squared poverty gap indices, i.e.,

$$PI = \frac{1}{n} \sum_{y < z} \left( \frac{z - Y_i}{z} \right) ^{\alpha},$$  \hspace{1cm} (4.15)

*Where*: $Z$ is poverty line, $n$= total number of households

$\alpha$ is a parameter to measure the degree of poverty, and $\alpha > 0$.

\(^{46}\) Please refer to section 5.1.1.1 in chapter 5 for detail justification of each determinant variable

\(^{47}\) Please refer to sections 5.2.1 and 5.3.3 in chapter 5 for detail model specifications.

\(^{48}\) FGT classes of poverty measurements refer to measures of poverty as explained by Foster, J., Greer, J., & Thorbecke, E. (1984:761-766). Detail explanation is found in section 6.1.1 in chapter 6
When $\alpha = 0$, PI measures the incidence of poverty (i.e. Head Count Index); when $\alpha = 1$, PI estimates the depth of poverty (i.e. Poverty Gap Index); and when $\alpha = 2$, PI estimates the severity of poverty (i.e. Squared Poverty Gap Index). In the latter case, there is more representation of the changes within the poorest groups of rural households.

The following figure sums-up the interrelated linkages between determinants of migration (push-pull factors) with respect to possible effects on total income of rural households. The linkages are developed incorporating the concepts LRF, HT and NELM models. The focus of the research is to analyze the effect of rural-out migration from the perspective of migrant sending households at origin.

Fig. 9 Linkages between determinants and effects of migration
Sending Region (Rural)

Push factors
- Low agricultural yield and income
- Lack of credit & insurance market
- Low wage rate
- Lack of local employment
- Poor infrastructure
- Population pressure
- Scarcity & fragmentation of land & other resources
- Low physical capital per household
- Low use of agricultural inputs & technologies
- Investment on low-return activities
- High young & elderly dependency ratio
- Extreme rural poverty & under nutrition

Multiplier effects
- Increase in investment on physical & working capital stock
- Increase in use of agricultural inputs and technologies, increase production
- Investment on high-return activities
- Off-farm enterprises
- Financial intermediaries

*Household Income change
*Change in poverty (HC, PG, SPG)

Rural-Urban Migration

Direct increase in total Household Income

- Remittance (monetary & non-monetary)
- Return labor/ Human capital

Multiplier effects
- Increase in investment on physical & working capital stock
- Increase in use of agricultural inputs and technologies, increase production
- Investment on high-return activities
- Off-farm enterprises
- Financial intermediaries

Receiving manufacturing Region (Urban)

Pull factors
- Emergence & Expansion of agro-processing industries
- Expected urban wage
- Employment opportunities
- Better infrastructure
- Better education & health services
- Attractive urban life
- Contacts and networks in destination region

Migration Decision
- Who migrates? Rates of migration (extent)?
- When to migrate & how long?
- Where to migrate (place & distance)?
- To which pattern?
- Where to allocate resources & remittances?

Opportunity cost
Cost of living & adjustment
Transport costs

Individual & Household characteristics
Migration cost

Household Income change
Change in poverty (HC, PG, SPG)

Opportunity cost
Cost of living & adjustment
Transport costs
4.2 Research Hypothesis

- Rural-urban migration negatively affects the available rural labor and positively affects the capital stock of rural households.
- Rural-urban migration influences the total agricultural income of households depending on the availability of production factors, incentives to migrate as well as the pattern, number and duration of migration.
- Rural-urban migration positively affects farm and total income of rural households through remittances.
- Rural-urban migration is a rational decision to maximize total household income of migrant sending rural households.
- Rural-urban migration reduces the incidence, depth and severity of rural poverty.

4.3 Research Methodology

This section describes the study area and the research methods employed to take sample, collect data and methods to analyze data. The discussion on sampling methods also includes the different procedures that were used for selection of households and research sites.

4.3.1 Description of the study area

The knowledge of the study area plays an important role in the design of the research, i.e. to select proper research methodologies and as background information while analyzing the effects of rural-urban migration in the study area. In addition, description of physical and demographic characteristics of the study area helps to know the production potentials, agro-climatic conditions, available production factors such as land and human resources, opportunities and threats that determine the production and income of the rural community. These characteristics determine the production and income of rural households and play a vital role in the analysis part of the thesis. The description of the
study area also presents the setup of other sectors such as industrial and commercial sectors that explain the potentials of income diversification opportunities, migratory trends and characteristics.

### 4.3.1.1 Physical Features and Demographic characteristics

The research is conducted in Ethiopia, SNNPR region, in Shebedino district of Sidama zone. Shebedino district is located at 6.58 (6° 34' 60 N) latitude and 38.17 (38° 10' 0 E) longitude south of the capital, Addis Ababa. The district is 279 kilometers away from Addis Ababa and one of the 19 districts in Sidama zone, SNNPR region of Ethiopia. The area borders with four districts: Dale district in the South, Awassa Zuria district in the North, Boricha and Gorche districts in the West and East, respectively. Hawassa, the regional Capital, is found at 15 km distance. The others nearby towns are Leku and Dilla.

All villages of the district have access to transportation. The district currently has 13km of asphalt roads, 40 kilometers of all-weather roads, and 50 kilometers of dry-weather roads. The altitude of the district ranges from 1800 to 2950 meters above sea level. The main soil types of the district include: euttric nito soil, pellic verti soil, Orthric luvi soil and chromic lovi soil (Sidama zone administration Bureau). About 90.6% of the area in the district is categorized as midland (woyna Dega) lying between 1,500-2500 meters above sea level and 9.4 % as highland (Dega) lying above 2,500 meters above sea level. The average annual rainfall ranges from 900-1,500 mm and has two rainy seasons: Belg (from February to April) and Kiremt (from June to beginning of October). The average temperature of the districts ranges from 16-25°C (Sidama zone administration Bureau).

Based on data from the Central Statistical Authority of Ethiopia (2011:39), the district has a total population of 262,091 of whom 132,294 are males and 129,797 are females. Rural inhabitants comprise 93% of the total population. The district is one of the densely populated areas in the zone as well as in the country with an average population density of 1,330 people per square kilometer. The largest ethnic group in the district is the

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49 Please refer to Annex 2 for the map of the district.
Sidama (95%) and all other ethnic groups made up the rest 5% (including the Amhara, Gurage and others). The Sidama language is widely spoken and used as a first language by the inhabitants. About 85% of the population in the district are said to be protestant Christians and the rest comprise Catholics, Orthodox Christians, Muslims, and adherents of traditional religions (Sidama zone administration Bureau). Documented data and information are not available on migration and on migration related characteristics specific to the district. According to information gathered from the sample of 259 rural households, the average age is 42 years for both migrant sending and non-migrant sending households, respectively. The average age of migrants is 32.7 years. The dependent age for elderly and young children is >65 years and <10 years, respectively. Children start to engage in farming activities at their early age in Sub-Saharan Africa and there is no exception for Ethiopia (ILO, 2005; Guarcello & Rosati 2007). The average household size for the sample of non-migrant sending and migrant sending households is 7.48 and 6.73, respectively. The average number of working family members per household is 3.86 (51.5%) for non-migrant sending households and 3.6 (53.5%) for migrant sending households.

4.3.1.2 Farming systems

Farming is the main occupation of the inhabitants in the district. The farming system in the district is mixed. The district is one of the known coffee producers in the country where the type of coffee produced from this region is labeled as ‘Sidama coffee’. Other cash crops include khat and sugarcane. Vegetables and fruits production includes Irish potato, sweet potato, tomato, avocado, banana, and mango. Crops such as false banana (enset), maize, and haricot beans are also the main food crops produced in the district. In

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50 Khat (scientific name: catha edulis) is a shrub plant with a stimulant leaves that have a stimulating and euphoric effect when chewed. The plant is popular in East Africa and Arabian Peninsula particularly: in Ethiopia, Eritrea, Kenya, Sudan, Somalia and Yemen. Khat is used as a socializing and recreational drug in these countries. Particularly to Yemen, Khat serves to entertain guests in social ceremonies such as weddings and mourning. Khat is produced in small pockets in the study area. For more information about the plant visit: http://summer2011botany01.providence.wikispaces.net/Khat
addition, *Teff*\(^{51}\) is also produced in small pockets among some farmers (Shebedino District Agriculture and Rural Development Bureau-SDARDB)

Ethiopia is the origin center for coffee Arabica and one of the oldest exporters of the commodity. Coffee has been given due priority and identified as one of important export products that have a potential to transform the subsistence mode of production to market-oriented one (PRSP: 75). Coffee contributes for more than 35% of the country’s export earnings. Ethiopia is the leading exporter of coffee Arabica in Africa and the 7\(^{th}\) exporter in the world coffee market. In addition, coffee production and trade is a means of livelihoods for more than 25% of the population. About 400,000 hectares of land is covered by coffee with total production of 180,000-276,000 tons per annum. 95% of the Ethiopian coffee is produced by small scale farmers and the rest by commercial farms. (McCarthy, 2007; STCP\(^{52}\) and the Africa Group LLC\(^{53}\)). The share of production for *Sidama* zone (the zone where the study area is found) is 35,000 tons organic coffee beans per year on 70,000 hectares of land (SCFCU\(^{54}\))

There are 18 coffee processing firms belonging to the farmers association and other 2 of private in the study area. Farmers’ cooperative unions have the authority to export coffee directly to the international market if they own an export license. In most cases, farmers sell their produces for collectors who are available in rural localities during harvest seasons. Please refer the value chain of coffee export marketing in Ethiopia in Annex 10.

Shortage and irregular precipitation has been among the challenges of the farming sector. As a result, frequent crop failure has been reported in the district. In addition, increase of

\(^{51}\) Teff (Scientific species name *Eragrostis tef*) is a tiny cereal crop produced and consumed largely in Ethiopia. The grain is ground to flour and used to make fermented flat bread (*injera*): a traditional staple food in Ethiopia. In the study area, *Teff* is produced in small pockets, and the majority for household consumption particularly in better-off households. The majority of the study area is midland and good teff yield is obtained at highlands with altitudes higher than 1800 meters above sea level. False banana (*Enset*) is the most common stable food in *Sidama* zone and *Teff* is considered as an expensive food crop.


\(^{54}\) SCFCU (Sidama Coffee Farmers Cooperative Union). [http://sidacoop.com/](http://sidacoop.com/)
population pressure and fragmentation of land holdings have aggravated the problems in
the district. As a result of these, rural inhabitants search for an additional source of
income to sustain their livelihood. Some of them include petty trading, livestock sale and
migration to obtain wage income (Negassa et al, 2005; SNNPR Livelihood profile, 2005).
The means of cultivating land depends on the size of land holdings as well as the wealth
status of households. Cultivation of land among the poor is usually undertaken by hand
hoes whereas better-off households use pair of oxen for cultivating their land. Livestock
production is also a common practice in the district. The main livestock reared include
cattle, poultry, sheep and goats. In addition, by products of livestock such as milk and
egg are other sources of income. Livestock production is carried out in traditional ways.
Apiculture is also practiced in small pockets. Donkeys, equines and horses are used for
transportation of people and goods. With respect to access to market, all villages are
connected with roads and farmers have the possibility to sell their produces either to the
nearby major towns such as Leku, Hawassa, Shashemene and Dilla or to further cities
such as Modjo, Ziway and Addis Ababa. The farmers have the possibilities to sell by
their own means, through their cooperatives or sell their crop field to traders without
harvesting their produces.

The bureau of agriculture and rural development in the district assists the farming
community by facilitating access to yield enhancing agricultural inputs (such as fertilizer,
Improved seeds and livestock breeds) as well as supporting farmers through providing
training and agricultural extension services. The bureau has assigned three
development/agricultural extension workers in each village of the district.

4.3.1.3 Health and Education

The Health bureau of the district has 5 health centers, 32 health posts, 1 private clinic, 11
rural drug vendors and 1 ongoing district hospital. In addition, the district has 5 health
officers, 66 clinical nurses, 10 pharmacy technicians, 8 laboratory technicians, 7 public
nurses, 2 sanitarians, and 66 health extension workers. The health service in the district
mainly aims at disease prevention and control strategies. Other health services include
maternal and child health, immunization, reproductive health, nutrition, malaria and HIV/AIDS prevention and control, TB and leprosy prevention and other services on hygiene and environmental sanitation. The main diseases in the district include malaria, pneumonia, diarrhea, HIV/AIDS and intestinal parasites (Negassa, et al, 2005). Malaria is a common phenomenon particularly during the rainy season. For each village (kebele) in the district, two health extension workers are deployed to work at a household level in the community. The health bureau of the district works on 16 health extension packages. The regional infant mortality rate is reported to be 85 newborn deaths per 1000 live births. The primary health care coverage of the district has been reported to be 86% in 2009/2010 year. With respect to safe water coverage, about 42.74% of the population get safe water supply of which 57% of it in urban centers and the remaining for rural villages (Bureau of health, Shebedino district).

In Shebedino district, there are 32 pre-primary schools; and 42 primary schools (both first and second cycles, i.e. from 1st- 8th grade) of which 33 of them are governmental and the rest are private schools. In addition, there is one governmental high school (9th-12th grade) and there are no colleges and universities available in the district. There are 911 primary school teachers out of which 656 of them are first cycle (1st- 4th grade) teachers and the rest teach in second cycle (5th - 8th grade). The total number of teachers in the secondary school of the district is 93. The average adult literacy rate in the district is reported to be 57% for males and 22.4% for females (Office of Education, Shebedino district).

With respect to the education of households in the sample, more than 88% of both non-migrant sending and migrant sending households fall under primary education and none educated category as summarized in the following figure.
4.3.1.4 Industries and commercial farms

Although the manufacturing sector contributes only 13.5% of the GDP, the sector is growing in recent times since different reforms such as privatization are in place. The manufacturing sector is dominated by enterprises such as food and beverages, textile, furniture, clothing, leather and footwear industries. Other manufacturing factories in the country include tobacco, cement, plastic, metal processing and chemical industries. Most of the manufacturing industries in the country are concentrated around the surrounding of cities. Likewise, the manufacturing industries around the research area are mainly found around the nearby city, Hawassa. Hawassa, is the regional capital found close to the study area. Hawassa is one of the major cities in the country and it is one of the destination regions for rural migrants particularly to the surrounding floricultural and other horticultural commercial farms. About 30 manufacturing industries are operating in and around Hawassa city of which 16 of them are food and beverage processing industries. One is a textile factory and the rest include industries that produce tin, plastic and construction materials. Around 20 manufacturing industries are under construction and will begin production in the near future. The commercial farms around the district mainly include floriculture, vegetables and fruits. More than 95% of the manufacturing
industries and commercial farms in the area belong to private owners and privatized enterprises (Hawassa area Investment Bureau).

It has been reported that the cost of labor in Ethiopian manufacturing sector is relatively low compared to other developing countries. However, unit labor cost in capital intensive industries such as metal and steel industries is higher than in labor intensive manufacturing industries (EEA, 2006:52). The wage rate depends on the type of industries and on the type of work/skill required from the worker. The average wage rate for manufacturing industries has reached up to 10 Ethiopian Birr (around US$ 0.59) per day recently. Similarly commercial farms pay different wage rates depending on different seasons such as plantation, weeding and harvesting. Wage rate for commercial farms particularly during plantation seasons has reached up to 22 Ethiopian Birr (around US$ 1.3) per day. Rural households searching for jobs around urban centers (i.e. around Hawassa city area) are recruited in most cases in commercial farms given their farming experience and interest. In this regard, Langano Lily farm and Awassa Greenwood are among the main commercial farms in the area. In addition, most of the commercial farms have overtime schemes if daily laborers work for more than eight hours. Some of the commercial farms and industries provide additional benefit schemes such as health insurance, sick leave and cheap housing facilities for their workers. Workers with previous experience in the farms are given priority in the recruitment process (Sidama zone administration bureau).

4.3.2 Research Design
The overall research design involved the following processes in general:

- Investigation of existing secondary data/information on the research topic
- Preliminary information gathering on the case study area. E.g.: on population size in districts and peasant associations
- Decision on sample size

55 Langano Lily farm is a member of the Klaver Lily Group, a Dutch company operating in Hawassa, Southern Ethiopia, specializing in floriculture. For more information please visit http://www.klaverlily.nl/ethiopie.html
56 Awassa Greenwood PLC a company in Hawassa that produce and export flowers and horticultural crops. For more information please visit http://awassagreenwoodplc.com/
- Translation of questionnaire to local language and simplifying terms
- Making sure that the data collection materials, enumerators and permissions are in place
- Providing training on the questionnaire for assistants of data collection. Three development workers from each sampled village participated in the training and data collection process.
- Questionnaire pre-testing
- Selection of sample households and key informants
- Explanation of the objectives of the research for respondents and building rapport
- Data collection
- Data coding and feeding to the computer
- Data processing and analysis
- Interpretation and presentation

4.3.3 Method of sampling

In this research, stratified and purposive sampling techniques were used jointly to select households and study locations. The reason for using stratified sampling technique is to include and represent specific groups of the research interest in different meaningful strata and with certain purposes of the research. Purposive sampling technique was used to select the research region where as stratified sampling technique was used to select villages/PAs and households taking to account certain strata/categories (as discussed in the following sections).

57 Development workers are graduates from technical and vocational agricultural colleges who are assigned by the local agricultural offices to provide technical assistance for the farming community. They work and live with the local community.
4.3.3.1 Selection of sample locations

The case study was conducted in Shebedino district, southern Ethiopia. Case studies provide a valuable opportunity for in depth look of a typical case and proper understanding of a particular place. The region for this particular case study was purposefully selected because migration of labor is prevalent in this particular region and known for sending-out labor migrants to destination locations such as to agro processing industries and state farms. The region has the highest population density and is one of the conflict free areas. In addition, the region is also characterized by its fertile land suitable for cereal production and most importantly known for its cash crop production, i.e. coffee. This helps to see the links between multiplier effects of migration and local production and total income of migrant sending households. The district comprises 32 rural villages in total. Out of the list of these villages, four villages were selected using simple random sampling technique\(^{58}\). The selected villages from Shebedino district are: Taramessa, Furra, Medregenet and Dobonegasha.

4.3.3.2 Household Selection

Before the final selection of households took place, the household sample frames were categorized in some form of sub-groups (strata). The general category of households from which data was collected includes rural households with and without migrants for comparison purposes. The specific categorization includes:

- migration pattern (non-migrant sending, temporary migrant sending and permanent migrant sending households)
- Income status (poorest, poor and better-offs)

Taking to consideration the above categories (strata), final selection of households were taken randomly. In total, 259 households were selected out of 4 villages representing 1853 family members. The proportion of sample for each PA depends on the total population in each PA. On the other hand, representatives of key informants and officials

\(^{58}\) The total villages in the district were given numbers and four villages were selected using lottery method of drawing out of the total listing.
in each sampled village were selected to gather general information about the research area. The household selection process can be summarized in the following procedure:

- The listings of total households living in each sampled village were taken from local offices in each village.
- The total household listings from each village were categorized in to certain strata: i.e. in terms of migration pattern and income status. According to the information gathered from local development workers, almost half of the total households in the sampled villages have experiences of sending migrants either in temporary or permanent patterns and about five percent of the total households were found to be better-off households (locally called model households/farmers). In this regard, the categorization of households was made in collaboration with local development workers in each sampled village.
- Based on each category/stratum identified, the required samples of households were drawn using simple random sampling technique.

The following table summarizes the number of households from each sample village

**Table 1: Sampled households with respect to migration pattern in the research area.**

<table>
<thead>
<tr>
<th>Migration pattern</th>
<th>Sampled villages in Shebedino District</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-migrant sending households</strong></td>
<td>Taramessa</td>
<td>Furra</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Temporary migrant sending households</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Permanent migrant sending households</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>53</td>
</tr>
</tbody>
</table>

**4.3.4 Data sources and method of data collection**

Both primary and secondary data were collected for the research. Secondary data sources includes books, journals, magazines, reports from migration bureaus, agriculture bureaus,
publications of governmental and non-governmental organizations, statistical and census reports, internet sources, etc. With respect to primary data collection, combinations of different methods were used. Before starting the process of primary data collection, intensive training was given for assistant data collectors regarding the concept of each question in the designed questionnaire and on data gathering techniques. In addition, the questionnaire was pretested with some respondents and was further improved according to the feedbacks obtained. Semi-structured individual interview was undertaken as the main data collection technique while doing the household survey. The use of individual interview method helps to keep the privacy of respondents and for free flow of information especially in discussing sensitive issues. Group discussion with selected community members was carried out for each sample village for certain questions in the research topic. For the household survey, data is collected for two years i.e. for the cropping year 2006 and 2010. Respondents were let free to respond only for information that they recall and know well particularly for previous years.

4.3.5 Method of data analysis

After the required data were collected, coded and fed to the computer, the data were analyzed by descriptive and inferential statistics. The descriptive analysis includes percentages, ratios and proportions whereas the inferential statistics include correlations and regressions. The type of analysis methods depends on the models specified in each category of analysis. The analysis of the effect of rural-urban migration on farm production and income has been analyzed in two-stages. The first stage analyses the effect of out-migration and remittances on production factors and then the second stage estimate the effect on farm income based on the estimations made in the first stage. The second stage has used the Cobb-Douglass production function as its methodological approach. The models and some econometric issues are discussed in the empirical chapters. In this research, the level of significance for test statistics is generally accepted at probability of 0.1 (at 10% significance level) and below. The combination of STATA software package (version 11), Inkscape and spread sheets were used for both data analysis and chart presentation.
CHAPTER FIVE

Impact of Rural-Urban Migration on Farm Income

Rural-urban migration on one hand, leads to the removal of labor and on the other hand, to the inflow of remittances for migrant sending households in rural origin. In addition, households incur cost of migration as an initial investment while sending a migrant. Therefore, it would be a prior step to discuss the characteristics of migration and possible determinants that shape remittance behavior as well as costs of migration before proceeding to estimate the effect of rural-urban migration on farm income. The first two sections of this chapter discuss the determinants of remittances and costs of migration in the study area. The third section analyzes the effect of out-migration on farm income. The forth section analyses the effect of out migration on labor and capital input intensity per unit of land and thereby on per capita farm income. The fifth section discusses the rationality of migration decision from the perspective of HT and NELM models and the final section concludes the chapter.

5.1 Characteristics of rural out-migration and remittances

5.1.1 Determinants of Remittance Income

Although there is no systematic and comprehensive theory of remittances behavior, Lucas & Stark 59 (1985) presented three hypotheses to identify motivations for remittance. The authors have found that motivation to remit can be a result of ‘pure altruism’ or ‘pure self-interest’ or in between called ‘tempered altruism’ or ‘enlightened self-interest’. Pure-altruism is when a migrant is motivated to remit with a purpose of caring for family members left in origin. In this regard, migrants enjoy remitting and maximize the utility of households. In this hypothesis, the lower the income of households predicts higher remittances. Pure self interest is when a migrant is motivated to remit solely as a result of

59 Lucas, R. E.B., & Stark, O. (1985:901-915) explained the hypotheses regarding the motivations to remit with a case study from Botswana.
selfish motivations without any altruism. This can be either due to the aspiration of ‘avaricious’ inheritance in keeping favor with families or with a motivation of asset investment in origin and to keep families left behind responsible for safeguarding assets on behalf of the migrant. In addition, a migrant is motivated to remit with an intention of developing self-esteem, social assets or political influence with families and friends when a migrant returns home. The third hypothesis for motivation of remitting is ‘tempered altruism’ or ‘enlightened self-interest’. This hypothesis takes to account the shortfalls of pure altruism and pure self-interest. In this hypothesis, remittance is an ‘inter temporal and mutually beneficial contractual arrangement between migrants and their families left behind’ (Stark and Lucas, 1985:904). The New Economics of Labor migration (NELM) model shares the concept of the third hypothesis.

5.1.1.1 Specification of Econometric Model

The determinant variables that potentially shape the remittance income of households are modeled in two ways. In the first model the patterns of migration (M_P), duration since migration (M_D) and number of migrants in a household (M_N) are taken as predictor variables of the outcome variable Y_R - the amount of remittance income. The second model incorporates a set of characteristics of migrants and their households as well as locational characteristics to see whether they increase the explanatory power of the model.

Model 1:
Y_R = \delta_0 + \delta_1 M_N + \delta_2 M_D + \delta_3 M_P + \varepsilon_R \tag{5.1}

Where Y_R is remittance income received by migrant sending households (in ETB)\(^{60}\)

M_N is the number of migrants per household sent to destination location
M_D is Duration since migration (measured in number of months)
M_P is Migration pattern (dummy: 1= for temporary; & 0 = for permanent pattern of migration)

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\(^{60}\) ETB- Ethiopian Birr is the currency unit of Ethiopia. 1 ETB is exchanged for approximately 0.061 and 0.118 US$ on average for the year 2010 and 2006, respectively.
\( \varepsilon_R \) is the error term
\( \delta_0 \) is a constant and; \( \delta_1, \delta_2 \) and \( \delta_3 \) are the coefficients of \( M_N \), \( M_D \) and \( M_P \) variables

As already described in model 1 above, remittance income can be shaped by different variables of migration, i.e. the number of migrants per household- \( M_N \), patterns of migration-\( M_P \) as well as the duration time since departure- \( M_D \). In this research, \( M_N \) is the number of departed individuals who have been the members/head of a household; and migrated either temporarily or permanently to an urban destination location. The number of migrants in a household affects the cost of migration at the initial stage of sending migrants, the number of available labor left behind as well as the amount of remittances to be received. \( M_P \) is a migration pattern for either temporary or permanent type of migration. Temporary migrants are rural family members who seasonally migrate to destination locations for a specific period of time and coming back to their origin (at least for three months stay per year). Permanent migrants are migrants who left their region of origin and start to reside in the destination region in permanent basis. \( M_D \) is the number of months that migrants spent in destination location. The duration of time since departure of migrants could affect the amount of remittances. Longer duration of working in urban destination is considered to predict higher wage income and then for higher remittances.

Characteristics of migrants and their families as well as locational characteristics are added in model 2 below as determinants of remittance behavior.

**Model 2:**

\[
Y_R = \gamma_0 + \gamma_1 M_N + \gamma_2 M_D + \gamma_3 M_P + \gamma_4 A_M + \gamma_5 E_{dM} + \gamma_6 M_M + \gamma_7 N_{HH} + \gamma_8 M_{Sh} + \gamma_9 A_h + \gamma_{10} R_j + \gamma_{11} Y_{fPH} + \varepsilon_R
\]  

(5.2)

Where:

- \( A_M \) is age of migrant(s)
- \( E_{dM} \) is average education of migrant(s)
- \( M_M \) is marital status of migrant(s) (1= if married; 0= otherwise)
As it has been discussed in the previous chapters, household characteristics play an important role in the New Economics of Labor Migration (NELM) model in migration decision and on remittance behavior. Migration decision is a collective action done by both migrants and members of rural households. Rural households decide on who migrates, when to send a migrant and how long should stay, how many migrants to send out and for how many times (rate of migration), where to send migrants, the pattern of migration (either temporarily or permanently), how to sponsor migration costs and how to allocate resources, how to re-assign work responsibilities to cover-up activities of departing migrants and on how and where to allocate remittances.

Age of migrant ($A_M$) is an important characteristic of migrants. The firms in destination prefer younger workers with certain levels of experience. In addition, younger workers are able to work for longer hours that determine the amount of wage income they obtain as well as the amount of remittances to be sent to rural families in origin. The correlation between age and migration has been mentioned in literatures (such as in Macisco & Pryor, 1963; Kim, 1979 and Ivan, 2008). With respect to education level of migrants ($Ed_M$), some migrants with relatively better educational qualification would be in a position to get better wage payment and incentive packages (in firms where education is a requirement). This might affect the amount of remittance to be sent home. Migrants with better education and networks may also travel to farther destinations in search for better employment opportunities. Marital status of migrants ($M_M$) could be also taken as factor that determines the amount of remittances to be sent home. Married migrants who start up their own families might have additional family responsibilities and the amount of
remittances to be sent for parents in origin might be affected. Household size ($N_{HH}$) can also be considered as one of the variables that determine rural out-migration and amount of remittances. Household size is the total number of family members belonging to a household. Rural household size determines the competition for and consumption of household resources. The larger the family size, the higher the resources required to fulfill the needs of the household members and this might determine the amount of remittances to be sent. Household characteristics also include characteristics of household heads. The reason for including household head characteristics is because household heads play a critical role in the process of making migration decision in the research area. For instance, Migration status of the head ($MS_h$) can be considered as one of the determinant factors. The head of a household is the main responsible person for fulfilling the needs of family members in the research area; and thus if the head is a migrant himself/herself, it determines the decision on the amount of remittances to be sent home. The Age of the head ($A_h$) can also determine the amount of remittance income. When parents get old, they become dependents on their children and migrants would be more pressured to send remittances particularly for poor households. Characteristics related to locations may also determine the amount of income obtained in destination and may affect the amount of remittance to be sent home. Region of destination ($R_j$) is one of the variables in this regard. Many rural households migrate to the nearby city (Hawassa area) which is found in Sidama zone (the zone where the study area is found). Some migrants with relatively better experiences, educational qualification and networks have the opportunity to travel farther to other zones and regions in search of better wage payment and incentive packages. As a result, the amount of remittances to be sent to families might change. Furthermore, the amount of farm income per members of a household in origin ($Y_{fPH}$) might also be a factor for determining the amount of remittances to be sent to rural families.
5.1.1.2 Results and Discussion

It has been discussed that measuring the determinants of remittance income is a complex phenomenon. The behavior of migrants with respect to remitting is related not only with natural behavior of individuals but also with existing socio-economic characteristics in origin and destination. Based on the estimation models described in the previous section, the following table show the determinants of remittance income with model 1. The estimations in model 2 with the inclusion of household, migrant and locational characteristics have a bit improved the explanatory power of the model. However, the majority of the coefficient of determination is still explained by the variables in model 1 (i.e. \(M_N\), \(M_D\) and \(M_P\)). In addition, most of the characteristics added in model 2 have produced insignificant results and the directions and magnitude of the variables have shown inconsistency between estimations in 2010 and 2006 years. In this regard, robust conclusion can not be made with respect to confirming household characteristics as determinant factors that shape remittance behavior. Therefore, only the estimations with model 1 are discussed in this section and please refer to annex 11 for estimation results with model 2.

Table 2: Determinants of remittance income

<table>
<thead>
<tr>
<th>Crop season</th>
<th>R²</th>
<th>F-stat</th>
<th>(M_N)</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t-stat</td>
</tr>
<tr>
<td>2010</td>
<td>0.145</td>
<td>F(3,125)= 7.92***</td>
<td>2487.68 (1643.8)</td>
<td>1.51</td>
</tr>
<tr>
<td>2006</td>
<td>0.166</td>
<td>F(3,125)= 7.35***</td>
<td>752.3*** (268.94)</td>
<td>2.8</td>
</tr>
<tr>
<td>Ave</td>
<td>0.197</td>
<td>F(3,125)= 8.25***</td>
<td>2074.4 (1323.5)</td>
<td>1.57</td>
</tr>
</tbody>
</table>

*** Significant at 1% ** Significant at 5% * Significant at 10%

Robust standard errors in parenthesis Source: Author’s estimation

85
According to the estimation results in the above table, the average result shows that 19.7% of the change in remittance income is determined by the changes in duration, number and patterns of migration. According to the average result, an increase in the number of an out-migrant of a household member leads to an increase in net remittance income by about 2074 ETB per annum. Similarly, an increase in duration of migration by one month increases the amount of remittance income by about 259 ETB. In addition, being a temporary migrant increase the remittance income by about 852 ETB, on average. This perhaps would be because permanent migrants start up their own life in destination and incur more expenses and investment in destination that eventually may affect the amount of remittance to be sent home. Temporary migrants live in destination region for a short period of time and return back to their permanent origin with their savings. Moreover, the amount of remittance income has considerably increased with the increase in number of migrants (M_N) per household in 2010 compared to the year 2006. Some migrants (particularly permanent migrants) who left their origin earlier serve as contact persons and may accommodate the newly arriving migrant family members and thus making the cost of migration lower for the new migrants. This eventually reduces the total costs of migration and would have an effect on the amount of remittances to be sent to home. The coefficients of the three explanatory variables (M_N, M_D and M_P) in the model have shown strong and positive relationships with the outcome variable (remittances). In addition, the F-test for all cases of observation produced significant results showing that the observed r-square is statistically reliable. Remittances not only facilitate farm investment but also enhance total household income and directly contribute for household consumption.

5.1.2 Cost of migration

When migrants start to travel to destination for a first time, transportation and initial adjustment costs (in the destination region) are covered by either their families or in some cases by friends and/or relatives living in origin/destination region. Temporary migrant sending households on average incurred about 436.94 ETB per person as an initial cost of
migration whereas permanent migrant sending households on average incurred 689 ETB per person as an initial cost of migration. The cost of sending a permanent migrant is more expensive and the cost becomes even higher for households who send more than one migrant at a time (particularly if the migrants do not have networks in the destination). Temporary migrants travel to the destination region regularly in every year. Some migrant workers particularly permanent migrants who traveled to destination region earlier serve as contact persons for potential migrants from his/her origin. As a result, cost of migration for new migrants with networks would be lower. In general, networks play an important role: in reducing the costs of migration, in increasing the probability of getting a job in destination and then maximizing the positive sides of migration as well as in lessening the opportunity cost of migration with respect to farm income. The importance of network has been pointed out in many migration researches (such as in Massey et al., 1993; Fields, 1975; Fields, 2005; Harris & Todaro, 1970; Todaro, 1980 and Boyd, 1989).
5.2 Impact of rural-urban migration on farm income

5.2.1 Specification of Econometric model

Rural-urban migration and inflow of remittances affect the farm income of rural households through changing the farm labor and capital stock. Out-migration affects the total labor force available in the household. Similarly, change in the available capital stock is expected as a result of remittances obtained from migrants and as a result of cost of migration (in this case if migrant sending families have sold part of their physical capital to sponsor migration costs). In order to analyze the effect of migration on farm output/income (i.e. through the effects on production factors), the neoclassical Cobb-Douglas type production function is adopted. The effects of rural-urban migration are estimated in two stages. In the first stage the effects of migration on production factors is analyzed; and in the second stage, the effects on farm income is estimated based on the results of the first stage. The stages are explained as follows.

Stage 1
In this stage, factors affecting the allocation of labor and capital inputs are analyzed, including the characteristics of migration variables as determinant factors. Migration involves the removal of labor in one hand, and the flow of remittances on the other that alters the available labor and capital input and thereby affecting farm income. In order to capture the differences within different migration patterns, the analysis is done for both temporary and permanent patterns of migration. The comparison is done in two ways. The first comparison is done between non-migrant sending households and temporary migrant sending households; and the second one is between non-migrant sending households and permanent migrant sending households, where non-migrant sending households are taken as control groups. Therefore, the determinants of available labor in a household are given by:
\[ L_{(T)} = \alpha_0 + \alpha_1 M_N + \alpha_2 N_{hh} + \alpha_3 D_{hh} + \varepsilon_{LT} \quad (5.3) \]

(for comparison between non-migrant sending and temporary migrant sending households)

\[ L_{(P)} = \beta_0 + \beta_1 M_N + \beta_2 N_{hh} + \beta_3 D_{hh} + \varepsilon_{LP} \quad (5.4) \]

(for comparison between non-migrant sending and permanent migrant sending households)

Where \( L \) is farm labor available in a household at given time of farming measured in Labor-hours. Labor-hours is the product of the number of individuals in a household working in the farm and the average working hours spent per day and calculated for a given cropping season. In the research area, the average on-farm cropping season where farmers intensively engage in farm activities is six months. \( L_{(T)} \) and \( L_{(P)} \) are labor variables for comparison with respect to temporary and permanent patterns of migration, respectively.

\( M_N \) : is the number of migrants in a household
\( N_{hh} \) : is the size of a household and
\( D_{hh} \) is the number of dependents in a household. \( N_{hh} \) and \( D_{hh} \) are household characteristics that can determine the availability and allocation of labor input

**Expected signs:**

\( \alpha_1, \beta_1 < 0 \); households who send migrants to destination region are expected to allocate less number of labor on farm activities (negative relation ship)

\( \alpha_2, \beta_2 > 0 \); households with larger family size in general are expected to allocate greater number of labor on farm activities (positive relationship)

\( \alpha_3, \beta_3 < 0 \); households with more number of dependents are expected to allocate less number of labor-hours on farm activities as working members are also responsible to provide care for the dependents in the house and to other non-farm activities (negative relation ship).
Similarly, the determinants of capital stock for migrant sending households are given by:

\[ K(T) = \gamma_0 + \gamma_1 Y_R + \gamma_2 Y_F + \gamma_3 MC + \varepsilon_{KT} \]  \hspace{1cm} (5.5) \hspace{1cm} \text{(for comparison between non-migrant sending and temporary migrant sending households)}

\[ K(P) = \delta_0 + \delta_1 Y_R + \delta_2 Y_F + \delta_3 MC + \varepsilon_{KP} \]  \hspace{1cm} (5.6) \hspace{1cm} \text{(for comparison between non-migrant sending and permanent migrant sending households)}

Where,

- \( K \) is farm capital stock allocated for agricultural production (including physical capital such as farm implements and hoes, draft animals; and working capital such as purchased chemical fertilizers, improved seeds and pesticides valued in monetary terms).

- \( K(T) \) and \( K(P) \) are capital stock variables for comparison with respect to temporary and permanent patterns of migration, respectively.

- \( Y_R \) is remittance income. Increase in the amount of remittance income predicts the enhancement of savings and investment on capital stock.

- \( Y_F \) is farm income. Increase in the amount of farm income in turn boosts savings and investment on capital stock.

- \( MC \) is Migration Cost. Migrant sending households incur cost of migration as part of initial investment while sending migrants. The changes in capital stock as a result of the inflow of farm income and remittances on one hand, and the outflow of the cost of migration on the other hand is discounted with the Net Present Value\(^{61}\) estimations for each period of observation.

\[^{61}\text{Net present value for changes in capital stock is estimated by using the formula:}\]

\[ \text{NPV} (i) = \sum_{t=0}^{N} \frac{R_t - MC}{(1+i)^t} \]  \hspace{1cm} \text{where } i = \text{the interest rate at each period of observation} \]

\[ \text{Rt= savings from the flow of remittances and farm income and MC is cost of migration at a given time. The interest rate (i) for 2006 and 2010 cropping year was taken as 3\% (0.03) and 4\% (0.04), respectively.} \]
Expected outcomes:

\( \gamma_1, \delta_1 > 0; \) higher remittances are expected to enhance the investment on capital stock of migrant sending households (positive relationship)

\( \gamma_2, \delta_2 > 0; \) higher income from farm is expected to predict higher investment on capital stock (positive relationship)

\( \gamma_3, \delta_3 < 0; \) if cost of migration reduces capital stock of migrant sending households.

\( \gamma_3, \delta_3 = 0; \) if cost of migration has no effect on capital stock

Permanent migrant sending households are expected to incur higher cost of migration than temporary migrant sending households due to the fact that permanent migrants need higher adjustment costs in destination region (as they need to start up a new life in destination region where they live permanently). At initial stages of migration, remittances are not expected. The cost of migration can be sponsored by either savings from farm income or by selling-out some of farm physical capital or sponsored by relatives/friends at origin/destination region or it can be covered by loans.

The predicted values from the OLS regression results of equations 5.3, 5.4, 5.5 and 5.6 are then inserted in the outcome model in stage 2.

Stage 2

In the second stage, the predicted values of labor and capital inputs (in the first stage estimation) for both temporary and permanent patterns of migration are then used as a regressor in the second stage. In the second stage, the predicted values of labor and capital variables including the exogenous variable land (Ld) are taken as explanatory variables for farm income. In order to do so, the Cobb-Douglass type production function is adopted in the second stage model.

The Cobb-Douglass production function is given by:

\[ Y_F = A L^\alpha K^\beta Ld^\gamma \]  

(5.7)

Where,

\( Y_F: \) is farm output at a given farming season measured in Ethiopian Birr (ETB)

L: labor input
K: is farm capital stock
Ld: is farm land holding available for cultivation measured in hectares.
A: is total factor productivity and estimated as a constant in the econometric model
$\alpha$, $\beta$ and $\gamma$ (1 - $\alpha$ - $\beta$) are partial elasticities of farm income with respect to labor, capital and land variables, respectively. They tell us the extent of the response/change of farm income as a result of change in inputs of labor, capital and land holding, respectively.

The linear econometric model in the second stage embeds the predicted values of the first stage estimation (as modeled in Equations 5.3, 5.4, 5.5, 5.6), plus land as exogenous variable as indicated in equations 5.8 and 5.9 below. Comparison is made between non-migrant sending and temporary migrant sending households as well as between non-migrant sending and permanent migrant sending households; where on-migrant sending households are taken as control groups.

$$\ln Y_{F(T)} = \eta_1 + \alpha_1 \ln \hat{L}_{(T)} + \beta_1 \ln \hat{K}_{(T)} + \gamma_1 \ln Ld_{(T)} + \varepsilon_{YF(T)}$$  \hspace{1cm} (5.8)

(Comparison 1: non-migrant sending versus temporary migrant sending households)

And

$$\ln Y_{F(P)} = \eta_2 + \alpha_2 \ln \hat{L}_{(P)} + \beta_2 \ln \hat{K}_{(P)} + \gamma_2 \ln Ld_{(P)} + \varepsilon_{YF(P)}$$  \hspace{1cm} (5.9)

(Comparison 2: non-migrant sending versus permanent migrant sending households)

Where $\hat{L}_{(T)}$ and $\hat{L}_{(P)}$ are the predicted estimations of labor from Equations 5.3 and 5.4, respectively

$\hat{K}_{(T)}$ and $\hat{K}_{(P)}$ are the predicted estimations of capital from Equations 5.5 and 5.6, respectively.

$\eta_1$ and $\eta_2$ are constants for comparisons 1 and 2, respectively

62 The predicted estimations $\hat{L}_{(T)}$, $\hat{L}_{(P)}$, $\hat{K}_{(T)}$ and $\hat{K}_{(P)}$ from Eqs: 5.3, 5.4, 5.5 and 5.6, respectively are converted to natural logarithms to fit them to the second stage estimation models in Eqs 5.8 and 5.9. The predicted estimations of capital stock for Eqs 5.5 and 5.6 are the sum of observed variables and residuals. In addition, the predicted values are converted to natural logarithms before embedding them in stage 2 estimation. For collinearity tests of variables in the first and stage equations please refer to Annex 7.
Based on the predicted estimations of equations 5.8 and 5.9, the differences in farm income\textsuperscript{63} between migrant sending and non-migrant sending households are calculated as follows.

Farm income percentage difference of temporary migrant sending households against non-migrant sending households (T) = \[
\frac{\ln \hat{Y}_{Fnm} - \ln \hat{Y}_{F}(T)}{\ln \hat{Y}_{Fnm}} \times 100
\] (5.10)

And, Farm income percentage difference of permanent migrant sending households against non-migrant sending households: (P) = \[
\frac{\ln \hat{Y}_{Fnm} - \ln \hat{Y}_{F}(P)}{\ln \hat{Y}_{Fnm}} \times 100
\] (5.11)

Where ln\( \hat{Y}_{F(T)} \), ln\( \hat{Y}_{F(P)} \) and ln\( \hat{Y}_{F(nm)} \) are the predicted values of farm income for temporary, permanent and non-migrant sending households, respectively.

**Expected outcomes**

- Farm income difference > 0, if the predicted farm income of migrant sending households is less than that of non-migrant sending households. In this regard, out-migration could negatively affect production factors (i.e. reducing labor and/or capital inputs) and thereby reducing farm income.

- Farm income difference = 0, if the predicted farm income of migrant sending households is same to that of non-migrant sending households. In this case, out-migration and remittances would have no or negligible effect on production factors and then on farm income; or if the lost labor input is compensated by boosting in capital stock that eventually leads to have a neutral effect on farm production and income.

- Farm income difference is < 0, if the predicted farm income of migrant sending households is greater than that of non-migrant sending households. In this regard, out-migration and remittances would play a vital role in enhancing the capital stock and making available labor productive. In addition, the effect of out-migration might have negligible

\textsuperscript{63} The differences in farm income estimated in natural logarithms are also presented in actual values.
effect in reducing labor input allocation for production (as a result of 
surplus labor in the family) compared to its role in boosting capital stock.

5.2.2 Some econometric issues

In doing two-step model estimations, the model in the first stage is embedded on the 
second; where the variables build up in the second stage contain the parameters estimated 
from the first stage. This produces noise in the covariance matrix of the second stage 
estimation caused by the first stage estimation. Thus, the estimated covariance matrix for 
the second model would be biased and needs to be adjusted to account for the variability 
in the first parameter. Different authors have derived methods to correct the covariance 
matrix of the second stage estimator while doing two-stage estimations. Amemiya (1978) 
developed asymptotic covariance estimation procedures for a two-stage multivariate logit 
models with same number of observation. Although the estimation methods are simple 
especially for models that involve several dependent variables, they are not as efficient as 
maximum likelihood estimator methods. Similarly, Heckman (1979) corrected the 
asymptotic covariance matrix of two-step estimations particularly for non-randomly 
selected samples where there exists biasness of sample selection. In addition, Murphy and 
Topel (1985) provided correction methods for covariance matrix for two-stage estimation 
using maximum likelihood and least square methods and for a condition where the 
number of observation from the first and second stage estimations are the same (Hole, 
2006; Karaca-Mandic & Train, 2003). As noted by Petrin and Train (2002) and Karaca- 
Mandic & Train (2003) bootstrapping methods applied for the entire two-step estimators 
provide a valid estimator of the covariance matrix and which is similar to the estimation 
done to correct the asymptotic standard errors by programming the asymptotic formula of 
covariance estimates. Bootstrapping is a convenient way of obtaining the covariance 
matrix estimators with two-step estimators and it also provides better parameter estimates 
particularly for conditions when asymptotic sampling distribution is too difficult to drive 
in multi-stage estimations (Schmidheiny, 2012 & Freedman, 1984). In this research, 
bootstrapping method is applied for the entire procedure of the two-step estimators with
1000 replications using STATA software package. On the other hand, tests for some econometric issues such as multicollinearity and heteroskedasticity were undertaken to avoid possible estimation biases. The degree of multicollinearity was tested by the Variance Inflating Factor (VIF). In this particular research, the value with VIF > 10 (or tolerance of < 0.1) is detected to be highly collinear. In such cases, one of the collinear variables was dropped. In OLS estimations, it is assumed that error terms for each observation are equally distributed with same weight. However, the error terms might not have constant variances and would raise the concern of heteroskedasticity. For each econometric model, the presence of heteroskedasticity is tested by running the Breusch-Pagan/Cook-Weisberg tests and robust standard errors were used to circumvent the concern. The tests have been undertaken using STATA software package version 11.

5.2.3 Results and Discussion

5.2.3.1 Impact of rural-urban migration on production factors

5.2.3.1.1 Impact on farm labor-hours

Ethiopia has a favorable climate and low cost labor market that creates a comparative advantage for the expansion of labor-intensive firms such as agro-processing industries, commercial farms, textile and leather industries. Labor-intensive firms in Ethiopia have created job opportunities particularly for non-educated labor and attracted migrant workers coming from different parts of the country. In addition, temporary migrants have the opportunity to obtain additional skill that might help them to improve their farming practices in their place of origin. Commercial farms in the research area employ laborers both on temporary and permanent basis. Commercial farms need a higher number of workers during planting and weeding season and with special overtime schedules for workers. The planting seasons of small scale farmers in the research area more or less overlap with planting seasons of commercial farms and families of temporary migrants who are left behind accomplish the plantation activities. Temporary migrants have the possibility to support their rural families particularly in non-farm activities. Permanent
migrants work for all seasons of the year and their families in the origin are responsible for all agricultural and non-agricultural activities.

The executive report from UNIDO and FAO (2010) pointed out that human power still remains the main source of power for cultivation of land in Sub-Saharan Africa, and no exception for Ethiopia. In the study area, farm activities (either crop or livestock production) are labor intensive. Farmers mainly produce coffee, false banana (‘enset’), cereal crops, ‘khat’, vegetables and fruits, livestock and their products. Coffee is produced with strict practices of organic farming without any use of manufactured yield enhancing technologies such as chemical fertilizers, pesticides, and plant growth hormones. Yield for organic farming is low and farmers are expected to spend more time on farm to enhance the production and quality of coffee beans. Farmers enhance the productivity of soil for coffee production through strict use of non-synthetic materials and methods such as green manure, composting, mulching and through appropriate cultivation practices. In addition, farmers practice contour plowing, terracing and agro-forestry to conserve the top soil. The preparation of natural yield enhancing materials and conservation practices is also labor intensive. In addition, plantation and harvesting of coffee is done by hand which also consumes much of the labor-hours of small scale rural farmers. False banana (‘enset’) production is the other labor intensive crop where farmers are expected to process the immediate harvests before taking to the market. With respect to animal husbandry, farmers use traditional production systems where they feed their animals either by cut-and-carry feeding system or herding animals to meadow. Such type of livestock production can also be considered as labor-intensive.

64 False Banana which is traditionally called ‘enset’ is a banana resembling plant which is largely produced in the Southern part of Ethiopia. ‘Enset’ is a staple food in the study area where the stems are harvested, chopped/grinded to make ‘kocho’ and ‘bulla’ (immediate products) which finally used to make pancake and porridge. Farmers are expected to process the harvest of false banana in the form of ‘Kocho’ and ‘Bulla’ in order to sell to the market. The processing of ‘enset’ is a labor intensive activity and usually accomplished by women. Products of ‘enset’ prepared as a pancake or porridge are served in the modern Ethiopian cuisine. In addition, the byproducts of ‘enset’ are also used for livestock production. Please visit a video showing processing of ‘enset’ [http://www.youtube.com/watch?v=dzamM3W3xkc](http://www.youtube.com/watch?v=dzamM3W3xkc) (accessed at 12/11/2011)

65 Cut-and-carry feeding system is a method of feeding animals by carrying residuals of crops/forages and feeding animals at their confinement.
The following table estimates the determinants of labor input among rural households. The following estimation results are presented for both temporary and permanent patterns of migration. The results are to be interpreted in comparison against non-migrant sending households.

Table 3: Stage 1 estimation result for the determinants of labor input
(For comparison of both temporary and permanent migrant sending households)

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>Mₙ</th>
<th>Nₜ</th>
<th>Dₜ</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t-stat</td>
<td>Coeff.</td>
<td>t-stat</td>
</tr>
<tr>
<td>2010</td>
<td>0.779</td>
<td>F(3,208)=248.7***</td>
<td>-238.6*** (85.76)</td>
<td>-2.78</td>
<td>726.1*** (29.67)</td>
<td>24.48</td>
</tr>
<tr>
<td>2006</td>
<td>0.69</td>
<td>F(3,208)=158.2***</td>
<td>-297.2*** (100.5)</td>
<td>-2.96</td>
<td>653.9*** (32.81)</td>
<td>19.93</td>
</tr>
<tr>
<td>Ave</td>
<td>0.758</td>
<td>F(3,208)=221.7***</td>
<td>-271.7*** (88.23)</td>
<td>-3.08</td>
<td>690.8*** (29.51)</td>
<td>23.41</td>
</tr>
</tbody>
</table>

Comparison 1: Temporary migrant sending against non-migrant sending households
No. Obs.=212 HHs

Lₜ(ₜ) = α₀ + α₁Mₙ + α₂Nₜ + α₃Dₜ + εₜₜ

Comparison 2: Permanent migrant sending against non-migrant sending households
No. Obs.=177 HHs

Lₚ(ₜ) = β₀ + β₁Mₙ + β₂Nₜ + β₃Dₜ + εₜₚ

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>Mₙ</th>
<th>Nₜ</th>
<th>Dₜ</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t-stat</td>
<td>Coeff.</td>
<td>t-stat</td>
</tr>
<tr>
<td>2010</td>
<td>0.755</td>
<td>F(3,173)=177.9***</td>
<td>-288.1*** (88.98)</td>
<td>-3.24</td>
<td>732.7*** (34.21)</td>
<td>21.42</td>
</tr>
<tr>
<td>2006</td>
<td>0.672</td>
<td>F(3,173)=118.3***</td>
<td>-357.2*** (98.04)</td>
<td>-3.64</td>
<td>632.6*** (36.21)</td>
<td>17.47</td>
</tr>
<tr>
<td>Ave</td>
<td>0.736</td>
<td>F(3,173)=160.6***</td>
<td>-332.2*** (88.69)</td>
<td>-3.75</td>
<td>681.8*** (33.37)</td>
<td>20.43</td>
</tr>
</tbody>
</table>

*** Significant at 1%   ** Significant at 5%   * Significant at 10%
Robust standard errors are found in parenthesis
Source: Author’s estimation
The OLS estimation result (in table 3 above) shows the determinants of labor input in both temporary and permanent patterns of migration. The coefficient of determination for average estimation in both types of comparisons show that about 75.8% and 73.6% of the change in labor-hours among temporary and permanent migrant sending households, respectively are explained by the changes in the number of migrants, size of a household and number of dependents. The average estimations show that out-migration of a family member in temporary and permanent migrant sending households reduces labor-hours by 271.7 and 332.2 units, respectively compared to non-migrant sending households. The results show that the effect of out-migration on reducing labor-hours is more severe for 2006 cropping season than 2010 as well as for permanent migrant sending households than for temporary migrant sending households. Some family members who were dependents in 2006 have joined the labor force in 2010 and the number of working members has been increasing in recent years. The size of a household is also found to affect the allocation of labor-hours positively and significantly in both types of estimation. The average estimation results show that the increment of household size by additional member leads to a 690.8 and 681.8 unit increases in labor-hours of temporary and permanent migrant sending households, respectively. The estimated results in both 2006 and 2010 cropping seasons has produced significant and positive relationships between labor allocation and household size. Similarly, the relationship between labor-hour allocation and number of dependents in a household has been found to be negative. An increase in a dependent family member in a household, on average, has reduced the allocation of labor-hours on farming activities by 654.8 units among temporary migrant sending households and by 631.2 units among permanent migrant sending households. The estimation results for both 2010 and 2006 cropping seasons show negative and strong relationships between labor allocation and number of dependents in a household. Households with more number of dependents (young children and elderly) are supposed to take care of the dependents left in the house and that hampers the time to be allocated for farm activities. The F-tests for both types of comparison as well as for each period of observation have also produced significant results. The estimation results in general confirm the hypothesis that available labor in a household is negatively influenced by the
number of out-migrants and dependents in a household and positively affected by the household size.

Migrant sending rural households make a collective decision to send migrants either temporarily or permanently based on the resources they have. Non-migrant sending households have allocated the highest amount of labor-hours as result of involving more workers in farm activities as well as allocation of more hours in farm compared to migrant sending households. Both permanent migrant sending and temporary migrant sending households allocated almost same amount of hours in farm activities. However, on average, permanent migrant sending households have greater number of family members working in the field and are more able to send migrants to destination than temporary migrant sending households.

In general, there is an increment in labor-hours for both migrant sending and non-migrant sending households in 2010 compared to 2006. This is due to the fact that family members who were dependents in 2006 have joined the labor force in 2010 and due to the slight increment of working hours of households.

The predicted values of the labor variable based on the OLS estimation results in table 3 would be used as regressors in the second stage estimator model in section 5.2.3.2.

5.2.3.1.2 Impact on farm capital stock

Small scale farmers in Sub-Saharan Africa use a small capital stock for farm production. For instance, a report from UNIDO and FAO (2010) indicated that the use of tractors in Sub-Saharan Africa has remained almost negligible over the past 40 years whereas tractor use has increased 10 fold in Asia over the same period.

The majority of small scale farmers in the study area own less than one hectare of land. Small scale farmers who possess small size of farm land use hand implements to cultivate
their land and farmers with relatively larger size of farm land use combinations of draft animals (particularly pair of oxen) and farm tools for cultivation. Farmers in the study area can not afford to purchase labor saving machineries and tractors. Therefore, the majority of farm activities are accomplished by hand given the size of their land holdings. In addition, farmers need working capital such as chemical fertilizer, pesticides and improved seeds to enhance their production. The majority of pesticides and chemical fertilizer is applied for vegetable and fruit production and for cereal crops production to some extent. Coffee production is entirely carried out without any use of synthetic materials and farmers strictly follow organic farming practices.

The following OLS estimation (in Table 4 below) presents the estimation results regarding the determinants of capital stock of rural households. As usual comparison is done between non-migrant sending and temporary migrant sending households as well as between non-migrant sending and permanent migrant sending households. The estimation results presented for both temporary and permanent migrant sending households are interpreted with comparison against non-migrant sending households.

### Table 4: stage 1 estimation result for the determinants of capital stock

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>Yᵣ</th>
<th>Y_f</th>
<th>MC</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t-stat</td>
<td>Coeff.</td>
<td>t-stat</td>
</tr>
<tr>
<td>2010</td>
<td>0.332</td>
<td>F(3,208)=36.01***</td>
<td>0.22*** (0.068)</td>
<td>3.25</td>
<td>0.11*** (0.012)</td>
<td>8.53</td>
</tr>
<tr>
<td>2006</td>
<td>0.20</td>
<td>F(3,208)=18.22***</td>
<td>0.17*** (0.049)</td>
<td>3.51</td>
<td>0.06*** (0.011)</td>
<td>5.59</td>
</tr>
<tr>
<td>Ave</td>
<td>0.342</td>
<td>F(3,208)=34.48***</td>
<td>0.23*** (0.06)</td>
<td>3.86</td>
<td>0.09*** (0.011)</td>
<td>8.39</td>
</tr>
</tbody>
</table>
\[ K_{(P)} = \delta_0 + \delta_1 Y_R + \delta_2 Y_F + \delta_3 MC + \epsilon_{KP} \]

**Comparison 2: Non-migrant sending against permanent migrant sending households**

No. Obs. = 177 HHs

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. ( R^2 )</th>
<th>F-stat</th>
<th>( Y_R )</th>
<th>( Y_F )</th>
<th>MC</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t-stat</td>
<td>Coeff.</td>
<td>t-stat</td>
</tr>
<tr>
<td>2010</td>
<td>0.278</td>
<td>F(3,173) = 22.22***</td>
<td>0.08* (0.046)</td>
<td>1.81</td>
<td>0.09*** (0.012)</td>
<td>7.90</td>
</tr>
<tr>
<td>2006</td>
<td>0.143</td>
<td>F(3,173) = 9.63***</td>
<td>-0.17 (0.126)</td>
<td>-1.37</td>
<td>0.06*** (0.011)</td>
<td>5.21</td>
</tr>
<tr>
<td>Ave</td>
<td>0.274</td>
<td>F(3,173) = 21.77***</td>
<td>0.08 (0.057)</td>
<td>1.40</td>
<td>0.09*** (0.011)</td>
<td>7.82</td>
</tr>
</tbody>
</table>

*** Significant at 1%  ** Significant at 5%  * Significant at 10%

Robust standard errors are found in parenthesis  Source: Author’s estimation

As it is possible to see the coefficient of determination for the average results above, about 34.2% and 27.4% change in capital stock of temporary and permanent migrant sending households is explained by the changes in remittance income, farm income and cost of migration. According to the estimation, remittance income has shown positive and significant effect for capital stock investment in temporary migrant sending households. According to the result, a 10% increase in remittance income leads to 2.2% increase in the amount of capital stock in temporary migrant sending households. The estimation results for both 2006 and 2010 cropping season show significant effect of remittance income on capital stock. The estimation result for comparison with permanent migrant sending households depict that income from remittances significantly increased the capital stock of permanent migrant sending households in recent years (i.e. for the year 2010). However, the average results and the estimation for the 2006 cropping year have produced insignificant results. This is in connection with the amount of remittances received by temporary and permanent migrant sending households. The amount of remittances received by temporary migrant sending households in 2010 and 2006 cropping seasons is higher by 20.1% and 54.83% than permanent migrant sending households, respectively. Permanent migrants invest more in the destination, start up their
own family and they send only a smaller proportion of remittance to their families living in rural areas than temporary migrants who return back to their origin with their savings. Farm income has been found to affect the capital stock positively in both types of comparisons. This means the increment in the amount of farm income predicts for increased investment on capital stock. According to the average estimation, a 1% increase in farm income leads to an increase of capital stock by 0.09% in both temporary and permanent migrant sending households; depicting that higher income from farm increases the savings and then investment on capital stock that in turn enhance farm production and income in the following cropping season. The estimations for both 2010 and 2006 cropping seasons have produced positive and significant effects of farm income on capital stock. The effect of migration cost on capital stock for both patterns of migrant sending households is found to be insignificant. This means that capital stock of migrant sending households is almost not depleted as a result of sending migrants (for both temporary and permanent migrant sending households). The cost of migration can be sponsored from the savings from farm income, from relatives/friends in origin or destination region or from loans. The F-tests for both types of comparison and period of observation have also produced significant results. In general, the estimation results and test statistics confirm the hypothesis that remittances and farm income positively affect the capital stock whereas the effect of cost of migration on capital stock of migrant sending households is negligible.

The predicted values of capital stock variable based on the estimation results in table 4 above would be used as a regressor in the second stage estimator model.

5.2.3.2 Impact of rural-urban migration on farm income

Rural households in the study area mainly derive their income from crop and livestock production. The following figures depict the main commodities produced as a source of income in the study area in 2010 and 2006 cropping seasons.
The following table presents the second stage of estimation results where the predicted values of the first stage estimation are regressed on farm income. The effects of out-migration and remittances are already embedded on labor and capital variables in the first stage estimation. The variable land is also included as an exogenous variable in the second stage model as one of the determinant factors affecting farm income of rural households.
Table 5: Second stage estimation results

\[ \ln Y_{F(T)} = \eta_1 + \alpha_1 \ln \hat{L}_T + \beta_1 \ln \hat{K}_T + \gamma_1 \ln L_d(T) + \varepsilon_{YF(T)} \]

Comparison 1: Non-migrant sending against temporary migrant sending households

No. Obs. = 212 HHs

<table>
<thead>
<tr>
<th>Croping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>ln (\hat{L}_T)</th>
<th>ln (\hat{K}_T)</th>
<th>lnLd(T)</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.859</td>
<td>F(3,208)=331***</td>
<td>0.15* (0.082)</td>
<td>1.87</td>
<td>1.21*** (0.070)</td>
<td>17.16</td>
</tr>
<tr>
<td>2006</td>
<td>0.736</td>
<td>F(3,208)=159,4***</td>
<td>0.37*** (0.124)</td>
<td>2.98</td>
<td>1.45*** (0.154)</td>
<td>9.39</td>
</tr>
<tr>
<td>Ave</td>
<td>0.842</td>
<td>F(3,208)=275,7***</td>
<td>0.26*** (0.09)</td>
<td>2.97</td>
<td>1.13*** (0.072)</td>
<td>15.77</td>
</tr>
</tbody>
</table>

\[ \ln Y_{F(P)} = \eta_2 + \alpha_2 \ln \hat{L}_P + \beta_2 \ln \hat{K}_P + \gamma_2 \ln L_d(P) + \varepsilon_{YF(P)} \]

Comparison 2: Non-migrant sending against permanent migrant sending households

No. Obs. = 177 HHs

<table>
<thead>
<tr>
<th>Croping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>ln (\hat{L}_P)</th>
<th>ln (\hat{K}_P)</th>
<th>lnLd(P)</th>
<th>Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.892</td>
<td>F(3,173)=309,5***</td>
<td>0.13 (0.106)</td>
<td>1.25</td>
<td>1.55*** (0.097)</td>
<td>16.01</td>
</tr>
<tr>
<td>2006</td>
<td>0.732</td>
<td>F(3,173)=137,8***</td>
<td>-0.19 (0.158)</td>
<td>-1.22</td>
<td>1.85*** (0.174)</td>
<td>10.62</td>
</tr>
<tr>
<td>Ave</td>
<td>0.911</td>
<td>F(3,173)=279,4***</td>
<td>0.14* (0.080)</td>
<td>1.72</td>
<td>1.68*** (0.075)</td>
<td>22.39</td>
</tr>
</tbody>
</table>

***, **, * Significant at 1%, 5% and 10%, respectively

Bootstrap standard errors are in parenthesis  
Source: Author’s estimation

The effects of out-migration and remittances have been embedded on labor and capital variables in the first stage of analysis and then the predicted values are in turn used to estimate the effect on farm income in the second stage. The average results for both types...

\(^{66}\) \(\hat{L}\) and \(\hat{K}\) are the predicted estimations from the first stage analysis. The predicted values are converted to natural logarithm to fit to the second stage estimator model.
of comparisons in the above table indicate that about 84.2% and 91.1% of the variation in farm income are explained by the changes in labor, capital stock and farm land holding in temporary and permanent migrant sending households, respectively. The average estimation in comparison 1 shows that one percent increase in the labor-hours, leads to a 0.26% increase in farm income of temporary migrant sending households. The marginal product of labor has reduced in the 2010 cropping season compared to the case in 2006 (i.e. from 0.37% to 0.15% increase in farm income for a one percent increase in labor input, for 2006 and 2010 cropping seasons respectively). Household members who were dependents in 2006 have joined the working members in recent years and increased the available labor working in a given plot of land. This makes the available labor surplus and reduces the marginal product of labor in recent production seasons. The estimation result in comparison 1 show that the marginal product of labor is still positive and out-migration has made labor productive in temporary migrant sending households compared to the case of non-migrant sending households. On the other hand, a 1.13% increase in farm income has been estimated for a one percent increase in the capital stock; which is invested as a result of savings from remittances and farm income. The estimation results in both comparisons 1 and 2 show the role of capital stock in determining farm income is larger than the rest of production factors and taking the largest share in determining production. In the above table both types of analyses have been made in comparison against non-migrant sending households. In this regard, remittances play an important role for investment in capital stock creating a gap in terms of capital stock holdings between migrant sending and non-migrant sending households. In addition, a one percent increase in size of farm land increases the farm income of temporary migrant sending households by 0.23%. In general, the estimations in both 2010 and 2006 cropping seasons have produced positive and significant effect of production factors on farm income.

In the second type of comparison (the comparison made between non-migrant sending and permanent migrant sending households), the effect of labor on farm income has produced insignificant results in both cropping seasons. Labor has been found to be surplus among permanent migrant sending households where the marginal product of labor is insignificant for each additional unit of labor used in the production process. In
this regard, out-migration of labor has produced negligible effect on farm income, keeping the other variables constant. Moreover, the average estimation shows that a one percent increase in capital stock leads to a 1.68% increase in farm income of permanent migrant sending households; where remittances and farm income are the determinant factors for investment in capital stock. In this regard, cost of migration has been found to have insignificant effect on capital stock and thus having negligible effect on farm income. The average estimation shows that farm income of permanent migrant sending households has increased by 0.11% for a 1% increase in the size of land. The estimations for both 2010 and 2006 cropping seasons in the second type of comparison have also produced positive and significant effect of production factors on farm income.

The sum of the coefficients of the production factors exceeds one, which is not in line with the assumption of the Cobb-Douglass production function. The production function assumes that the sum of the coefficients of the production factors is summed up to one and applied for macro level analysis. The analysis has been done at micro (household) level and could not hold the homogenous assumption of the production function. As it is already discussed in the previous chapters, migrant sending households decide to send migrants either temporarily or permanently based on the resources they have, expected benefits from migration and possible effects on farm production. The changes in labor and capital inputs as a result of out-migration and remittances also change the extent of intensification of labor and capital per a given size of land and then changing per capita farm income. The effect of migration on input intensification is dealt separately in section 5.3.

The following scatter plots show the relationship between labor, capital and farm land with farm income separately).
Fig. 13 Relationship between Labor-hours and farm income

![Graph showing the relationship between labor-hours allocation and farm income (Average estimation, N=259HHs).](image1)

Fig. 14 Relationship between Capital stock and farm income

![Graph showing the relationship between farm capital stock allocation and farm income (Average estimation, N=259HHs).](image2)
As indicated in the previous estimations, out-migration and remittances affect farm income of rural households through their effects on labor and capital inputs as discussed above. Based on the estimation results presented in table 5, the following calculations are made to compare the predicted farm income differences in temporary and permanent migrant sending households. As usual, non-migrant sending households are taken as control group.
Table 6: Differences of farm income in temporary and permanent migrant sending households

<table>
<thead>
<tr>
<th>Migration pattern</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
<th>Migration pattern</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \ln \hat{Y}_{F(T)} )</td>
<td>( \ln \hat{Y}_{F(T)} )</td>
<td>( \ln \hat{Y}_{F(T)} )</td>
<td></td>
<td>( \ln \hat{Y}_{F(P)} )</td>
<td>( \ln \hat{Y}_{F(P)} )</td>
<td>( \ln \hat{Y}_{F(P)} )</td>
</tr>
<tr>
<td>Non-migrant sending HHs (control groups)</td>
<td>9.045</td>
<td>8.519</td>
<td>8.878</td>
<td>Non-migrant sending HHs (control groups)</td>
<td>9.139</td>
<td>8.624</td>
<td>8.942</td>
</tr>
<tr>
<td>Difference</td>
<td>-0.142 (gains)</td>
<td>-0.429 (gains)</td>
<td>-0.07 (gains)</td>
<td>Difference</td>
<td>0.001 (losses)</td>
<td>-0.035 (gains)</td>
<td>-0.013 (gains)</td>
</tr>
<tr>
<td>% Farm income Difference</td>
<td>-1.57%</td>
<td>-1.91%</td>
<td>-0.79%</td>
<td>% Farm income Difference</td>
<td>0.01%</td>
<td>-0.41%</td>
<td>-0.15%</td>
</tr>
<tr>
<td>Actual Farm income of non-migrant sending households (Average in ETB)</td>
<td>14618.2</td>
<td>8303.52</td>
<td>11460.9</td>
<td>Actual Farm income of non-migrant sending households (Average in ETB)</td>
<td>14618.2</td>
<td>8303.52</td>
<td>11460.9</td>
</tr>
<tr>
<td>Difference</td>
<td>229.51 (gains)</td>
<td>158.6 (gains)</td>
<td>90.54 (gains)</td>
<td>Difference</td>
<td>-1.46 (losses)</td>
<td>34.04 (gains)</td>
<td>17.19 (gains)</td>
</tr>
</tbody>
</table>

On average, as a result of temporary and permanent migration, the farm income of rural households has increased by 0.79% (i.e. by 90.54 ETB per cropping season) and by 0.15% (by 17.19 ETB per cropping season), respectively, compared to the income obtained without sending migrants. The percentage difference in farm income of temporary migrant sending households compared to non-migrant sending households was 1.57% (229.51 ETB) for the cropping season in 2010 whereas it was 1.91% (158.6 ETB) for 2006. The cumulative effect of out-migration and remittances on labor and capital

\[ ^{67} \] Actual farm income gained/lost as a result of temporary and permanent migration is calculated as a product of the percentage of farm income difference and farm income of non-migrant sending households.
Input has contributed for the differences in farm income. The extent of significance of labor input has been reduced in recent years leading to the reduction of the contribution of labor in determining farm income of temporary migrant sending households. Likewise, the percentage difference in farm income of permanent migrant sending households for cropping seasons 2010 and 2006 has been 0.01% (-1.46 ETB) and -0.41% (34.04 ETB), respectively. Although the estimations for 2010 shows losses of farm income in permanent migrant sending households, the amount is negligible compared to gains in the other period of observation. Labor is found to be insignificant in contributing for farm income of permanent migrant sending households (for both 2010 and 2006 cropping seasons). Therefore, the change observed in farm income of permanent migrant sending households is mainly as a result of changes in capital stock, which is in turn influenced by the investment made from remittances and farm income. The gains of farm income as a result of permanent migration are found to be lower than the gains from temporary migration. Temporary migrant sending households have received higher remittances than permanent migrant sending households that enhance the investment on capital stock. In addition, the marginal product of labor has remained positive for temporary migrant sending households. From the previous estimations it is also possible to deduce that migrants who stayed longer in destination are in a position to send higher remittances to their families than migrants who went to the destination region recently. Higher remittances have predicted higher investment on capital stock and then increased farm income.

5.3 Impact of out-migration and remittances on input intensity per unit of land and then on per capita farm income

The majority of agricultural production in Ethiopia is carried out by small scale farmers who own small size of land. The average farm land holding is even smaller in Shebedino district compared to other districts in the country. Farmers are not able to extend their total farm land holdings and they use intensive farming in their plot of land with the objective of enhancing yield per a given plot of land. The aim of this section is to analyze the effect of out-migration and remittances on intensity of labor and capital per a given
hectare of land and thereby to see its effect on per capita farm income. The analysis is
done for non migrant sending, temporary migrant sending and permanent migrant
sending households where non-migrant sending households are taken as control groups.

5.3.1 Specification of Econometric Model

The Cobb-Douglas type production function is given by:

\[ Y_F = AL^a K^\beta Ld^{1-a-\beta} \]

If both sides of the equation are divided by the labor variable (L), then

\[ \frac{Y_F}{L} = y_F = (AL^a K^\beta Ld^{1-a-\beta}) L^{-1} \]

\[ = AL^{(1-a)} Ld^{(1-a)} K^\beta Ld^{-\beta} \] (5.13)

This can also be re-written as:

\[ = AL^{(1-a)} Ld^{(1-a)} K^\beta Ld^{-\beta} \] (5.14)

\[ = A \left( \frac{L}{Ld} \right)^{(1-a)} \left( \frac{K}{Ld} \right)^\beta \]

\[ \frac{\text{Labor} - \text{Intensity}}{\text{per unit of land}} \frac{\text{Capital} - \text{Intensity}}{\text{per unit of land}} \]

Thus, the linear log-form econometric model is given by:

\[ \ln y_F = \psi - (1-\alpha)*[\ln L - \ln(Ld)] + \beta*[\ln K - \ln(Ld)] + \varepsilon_{yF} \] (5.17)

or can be re-written as:

\[ \ln y_F = \psi + (\alpha-1)*[\ln L - \ln(Ld)] + \beta*[\ln K - \ln(Ld)] + \varepsilon_{yF} \] (5.18)

Where \( \psi \) is a constant
Therefore, the predicted values of the first stage estimation on labor and capital variables in table 2 and 3 above (in section 5.2.3.1) are then inserted in eq. 5.18 and done for both types of comparisons as follows:

**Comparison 1. Non-migration against temporary migration**

\[
\ln y_{F(T)} = \psi_1 + (\alpha_1 - 1) \times [\ln \hat{L}_T - \ln(Ld_T)] + \beta_1 \times [\ln \hat{K}_T - \ln(Ld_T)] + \varepsilon_{yF(T)}
\]

(5.19) and

**Comparison 2. Non-migration against permanent migration**

\[
\ln y_{F(P)} = \psi_2 + (\alpha_2 - 1) \times [\ln \hat{L}_P - \ln(Ld_P)] + \beta_2 \times [\ln \hat{K}_P - \ln(Ld_P)] + \varepsilon_{yF(P)}
\]

(5.20)
5.3.2 Results and Discussion

The following table estimates the effect of labor and capital intensity per unit of land on per capita income as a result of out-migration and flow of remittances. Similar to the previous estimations, the predicted values of L and K are fitted in the estimation model to see the effect of out-migration and remittances on labor and capital intensity per unit of land and thereby on per capita farm income.

Table 7: Effect of out-migration and remittances on labor and capital intensity per unit of land and thereby on per capita farm income

\[
\ln y_{F(T)} = \psi_1 + (\alpha_1 - 1)[\ln \hat{L}(T) - \ln(L_d(T))] + \beta_1[\ln \hat{K}(T) - \ln(L_d(T))] + \varepsilon_{yF(T)}
\]

Comparison 1: Non-migrant sending against temporary migrant sending households
No. Obs.=212 HHs

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>\ln \hat{L}(T) - \ln(L_d(T))</th>
<th>\ln \hat{K}(T) - \ln(L_d(T))</th>
<th>_Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>z</td>
<td>Coeff.</td>
</tr>
<tr>
<td>2010</td>
<td>0.684</td>
<td>F(2,209)=229.5***</td>
<td>-1.15*** (0.060)</td>
<td>-19.31</td>
<td>0.92*** (0.063)</td>
</tr>
<tr>
<td>2006</td>
<td>0.400</td>
<td>F(2,209)=71.37***</td>
<td>-1.09*** (0.113)</td>
<td>-9.70</td>
<td>0.79*** (0.147)</td>
</tr>
<tr>
<td>Ave</td>
<td>0.619</td>
<td>F(2,209)=172.3***</td>
<td>-1.07*** (0.061)</td>
<td>-17.48</td>
<td>0.82*** (0.082)</td>
</tr>
</tbody>
</table>

\[
\ln y_{F(P)} = \psi_2 + (\alpha_2 - 1)[\ln \hat{L}(P) - \ln(L_d(P))] + \beta_2[\ln \hat{K}(P) - \ln(L_d(P))] + \varepsilon_{yF(P)}
\]

Comparison 2: Non-migrant sending against permanent migrant sending households
No. Obs.=177 HHs

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>\ln \hat{L}(P) - \ln(L_d(P))</th>
<th>\ln \hat{K}(P) - \ln(L_d(P))</th>
<th>_Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>z</td>
<td>Coeff.</td>
</tr>
<tr>
<td>2010</td>
<td>0.685</td>
<td>F(2,174)=192.4***</td>
<td>-1.22*** (0.098)</td>
<td>-12.51</td>
<td>1.03*** (0.132)</td>
</tr>
<tr>
<td>2006</td>
<td>0.540</td>
<td>F(2,174)=104.5***</td>
<td>-1.47*** (0.088)</td>
<td>-16.69</td>
<td>1.20*** (0.1)</td>
</tr>
<tr>
<td>Ave</td>
<td>0.696</td>
<td>F(2,174)=202.5***</td>
<td>-1.24*** (0.084)</td>
<td>-14.81</td>
<td>1.08*** (0.101)</td>
</tr>
</tbody>
</table>

***, **, * Significant at 1%, 5%, and 10%, respectively

Bootstrap standard errors are in parenthesis

Source: Author’s estimation
The average estimations in both types of comparisons in the above table show that about 61.9% and 69.6% of the variation in per capita farm income is explained by changes in labor and capital intensity per unit of land in comparisons 1 and 2, respectively. The average result shows that a 1% increase in intensity of labor per unit of land leads to a 1.07% and 1.24% reduction in per capita farm income in temporary and permanent migrant sending households, respectively. Similarly, on average, a 1% increase in capital intensity leads to a 0.82% and 1.08% increase in per capita farm income of temporary and permanent migrant sending households, respectively. The result shows that the more amounts of labor-hours allocated per a hectare of land predicts the lower amount of per capita farm income a household obtains. In this regard, permanent migrant sending households have obtained less per capita farm income as a result of the allocation of more labor-hours in the farm. On the other hand, capital intensity per unit of land predicts a positive relationship with per capita farm income. According to the estimations in both 2006 and 2010 cropping seasons, the marginal product of capital intensity per unit of land is found to be higher for permanent migrant sending households than temporary migrant sending households. All the test statistics in both types of comparisons and periods of observation have produced significant results.

Based on the estimation results presented in table 7 above, the following calculations are made to see the effect of out-migration and remittances on the intensity of labor and capital inputs per unit of land, respectively and thereby on per capita farm income.
Table 8: Estimation of per capita farm income as a result of out-migration and remittances on labor and capital intensity (based on Table 7 estimation)

<table>
<thead>
<tr>
<th>Migration pattern</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\ln \hat{y}_{f(T)}$</td>
<td>$\ln \hat{y}_{f(T)}$</td>
<td>$\ln \hat{y}_{f(T)}$</td>
<td>$\ln \hat{y}_{f(P)}$</td>
<td>$\ln \hat{y}_{f(P)}$</td>
<td>$\ln \hat{y}_{f(P)}$</td>
</tr>
<tr>
<td>Non-migration</td>
<td>0.923</td>
<td>0.773</td>
<td>0.513</td>
<td>Non-migration</td>
<td>0.996</td>
<td>0.574</td>
</tr>
<tr>
<td>Temporary migration</td>
<td>1.271</td>
<td>1.128</td>
<td>0.858</td>
<td>Permanent migration</td>
<td>1.222</td>
<td>0.828</td>
</tr>
<tr>
<td>Difference (Comparison 1)</td>
<td>-0.348</td>
<td>-0.355</td>
<td>-0.345</td>
<td>Difference (Comparison 2)</td>
<td>-0.226</td>
<td>-0.254</td>
</tr>
<tr>
<td>% Difference in per capita farm income</td>
<td>-37.7%</td>
<td>-45.92%</td>
<td>-67.25%</td>
<td>% Difference in per capita farm income</td>
<td>-22.69%</td>
<td>-44.25%</td>
</tr>
<tr>
<td>Average Farm income per labor-hour of non-migrant sending households (in ETB)</td>
<td>3.75</td>
<td>2.39</td>
<td>3.09</td>
<td>Average Farm income per labor-hour of non-migrant sending households (in ETB)</td>
<td>3.75</td>
<td>2.39</td>
</tr>
<tr>
<td>Differences of farm income per labor-hour in actual value (in ETB)</td>
<td>-1.41 (gains)</td>
<td>-1.1 (gains)</td>
<td>-2.08 (gains)</td>
<td>Differences of farm income per labor-hour in actual value (in ETB)</td>
<td>-0.85 (gains)</td>
<td>-1.06 (gains)</td>
</tr>
</tbody>
</table>

The calculations in the above table are made based on the estimation results in Table 7. The calculations are made based on the predicted differences in per capita farm income as a result of the effect of labor and capital intensity per unit of land which is in turn influenced by out-migration and flow of remittances.
According to the computation results, migrant sending households (in both temporary and permanent patterns) are found to have higher per capita farm income in both 2010 and 2006 cropping seasons. The average results show that the per capita farm income of temporary migrant sending households has been higher than non-migrant sending households. The percentage point difference in per capita farm income in comparison 1 (between non-migrant sending and temporary migrant sending households) is 37.7% (1.41 ETB) and 45.92% (1.1 ETB), for the cropping seasons 2010 and 2006, respectively. On the other hand, the percentage differences in per capita farm income between non-migrant sending and permanent migrant sending households in 2010 and 2006 cropping seasons are 22.69% (0.85 ETB) and 44.25% (1.06 ETB), respectively. The results predict that both temporary and permanent migrant sending households have gained higher per capita farm income as a result of lower intensity of labor and higher intensity of capital per unit of land than non-migrant sending households. In this regard, out-migration and remittances are determinant factors that affect the intensity of labor and capital per unit of land and thereby altering the per capita farm income. The percentage point differences in per capita farm income of temporary migrant sending households (in both cropping seasons) are found to be higher than the percentage differences in permanent migrant sending households which is related to the higher intensity of labor allocated per unit of land among permanent migrant sending households.

In general, the above estimation results show that migrant sending households have gained by sending out-either temporary or permanent migrants. Out-migration of family members, on one hand, has reduced the intensity of labor to be allocated in a given plot of land and on the other hand, the flow remittances have increased the intensity of capital per unit of land. This is true particularly for households who have smaller per capita land and with surplus and less productive labor. In such cases, sending out migrants has led to higher per capital farm income due to the estimated inverse relationship between labor intensity per unit of land and per capita farm income as well as the direct relationship between capital intensity per unit of land and per capita farm income.
5.4 Rationality of migration decision from the perspective of theoretical migration models

In the previous sections, the impact of rural-urban migration on farm income has been discussed. The estimation results show that migrant sending households have gained higher farm income and per capita farm income than non-migrant sending households. This section discusses the estimation results from the perspective of the theoretical models of rural-urban migration.

As already described in the literature, the Harris-Todaro model takes to account the probability of getting a job in destination as an important variable to assume the ‘expected income’ in destination and to make efficient migration decision. In addition, the Harris-Todaro model assumes migration decision to be made at individual level (migrants themselves in this case), where migrants do a cost-benefit analysis taking to account the total income they will obtain from urban destination and the income they are getting from their origin. However, the New Economics of Labor Migration (NELM) model argues that migration is not an individual phenomenon but is a mutual affair where decision is made at a household or family level particularly in least developed countries. The NELM model assumes that rural-urban migration takes place to lessen risks as a result of market failures and incomplete capital markets as well as to maximize the income of households especially in unstable and least developed economies (Katz & Stark, 1986 and Taylor et al, 1996).

Therefore, taking to account the assumptions of both models, let’s incorporate both models and analyze the estimated results from the perspective of migrant sending households where decision is made.

According to the Harris-Todaro model, rural migrants make a decision to migrate if the urban-rural expected wage differential is positive or,

\[ E(W_U) > W_A \]
Where $E(W_U)$ is the expected wage from urban destinations and calculated as the product of the probability to get a job in urban destination ($P_j$) and the total wage income obtained from urban destination($W_U$); and $W_A$ is the wage income from rural region. Thus, the decision to migrate occurs when:

$$P_j (W_U) > W_A$$

Therefore, if the assumption of the NELM model is incorporated from the perspective of migrant sending households and with the mathematical explanation of the Harris-Todaro model, rural households make a decision to send a family member(s) if the expected remittance they obtain from migrants is greater than migrants’ contribution on rural income (i.e. if expected gains from migration is greater than the possible losses a result of sending migrants). In the other way round, rural out-migration is not desirable if

$$\text{Total Lost Income (TLI)} > P_j (\alpha Y_R + \beta Y_F)$$

Where: $P_j$ is the probability to get a job in a destination region-$j$

$\alpha Y_R$ is the portion of remittance income directly used by migrant sending families and contributing for increment of total household income

$\beta Y_F$ is farm income gained/lost due to effects of migration (i.e. the differences in the predicted farm income as a result of out-migration)

The estimations made in the previous sections have shown that migrant sending households have gained higher total income and per capita farm income than non-migrant sending households despite the fact that differences in farm income exist between temporary and permanent migrant sending households. As far as the total income of households concerned, rural migrant sending households have made a rational decision to send migrants taking to account the resources they have and the expectation of remittances from destination region. The following table analyses the decision making points where rural-out migration would have been undesirable with respect to maximizing the total income of rural households.
Table 9: Migration decision point for temporary and permanent migrant sending households
(Using the estimated total farm income differences in table 6)

**1: Decision making point for Temporary migrant sending households**

<table>
<thead>
<tr>
<th>Total Lost Income (TLI) &lt; Pj (αY_R + βY_F) (for efficient migration decision)</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net remittances and farm income differences (temporary migration)</td>
<td>3118.73</td>
<td>229.51 (gains)</td>
<td>1825.10</td>
</tr>
<tr>
<td>Possible TLI above which temporary migration is not a rational decision (with respect to a given probability to get a temporary job in a destination region)</td>
<td><strong>3348.24</strong> (at Pj = 100%)</td>
<td><strong>1983.7</strong> (at Pj = 100%)</td>
<td><strong>2562.45</strong> (at Pj = 100%)</td>
</tr>
<tr>
<td></td>
<td><strong>1674.12</strong> (at Pj = 50%)</td>
<td><strong>991.85</strong> (at Pj = 50%)</td>
<td><strong>1281.23</strong> (at Pj = 50%)</td>
</tr>
</tbody>
</table>

**2: Decision making point for permanent migrant sending households**

<table>
<thead>
<tr>
<th>Total Lost Income (TLI) &lt; Pj (αY_R + βY_F) (for efficient migration decision)</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net remittances and lost farm income (permanent migration)</td>
<td>2491.49</td>
<td>-1.46 (losses)</td>
<td>824.47</td>
</tr>
<tr>
<td>Possible TLI above which permanent migration is not a rational decision (with respect to a given probability to get a permanent job in a destination region)</td>
<td><strong>2490.03</strong> (at Pj = 100%)</td>
<td><strong>858.51</strong> (at Pj = 100%)</td>
<td><strong>1675.17</strong> (at Pj = 100%)</td>
</tr>
<tr>
<td></td>
<td><strong>1245.02</strong> (at Pj = 50%)</td>
<td><strong>429.26</strong> (at Pj = 50%)</td>
<td><strong>837.59</strong> (at Pj = 50%)</td>
</tr>
</tbody>
</table>
As it is possible to see the average estimation from the above table, out-migration is a desirable condition for temporary migrant sending households if the amount of lost farm income as a result of out-migration does not exceed 2562.45 ETB (with 100% probability of getting a temporary job). If the probability to get a job is 50%, then the lost farm income should not exceed 1281.23 ETB as migrants bear risk when the probability to get a job is low. The estimation results clearly show that temporary migrants sending households have gained higher income as a result of sending migrants and temporary out-migration is desirable even with few chances of employment in destination region. With a hundred percent probability of getting a temporary job in destination region, the lost farm income should not exceed 3348.24 ETB in 2010 and 1983.7 ETB in 2006 to make a rational decision for migration. The comparisons for 2010 and 2006 cropping seasons show that the decision to send migrants has been found more rational decision in recent years. This is because labor is getting surplus in recent years where the marginal product of labor started to reduce in recent years. In addition, the increment of remittances in recent years makes the decision for out-migration more rational than the case in previous years.

The second type of calculation with respect to permanent migrant sending households show that permanent out-migration is a desirable condition if the amount of lost farm income as a result of migration does not exceed 1675.17 ETB and 837.59 ETB with a 100% and 50% probability of getting a permanent job, respectively. The average estimated results clearly show that permanent migrant sending households have gained as a result of sending migrants despite the fact that the amount of gains is higher for the case of temporary migrant sending households. The decision for discouraging permanent out-migration is when the loss of income is 2490.03 ETB and 858.51 ETB for 2010 and 2006 cropping season, respectively with hundred percent probability of getting a job. Just like the case of temporary migrant sending households, the decision to send permanent migrants in recent years is getting more rational than the previous years as a result of surplus labor and the increment of remittances.
In general, the calculated results show that there is gain in total income as a result of sending both permanent and temporary migrants and the effect of out-migration is able to compensate the opportunity cost of sending migrants. This depicts that the decision to send migrants is acceptable for both patterns of migration from the perspective of maximizing household income. The higher the probability of getting a job in destination region, the more efficient the migration decision would be. The probability of getting a job in urban destination become higher if rural migrants are experienced and/or educated (depending on the type and requirement of skill in destination region), if unemployment level in destination region is low, if the number of jobs created in destination is increasing as well as the availability of contacts and networks in destination region. Particular to this research, the expansion of labor-intensive and agriculture related jobs in the destination region (such as commercial farms and agro-processing industries) has increased the probability of getting a job. In this regard, rural migrants who are less educated have a comparative advantage in low skilled jobs and eventually bring them an incentive to migrate. With respect to the creation of urban jobs, the ‘Todaro paradox’ might occur because of the creation of jobs in destination. The creation of more jobs in a destination region would increase the motivation of potential migrants from rural regions and induce for more migration. In this case, the supply for labor exceeds the demand for labor in a destination region and this will reduce the probability of getting job in urban destination. Moreover, it should be noted that rural-urban migration is desirable if rural households have either surplus workers compared to the size of land they own (who can easily substitute the leaving migrants) or the remaining migrant sending households should manage to work longer hours to compensate the lost labor (if out-migration affects production). Moreover, very poor households particularly with very small size of farm land and resources would prefer migration in order to supplement their farm income and make their family labor productive.
5.5 Concluding remarks

In this chapter, the determinants of labor and capital inputs and then the effects on total farm income has been discussed by comparing temporary and permanent patterns of migration as well as from the perspective of 2010 and 2006 cropping seasons. Two-step estimation models have been used where the first stage estimates the determinants that affect the allocation of labor and capital inputs and in the second stage the effects on farm income has been analyzed based on the estimation results in the first stage. On one hand, out-migration has been found to reduce the available labor of migrant sending households and on the other hand remittance income has played an important role in boosting the capital stock of migrant sending households. The effect on farm income based on the results of the first stage estimations has shown that migrant sending households have obtained higher income from farm than non-migrant sending households despite the fact that out-migration reduces the available labor in migrant sending households. The marginal product labor in temporary migrant sending households has remained positive although the extent of significance on farm income showed reduction in recent years. With respect to the case of permanent migrant sending households, the labor input has been found to be insignificant in determining the farm income where the changes in farm income are observed as a result of changes in capital stock and size of farm land.

The independent comparisons made between temporary and permanent migrant sending households in relation to non-migrant sending households show that temporary migrant sending households have gained higher income from farm compared to non-migrant sending households due to higher productivity of labor and higher amount of remittances received from migrants. In the same vein, out-migration and remittances are also found to affect the intensity of labor and capital per unit of land and thereby influencing the per capita farm income of migrant sending households. According to the estimation results, migrant sending households have less intensity of labor per unit of land and higher intensity of capital per unit of land than non-migrant sending households that helps them to enjoy higher per capita farm income.
In general, migrant sending households have gained higher farm income and per capita farm income than non-migrant sending households. Moreover, the chapter analyzed the conditions to make migration a desirable phenomenon taking to account the concept of HT and NELM model in combination with certain modifications. The estimation results show that there is no lost farm income as a result of sending out migrants but instead migrant sending households have benefited from migration and supplemented their household income. Therefore, migrant sending households can be considered as rational decision makers even with few chances of employment opportunities in destination region.

Based on the estimation results, the Lewis assumption is likely to work for labor surplus regions where the marginal productivity of labor in the agriculture sector is low. The Lewis dual economy model assumes that there exists surplus labor in the traditional (agricultural) sector to be re-allocated to fill the labor demand in the modern (urban) sector where the loss of labor in the traditional agriculture sector does not reduce agricultural production as a result of labor migration. However, the assumption might be unlikely to work for regions with larger per capita farm land and with labor-intensive farm production systems where most agricultural activities (such as tillage, weeding, natural fertilizer preparation, fertilizing, soil conservation practices, harvesting and threshing) are accomplished by human power with simple farm tools and draft animals. This holds true particularly at peak seasons of farming where the demand for labor is high. Rural households make a decision on duration and patterns of migration (either temporary or permanent) taking to account their resources, the opportunity costs, push and pull factors in rural origin as well as other factors such as availability of networks and contacts in destination region. The New Economics of Labor Migration (NELM) model argues that rural-out migration is a mutual decision made by household members to minimize lack of credit market in least developed economies. In this regard, rural households decide to send migrants for work with the expectation that remittances they receive contribute in fulfilling the capital stock gap they have. The role of remittances on household expenditure pattern and on poverty is discussed in the next chapter.
CHAPTER SIX

The Impact of Rural-Urban Migration on total household income and Poverty

6.1 The effect of rural-urban migration on poverty

The migration of labor from rural origins to urban destination can be seen in two ways. On one hand, rural households who are poor send migrants to urban destinations and thereby reduce the number of poor and improve the productivity of available labor in the household. On the other hand, remittances sent to rural families in origin contribute for promoting investment and contributing directly to household income. This leads to minimize the incidence and depth of poverty as well as to the improvement of living standards.

Remittances in general have been regarded as an important tool for rural development in receiving rural regions in developing countries (IFAD & FAO, 2008). A poverty implication of rural-urban migration is another component of analysis in this research. This chapter analyzes the impact of rural-urban migration on household poverty taking to account the FGT class measurements of poverty as discussed below.

6.1.1 Estimation method

Poverty is a complex phenomenon and related with several factors. Poverty can be either income poverty or non-income poverty. Income poverty, which is measured in monetary terms, is the traditional and widely used measurement of poverty (Coudouel et al, 2002). Income poverty is lack of sufficient income to meet minimum consumption needs measured in poverty line. Poverty line measures the minimum and basic standard of living that a household should be able to meet.

Poverty line in this particular research is computed taking to account the Purchasing Power Parity (PPP) and in terms of both US$ 1.25 and US$ 2 a day poverty lines.
Thus, the poverty line (at yearly basis) at US$ 1.25 a day (PPP) is given by

\[ Z \text{ (for Year X)} = \text{PPP conversion factor to LCU} \times \text{US$ 1.25} \times 365 \times \frac{\text{CPI (latest yr. X)}}{\text{CPI (Aver. yr. X)}} \]

And poverty line at US$ 2 a day is given by

\[ Z \text{ (for Year X)} = \text{PPP conversion factor to LCU} \times \text{US$ 2} \times 365 \times \frac{\text{CPI (latest yr. X)}}{\text{CPI (Aver. yr. X)}} \]

Where \( Z \) is poverty line for a year x, PPP conversion factors for Local Currency Units (LCU)\(^{68}\) is an index for ETB.

\( \text{CPI} \)\(^{69}\) (latest yr. X) is Consumer Price Index for the latest month of year X.

\( \text{CPI (Aver. yr. X)} \) is the Average Consumer Price Index of each month in year X.

Therefore, at US$ 1.25 a day (PPP), poverty line for Ethiopia in the year 2006 is calculated as:

\[ Z \text{ (PPP)}_{2006} = (\text{PPP Conversion factor to LCU})_{2006} \times \text{US$1.25} \times 365 \times \frac{\text{CPI (Dec. 2006)}}{\text{CPI (Aver. 2006)}} \]

\[ = 3 \text{ ETB/US$1}_{(2006)} \times \text{US$1.25} \times 365 \times \frac{166.4}{154.74} \]

\[ = 1471.1 \text{ ETB per annum for the year 2006 (to be estimated at a household level).} \]

Similarly, the poverty line for the year 2010 is calculated as:

\[ Z \text{ (PPP)}_{2010} = (\text{PPP Conversion factor to LCU})_{2010} \times \text{US$1.25} \times 365 \times \frac{\text{CPI (Dec. 2010)}}{\text{CPI (Aver. 2010)}} \]

\[ = 5.5 \text{ ETB/US$1}_{(2010)} \times \text{US$1.25} \times 365 \times \frac{202.4}{185.84} \]

\[ = 2731.44 \text{ ETB per annum for the year 2010 (to be estimated at a household level).} \]

---

\(^{68}\) PPP conversion factors, private consumption (Local Currency Units per international $) are taken from the World Bank Database published for Ethiopia (for the year 2006 & 2010) \( \text{http://databank.worldbank.org} \) (accessed at 06/11/2011)

\(^{69}\) CPI (Consumer Price Index) data is taken from the Central Statistical Authority(CSA) of Ethiopia published for each month of a year (in this research for the year 2006 and 2010 considered) \( \text{http://www.csa.gov.et/Consumer_Price_Index.htm} \) (accessed at 06/11/2011)
When the poverty line is assumed at 2$ a day (PPP), the poverty line for the year 2006 (calculated per annum) would be:

\[
Z_{\text{PPP}}^{2006} = (\text{PPP Conversion factor to LCU})^{2006} \times \text{US}$2 \times 365 \times \frac{\text{CPI(Dec.}2006\text{)}}{\text{CPI(Aver.}2006\text{)}}
\]

\[
= 3 \text{ ETB/US$1}^{(2006)} \times \text{US$}2 \times 365 \times \frac{166.4}{154.74}
\]

\[
= 2355 \text{ ETB per annum for the year 2006 (to be estimated at a household level)}.
\]

The poverty line for the year 2010 is calculated as:

\[
Z_{\text{PPP}}^{2010} = (\text{PPP Conversion factor to LCU})^{2010} \times \text{US$2 \times 365 \times \frac{\text{CPI(Dec.}2010\text{)}}{\text{CPI(Aver.}2010\text{)}}}
\]

\[
= 5.5 \text{ ETB/US$1}^{(2010)} \times \text{US$2 \times 365 \times \frac{202.4}{185.84}}
\]

\[
= 4372.8 \text{ ETB per annum for the year 2010 (to be estimated at a household level)}.
\]

The FGT classes of poverty measurements as formulated in Foster et al (1984) are explained in the following sub sections.

### 6.1.1.1 Incidence of poverty (Headcount Index (HCI))

The head count index is used to measure the proportion of households who are poor i.e. the proportion of households for whom consumption or income is less than the poverty line \( z \) (estimated for a household level). It is used to measure the share of the household that can not afford to buy basic necessities. If ‘\( n \)’ is the total number of households, ‘\( q \)’ the number of households who are poor, then the head count (H) is given as:

\[
H = \frac{q}{n}
\]  

(6.1)
This measure shows only the incidence of poverty and does not indicate how poor the poor are. This measurement is not sensitive to the differences of those groups already below poverty line (Foster et al, 1984; WB, 2005).

6.1.1.2 Depth of poverty (Poverty Gap Index -PGI)

The PGI is used to measure the depth of poverty. In this research, the PGI is taken to account in measuring the extent/distance to which households fall below the poverty line. This measurement estimates how far the average income of households falls from the poverty line.

If \( y \) is the income of poor households, and the calculation is made only from those households who are under the poverty line (z), q is the number of poor households (with less than a poverty line) and n is the total number of households; then the poverty gap index (PGI) is given as

\[
\text{PGI} = \frac{1}{n} \sum_{i=1}^{n} \left( \frac{z - y_i}{z} \right) \quad : \text{where} \ y_i < z \tag{6.2}
\]

\( z - y_i \) is the income shortfall

In addition, PGI helps to calculate the resources required to eradicate poverty from poor households.

The resource needed to eradicate poverty in this regard is the product of PGI and Z, i.e. \( \text{PGI} \times Z \)

This measure fails to explain the inequalities within the poor groups which call for the need for squared poverty gap index (SPGI) measurement (Foster et al, 1984; WB, 2005).

6.1.1.3 Severity of poverty (Squared Poverty Gap Index (SPGI))

The squared poverty gap index is the squared distances below poverty lines. The measurement takes into account not only the distance separating the poor from the poverty line (the poverty gap), but also the inequality amongst the poor showing how the
poverty is severe. That is, a higher weight is placed on those households who are further away from the poverty line (the poorest of the poor). The squared poverty gap index (SPGI) is given by:

$$\text{SPGI} = \frac{1}{n} \sum_{i=1}^{n} \left( \frac{z - y_i}{z} \right)^2; \text{ where } y_i < z \text{ (estimated for a household level).}$$

(6.3)

The squaring of poverty gap index puts more weight on observations that fall well below the poverty line.

The PGI is more sensitive to the well-being of the poorest than head count. The Squared Poverty Gap Index is the most sensitive to show inequalities within the poor though it does not have a meaningful interpretation (Foster et al, 1984; WB, 2005)

6.1.2 Results and Discussion

This section discusses both the direct and multiplier effects of remittances and out-migration on poverty status of rural households. Remittances and out-migration have multiplier effects on farm income of households and then on their poverty status. The analysis of poverty with total income comprises both the multiplier and direct effects of remittances and out-migration. Direct effect implies that portion of remittances received by households at rural origin can be directly used for consumption and improving the living standard, and thereby reducing the poverty status of households. The estimation takes to account the poverty line of both US$ 1.25 and US$ 2 a day (PPP).

6.1.2.1 Poverty measurements with farm income

Out-migration and remittances affect farm income through their effect on production factors (in this case by affecting labor and capital input). When poverty is estimated
taking to account the farm income of migrant sending and non-migrant sending households, the following results are found.

### Table 10: Poverty measurements at $1.25 a day (PPP) with farm income

<table>
<thead>
<tr>
<th>Poverty measurements at US$ 1.25 a day (PPP) with respect to farm income</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCI (%)</td>
<td>PGI (%)</td>
<td>SPGI (%)</td>
</tr>
<tr>
<td>Non-migrant sending households</td>
<td>78.46</td>
<td>46.14</td>
<td>31.19</td>
</tr>
<tr>
<td>Temporary migrant sending households</td>
<td>81.71</td>
<td>48.98</td>
<td>33.83</td>
</tr>
<tr>
<td>Permanent migrant sending households</td>
<td>76.6</td>
<td>46.17</td>
<td>32.9</td>
</tr>
</tbody>
</table>

The average estimation of poverty (considering only the farm income of rural households) in the table above shows that the percentage of the sample rural households living under $1.25 a day (PPP) for non-migrant sending, temporary migrant sending and permanent migrant sending households is 77.69%, 82.93% and 74.47%, respectively. The average estimation results show that the percentage of poor households is the highest for temporary migrant sending households followed by non-migrant sending households. The head count indices (HCI) in general show the number of non-migrant sending poor households remained same for both 2006 and 2010 where as the percentage of the poor households has increased among temporary and permanent migrant sending households in both estimation years.

The average estimation of poverty gap index (PGI) within the poor groups shows that the depth of poverty is the highest among temporary migrant sending poor households (with an income shortfall of 46.44% far from the poverty line, on average). Permanent and non-migrant sending households have an income shortfall of 42.47% and 44.6% from the
poverty line, respectively. This indicates that poor households of temporary migrant sending households are farther from poverty line compared to permanent and non-migrant sending households. The depth of poverty has shown increment in 2010 for both non-migrant sending and migrant sending poor households compared to the case in 2006.

Based on the average poverty gap estimation (with a poverty line of US$ 1.25 a day (PPP)), the cost of lifting a poor household out of poverty for non-migrant sending, temporary and permanent migrant sending households is on average 656.11 ETB (i.e.1471.1*0.446), 683.18 ETB (i.e. 1471.1*0.4644) and 624.33 ETB (i.e. 1471.1*0.4244) per poor household member per year, respectively (taking to account farm income only for the estimation).

Although squared poverty gap (SPGI) has no meaningful interpretation, the results indicate the status of income inequalities within the poor households. The average estimation shows that poverty is more severe among the poor households of temporary migrant sending households than their permanent and non-migrant sending counterparts (once again, taking farm income only). This shows that the number of poor households in temporary migrant sending households who are found farthest from the poverty line (i.e. 31.29%) are higher than non-migrant sending (29.12%) and permanent migrant sending (29.26%) poor households. The yearly estimation depicts that the severity of poverty and inequality among the poor increased in recent years. The following chart shows the poverty measurements of rural households with the default poverty line of US$ 1.25 a day (PPP).
Fig. 16 Level of poverty at US$ 1.25 a day (PPP) and with farm income

![Poverty measurement at US$ 1.25 a day (PPP) (considering farm income only)](image)

Poverty level of rural households at US $2 a day (PPP) is estimated in the table below.

**Table 11: Poverty measurements at US $2 a day (PPP) with farm income**

<table>
<thead>
<tr>
<th>Poverty measurements at US$ 2 a day (PPP) with respect to farm income</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCI (%)</td>
<td>PGI (%)</td>
<td>SPGI (%)</td>
</tr>
<tr>
<td>Non-migrant sending households</td>
<td>88.46</td>
<td>60.46</td>
<td>45.47</td>
</tr>
<tr>
<td>Temporary migrant sending households</td>
<td>89.02</td>
<td>62.98</td>
<td>48.15</td>
</tr>
<tr>
<td>Permanent migrant sending households</td>
<td>89.36</td>
<td>60.7</td>
<td>46.14</td>
</tr>
</tbody>
</table>
Considering the farm income of households, the average HCI estimation shows that the percentage of the poor households living under US $2 a day (PPP) for non-migrant sending households is 88.46%. That means, on average, 10.77% of non-migrant sending households earn between US$ 1.25 and 2 a day (PPP). The average percentage of temporary and permanent migrant sending households who live under US$ 2 a day is almost the same, i.e. 87.8% and 87.23%, respectively. This means that on average, about 4.87% and 12.76% of poor households in temporary and permanent migrant sending households earn between US$ 1.25 and 2 a day (PPP), respectively. Although permanent migrant sending households have the least number of poor households who earn below US$ 1.25, still a great number of them found below US$ 2 a day.

The average PGI estimation indicates that the depth of poverty for poor households in non-migrant sending, temporary migrant sending and permanent migrant sending households who earn below $2 a day are 44.6%, 46.44% and 42.47%, respectively and those poor households who earn between US$ 1.25 and 2 a day (PPP) are 14.85%, 14.84% and 15.35%, respectively. This indicates that the depth of poverty with a poverty line between US$ 1.25 and 2 a day is the highest among permanent migrant sending and similar for both non-migrant and temporary migrant sending poor households. Similarly, the average SPGI estimation shows that the severity of poverty within the poor households who earn between US$ 1.25 and 2 a day (PPP) is 14.75%, 14.69% and 13.47% for non-migrant sending, temporary and permanent migrant sending households, respectively.

In recent years (taking to consideration the farm income of rural households and at a poverty line of US$ 1.25 a day), temporary migrant sending households in most cases show the highest incidence of poverty and non-migrant sending households the lowest depth and severity of poverty. At 2 US$ a day estimation, non-migrant sending households show the lowest incidence and intensity of poverty compared to migrant sending households (i.e. temporary and permanent migrant sending households). This might indicate that rural households with lower farm income and chronic poverty send migrants to supplement their farm income and to reduce the level of poverty. The next
section discusses the poverty level of rural households with total income including the remittances used for consumption directly.

6.1.2.2 Poverty measurements with total income

Total household income of migrant sending households is supplemented by certain amount of remittances directly available for consumption. The estimations in table 12 and 13 below depicts the effect of total income (i.e. including farm income) in shaping the poverty level of migrant sending households with a poverty line of 1.25 and 2 US$ a day (PPP), respectively.

Table 12: Poverty measurements at US $1.25 a day (PPP) calculated with total income

<table>
<thead>
<tr>
<th>Poverty measurements at US$ 1.25 a day (PPP) with total income</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCI (%)</td>
<td>PGI (%)</td>
<td>SPGI (%)</td>
</tr>
<tr>
<td>Non-migrant sending households</td>
<td>78.46</td>
<td>46.14</td>
<td>31.19</td>
</tr>
<tr>
<td>Temporary migrant sending households</td>
<td>75.61</td>
<td>38.82</td>
<td>25.03</td>
</tr>
<tr>
<td>Permanent migrant sending households</td>
<td>70.21</td>
<td>40.97</td>
<td>28.15</td>
</tr>
</tbody>
</table>

The average HCI estimation at US $1.25 a day using total income of a household shows that the number of poor households among temporary migrant sending households has reduced by 10.98 percentage points (i.e. from 82.93% to 71.95% as a result of the additional remittances directly contributing to total income). In the same vein, the average number of poor households in permanent migrant sending groups has reduced by 4.26 percentage points (from 74.47 to 70.21) indicating that the amount of remittances...
used directly by the poor migrant sending households has been helpful in lifting them up from the poverty line. Remittances have supported more number of temporary migrant sending households to come out of poverty compared to the case for permanent migrant sending households. This is associated with the higher amount of remittances received by temporary migrant sending households.

The average PGI estimations in table 12 also show that the depth of poverty for poor temporary and permanent migrant sending households fall to 35.79% and 38.3%, respectively, compared to the estimation done with only farm income (i.e. 46.44% and 42.47% for temporary and permanent migrant sending households, respectively). The average estimation of the depth of poverty within the poor groups is the highest for non-migrant sending households (with an income shortfall of 44.6% from the poverty line) and the lowest for temporary migrant sending poor households (with an income shortfall of 35.79% from the poverty line). This indicates that portion of remittances that directly contribute for the total income of poor temporary migrant sending households have been more beneficial not only in lifting them out of the poverty but also in reducing their intensity of poverty compared to the case for permanent migrant sending poor households. In the same vein, the cost of eliminating poverty per household for temporary and permanent migrant sending households on average has reduced to 526.51 ETB (i.e. 0.3579*1471.1) and 563.43 ETB (i.e. 0.383*1471.1) per annum per poor household member, respectively. The estimation results show that temporary migrant sending households need the lowest cost to bring them out of poverty compared to non-migrant sending households as a result of remittances. Remittances have reduced the cost of eliminating poverty out of temporary and permanent migrant sending poor households by 22.93% (i.e. 156.67 ETB) and by 9.75% (i.e. 60.9 ETB), respectively.

The average squared poverty gap estimations also show that the severity of poverty for the poorest groups of temporary and permanent migrant sending households has reduced to 22.18% and 25.43%, respectively as a result of remittances that directly increases total household income. This shows the effect of net remittances in lifting a significant number of households out of their chronic poverty. The following chart shows the level of
poverty in migrant sending and non-migrant sending households calculated with total income.

Fig. 17 Level of poverty at US$ 1.25 a day (PPP) calculated with total income

When poverty line is assumed at US$ 2 a day (PPP), the following results are obtained (as presented in table 13 below).
<table>
<thead>
<tr>
<th>Migrant sending pattern</th>
<th>2010</th>
<th>2006</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCI (%)</td>
<td>PGI (%)</td>
<td>SPGI (%)</td>
</tr>
<tr>
<td>Non-migrant sending households</td>
<td>88.46</td>
<td>60.46</td>
<td>45.47</td>
</tr>
<tr>
<td>Temporary migrant sending households</td>
<td>86.59</td>
<td>55.31</td>
<td>39.42</td>
</tr>
<tr>
<td>Permanent migrant sending households</td>
<td>87.23</td>
<td>55.71</td>
<td>41.1</td>
</tr>
</tbody>
</table>

Taking to account additional income directly obtained from remittances, the average estimation at US$ 2 a day (PPP) shows that the percentage of households living between US$ 1.25 and 2 a day for temporary and permanent migrant sending households is 13.42% (i.e. 85.37% - 71.95%) and 14.9% (i.e. 85.11% - 70.21%), respectively. In addition, the poverty gap index for temporary and permanent migrant sending households earning between $1.25 and $2 a day is 17.08% and 15.07%, respectively. In addition, the squared poverty gap index is 14.47% and 13.05% for temporary and permanent migrant sending households, respectively. The results indicate that a considerable number of households are still found below the boundary of US$ 2 a day despite the fact that the poor groups of migrant sending households are able to escape the absolute poverty line measurement of US$ 1.25 a day compared to non-migrant sending poor households. In general, remittances play an important role not only in reducing the incidence of poverty but also in bringing very poor households close to poverty line.
6.2 Remittances and household expenditure pattern

Remittances are considered as an important development tool. Remittances are not only used for capital investment in either farm or non-farm businesses but also to improve basic needs and standard of living. Even in cases where remittance income is not allocated for capital stock investment, it is used to cover household expenses and thereby the savings from farm income would be left unconsumed and entirely used for farm investment.

Rural households in the study area mainly drive their income from agriculture and remittances. In the previous sections, it has been discussed that remittances enhance income of migrant sending households not only by facilitating investment on farm and non-farm business but also by directly contributing to the total household income. With respect to household consumption patterns of both migrant sending and non migrant sending households, the following chart depicts the main household expenditures with respect to total household income.

Fig. 18: Current expenditures of households with respect to total household income

The basic household expenditures compared with respect to the total household income obtained for non-migrant sending, temporary and permanent migrant sending households
is 49.31%, 49.95%, and 42.11%, respectively. Temporary migrant sending households have spent more on main household expenditures compared to the total income they have; followed by non-migrant sending and permanent migrant sending households, respectively. The detail proportions of the basic expenditures with respect to the total household income are presented in the following chart.

**Fig. 19 Proportion of household income spent for main household expenditures.**

Temporary migrant sending households have received higher remittances compared to permanent migrant sending households and they have the second highest total income. The proportion of expenditures for basic needs (food and clothing) with respect to total household income is almost related in non-migrant sending and migrant sending households. Although temporary migrant sending households have smaller number of family members than permanent and non-migrant sending households, their investment on education and training is the highest and this might be associated with the amount of remittances received.
6.3 Concluding remarks

The effect of rural-urban migration on farm income has been discussed in chapter five. In this chapter, the effect of out-migration has been examined from the perspective of total household income and poverty. Poverty estimations calculated with $1.25 (PPP) with total income showed that the incidence, depth and severity of poverty for temporary and permanent migrant sending households has considerably reduced. The reduction in depth and severity of poverty within temporary migrant sending households has been higher compared to the case among permanent migrant sending households. This can be associated with the fact that the amount of remittances received by temporary migrant sending households is higher than permanent migrant sending households leading to a radical change of poverty among the poorest group of temporary migrant sending households. The estimation in $2 a day (PPP) has also brought related results. In general, the poverty estimation results show that remittances should be in a considerable amount in order to lift poor households out of poverty as well as to reduce the resources required to eliminate poverty. This holds true particularly with respect to reducing the depth of poverty (i.e. in reducing the distance away from the poverty line) within the poor and to reduce inequalities among poor households. Moreover, the estimation on expenditure patterns show that temporary migrant sending households incurred highest expenditures particularly on education and training which might be related to the amount of remittances they received. The case for permanent migrant sending households on basic expenditures resulted mixed outcomes. Poor households with very low farm income and limited resources such as land would be more benefited from sending migrants to work in destination region. In this regard, out-migration can be considered as a strategy to reduce the incidence and intensity of household poverty as well as to diversity risks.
CHAPTER SEVEN

Conclusion and Recommendations

This research has presented the impacts of rural-urban migration on income and poverty of rural households taking the case study done in Shebedino district, Southern Ethiopia. Specifically, the research presented the main economic migration models, their critics as well as the empirical works done on the models. The model reviews range from the early Ravenstein’s laws of migration to the New Economics of Labor Migration (NELM) model. The research also presented the rural-urban linkages and characteristics of labor market in Ethiopia from the perspective of historical trends of migration, patterns of migration and labor productivity.

The impact of rural-urban migration on farm income has been discussed in two stages using the Cobb-Douglas production function approach. In the first stage, the determinants of labor and capital input including out-migration and remittances have been estimated and then in the second stage the effect on total farm income was estimated based on the results from the first stage. The empirical findings in the first stage of estimation confirmed that out-migration has significantly reduced the available labor in migrant sending households and remittances play a positive and significant role for boosting investment on capital stock. The second stage estimation has shown that rural-urban migration increased the total farm income of migrant sending households in general and for temporary migrant sending households in particular. The increment in farm income of temporary migrant sending households has been predicted as a result of positive of marginal product of labor and higher amount of remittances received that facilitates investment on capital stock. The estimations made between non-migrant sending and permanent migrant sending households have shown that the predicted labor has been insignificant in determining farm income of permanent migrant sending households and the increment of income has been predicted from the investment on capital stock, which is in turn as a result from savings from remittances and farm income. Other estimation has been made on the effect of out-migration and remittances on intensity of labor and capital inputs per unit of land and thereby on per capita farm income. The estimation
results indicated that rural households with higher predicted intensity of labor per unit of land have obtained lower per capita farm income than households with less labor intensity per unit of land. On the other hand, the predicted capital intensity per unit of land has been found to have a positive effect on per capita farm income. Therefore, migrant sending households have predicted lower intensity of labor per unit of land as well as higher intensity of capital stock per unit of land and thus having a higher per capita farm income than non-migrant sending households. In this regard, out-migration of labor and flow of remittances have played an important role in determining the intensity of labor and capital input per unit of land. Therefore, rural-urban migration rather makes the remaining rural labor productive (depending on the size of working family members in a household and the size of land owned) and boosts the capital stock of households that in turn enhances farm income.

The research has used the concept of the Harris-Todaro model and the New Economics of Labor Migration (NELM) model in combination and with certain modifications to determine the conditions needed for rational migration decision. The Harris-Todaro model has been modified by incorporating the assumptions of the NELM model at household level. The Harris-Todaro assumption considers individuals as decision makers where individuals make a rational migration decision when the expected urban income (i.e. the product of urban income and the probability to get an urban job) is greater than the actual rural income. Thus, the research has accounted for household decision making points where expected urban income is equated as a product of the proportion of remittances received by migrant sending family and the probability of getting an urban job as well as rural income equated with the contribution of migrants for household income (i.e. amount of lost farm income as a result of sending migrants). This is formulated by taking to account the NELM assumption that migration is a collective decision made by a household particularly taking to account the case of least developed economies. Based on the analysis done between migrant sending and non-migrant sending households, out-migration has been found beneficial for migrant sending households even with few chances of employment in urban destination region in the study area. The results have clearly shown that migrant sending households have made a
rational migration decision with respect to enhancing the total household income. In this regard, one should note that rural households who own larger size of farm land and resources but with limited family labor might have higher opportunity cost of mobility unless the amount of remittance is large enough to replace the possible income losses from farm.

The estimation of the effect of rural-urban migration on poverty was presented with respect to headcount index, poverty gap and squared poverty gap index to measure not only the percentage of the poor that fall under the poverty line but also to estimate the depth and severity of poverty within the poor groups. Moreover, the amount of resources needed to lift the poor households out of absolute poverty has been part of the discussion. The results indicated that remittances play a vital role not only in reducing the incidence of poverty but particularly in reducing the depth and severity of poverty. With some remittances directly used to increase household income, the poorest groups of rural households are able to reduce the distance they are away from the poverty line and come out of chronic poverty. However, the results indicated that remittances should be in a substantial amount in order to lift households out of poverty (i.e. to lift them above the poverty line). The estimation of poverty was done with both US$ 1.25 and 2 (PPP) poverty lines.

In general, rural-urban migration plays an important role both in meeting the labor demands of industries and facilitating the process of rural transformation. Remittances sent to families of migrants residing in rural origin can contribute for rural development not only by facilitating investment but also by enhancing the living standard of households and reducing chronic poverty. Rural-urban migration can be taken as a strategy particularly for poorest groups of rural households where they can supplement their farm income and then diversify risks. In this research, the effect of rural-urban migration is analyzed from the perspective of migrant sending regions (i.e. from the perspective of rural origins) in Ethiopia. The effect of rural-urban migration from the perspective of migrant receivers (particularly commercial farms and labor intensive industries around urban regions) remained future area of research. The following policy
recommendations are drawn taking to account the current circumstances of rural-urban migration in Ethiopia in general and the case study in particular.

- The poverty reduction strategy paper of the country should incorporate the conditions where rural-urban migration can enhance rural development and reduce poverty. In the poverty reduction strategy paper of the country, rural-urban migration is considered as undesirable incidence. However, rural-urban migration can be a desirable phenomenon and should be part and parcel of the poverty reduction strategy paper. The strategy paper should be designed in the ways of maximizing the benefits of migration and minimizing the negative outcomes.

- Rural development policies should be designed in ways of enhancing the productivity of labor and improving the living standard of the rural population and contribute for the process of rural transformations. Moreover, rural development policies should pave opportunities to enable migrants to involve in farm and non-farm investments. Non-farm enterprises serve as a means of rural livelihood diversification and reduce the pressure on land. Furthermore, rural development policies should pay a special attention for the poorest groups of the rural population who migrate as a result of chronic poverty. The poor should participate from the planning to evaluation of rural development projects in this regard.

- Vocational training should be given for rural migrants to equip them with the necessary skills and make them competitive in the non-farm labor market. Similarly, favorable conditions should be created to enable migrants transfer their skill gained from commercial farms and industries to their rural origin.

- Rural-urban migration facilitates the linkages between agriculture and industrial development particularly in re-allocation of labor from less productive sectors to more productive sectors. Rural-urban migration is a means of structural transformation leading to economic growth. In this regard, the good performance of the urban economy and the expansion of labor intensive industries facilitate the
rural-urban linkages. Therefore, urban and rural development policies should be consistent and complementary to each other. In addition, migration policies should be entrenched in the macro-economic policy of the country.

- Land is an important asset for the rural population. Land fragmentation as a result of population growth is one of the challenges of rural households forcing households to migrate, particularly in densest populated districts of the country such as Shebedino district. The growth of labor force is too high as compared to the growth of available resources and employment opportunities. Thus, population and land use policies should be revised regularly based on existing situations.

- The government and private sector should create employment opportunities in the rural and urban economies to reduce the level of open and disguised unemployment as well as chronic poverty of rural regions. In this regard, the government should create conducive business environment and infrastructure for the private sector.

- Agriculture is the back of the economy of the country. Despite the fact that the sector is a means of living for more than 83% percent of the population, it is still practiced in traditional way. Small-scale farming is unable to feed the increasing population. In addition, the sector is affected by natural calamities and recurrent droughts and forcing rural households to migrate. Therefore, modern technologies, mechanized farming and irrigated agriculture should be introduced in considerable extent.

- Ethiopia is one of the most unurbanized countries in Sub-Saharan Africa and the process of urbanization is fueled by rural-urban migration. Urban development policies should be strengthened so that urban centers are capable of handling migrants coming from rural regions and minimize the undesirable effects migration. Research in Sub-Sahara Africa show that urban centers are not in the
right position to entertain migrants as result of poor infrastructure and low employment capacity. Urbanization and rural-urban linkages should be supported by the development of infrastructure such as road and transportation facilities.

- Rural-urban migration is able to reduce the absolute poverty of a poor household in two cases: by reducing the dependency of household members as well as via remittances sent to families. Moreover, in some cases students are dropping-out from school as a result of chronic poverty and migrating to urban regions in search for job and better living condition. Rural health care systems, education and access to credit should be strengthened and should be made pro-poor. In this regard, sustainable poverty reduction programs should be strengthened with collective partnership between governmental, non-governmental organizations and other stakeholders.

- Rural households get information regarding the opportunities in urban regions from friends or relatives informally. In such cases, information is often biased and exaggerated leading to excess migration to urban centers, increasing the unemployment level, exploitation of labor and human trafficking. Thus, access to information should be improved for potential rural migrants.
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Appendices

Annex 1: The map of regions of Ethiopia

(Source: Map of Ethiopian Regions: http://mapsof.net/map/ethiopia-regions-english)
Annex 2: Map of Shebedino district, in Sidama zone, SNNPR region of Ethiopia

(Source: http://www.souhttourism.gov.et/Home/about.html)
Annex 3: Coffee export marketing value chain in Ethiopia
(Adopted from McCarthy, 2007)
Annex 4: Estimation results of the second stage estimator in two step analysis (with uncorrected standard errors)

A: Stage 2 estimation results on farm income

\[ \ln Y_{F(T)} = \eta_1 + \alpha_1 \ln \hat{L}_T + \beta_1 \ln \hat{K}_T + \gamma_1 \ln Ld_{T} + \varepsilon_{YF(T)} \]

Comparison 1: Non-migrant sending against temporary migrant sending households

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. ( R^2 )</th>
<th>F-stat</th>
<th>( \ln \hat{L}_{(T)} )</th>
<th>Coeff.</th>
<th>t</th>
<th>( \ln \hat{K}_{(T)} )</th>
<th>Coeff.</th>
<th>t</th>
<th>( \ln Ld_{(T)} )</th>
<th>Coeff.</th>
<th>t</th>
<th>Const</th>
<th>Coeff.</th>
<th>t</th>
<th>Coeff.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.859</td>
<td>F(3,208)=331***</td>
<td>0.15**</td>
<td>(0.068)</td>
<td>2.26</td>
<td>1.21***</td>
<td>(0.055)</td>
<td>21.86</td>
<td>0.22***</td>
<td>(0.046)</td>
<td>4.81</td>
<td>-1.16</td>
<td>(0.687)</td>
<td>-1.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.736</td>
<td>F(3,208)=159.4***</td>
<td>0.37***</td>
<td>(0.094)</td>
<td>3.95</td>
<td>1.45***</td>
<td>(0.090)</td>
<td>16.01</td>
<td>0.27***</td>
<td>(0.054)</td>
<td>5.07</td>
<td>-4.24***</td>
<td>(0.955)</td>
<td>-4.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ave</td>
<td>0.842</td>
<td>F(3,208)=275.7***</td>
<td>0.26***</td>
<td>(0.07)</td>
<td>3.78</td>
<td>1.13***</td>
<td>(0.055)</td>
<td>20.70</td>
<td>0.23***</td>
<td>(0.045)</td>
<td>5.26</td>
<td>-1.32</td>
<td>(0.687)</td>
<td>-1.93</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comparison 2: Non-migrant sending against permanent migrant sending households

| Cropping season | Adj. \( R^2 \) | F-stat | \( \ln \hat{L}_{(P)} \) | Coeff. | t | \( \ln \hat{K}_{(P)} \) | Coeff. | t | \( \ln Ld_{(P)} \) | Coeff. | t | Const | Coeff. | t |
|----------------|----------------|--------|----------------|--------|---|----------------|--------|---|----------------|--------|---|--------|--------|---|--------|---|
| 2010           | 0.892          | F(3,173)=309.5*** | 0.13* | (0.067) | 1.97 | 1.55*** | (0.066) | 23.56 | 0.17*** | (0.049) | 3.49 | -3.6*** | (0.773) | -4.65 |
| 2006           | 0.732          | F(3,173)=137.8*** | -0.19 | (0.115) | -1.68 | 1.85*** | (0.127) | 14.61 | 0.33*** | (0.066) | 4.99 | -2.49** | (1.18) | -2.11 |
| Ave            | 0.911          | F(3,173)=279.4*** | 0.14** | (0.061) | 2.25 | 1.68*** | (0.061) | 27.72 | 0.11*** | (0.043) | 2.54 | -4.35*** | (0.693) | -6.29 |

***, **, * Significant at 1%, 5% and 10%, respectively

Standard errors are in parenthesis (uncorrected) Source: Author’s estimation
B: Effect of out-migration and remittances on labor and capital intensity per unit of land and thereby on per capita farm income

\[ \ln y_{F(T)} = \psi_1 + (\alpha_1-1)\cdot[\ln \hat{L}(T) - \ln(Ld(T))] + \beta_1\cdot[\ln \hat{K}(T) - \ln(Ld(T))] + \varepsilon_{yF(T)} \]

Comparison 1: Non-migrant sending against temporary migrant sending households

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>( \ln \hat{L}(T) - \ln(Ld(T)) )</th>
<th>( \ln \hat{K}(T) - \ln(Ld(T)) )</th>
<th>-Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t</td>
<td>Coeff.</td>
</tr>
<tr>
<td>2010</td>
<td>0.684</td>
<td>F(2,209)=229.5***</td>
<td>-1.15*** (0.054)</td>
<td>-21.19</td>
<td>0.92*** (0.065)</td>
</tr>
<tr>
<td>2006</td>
<td>0.400</td>
<td>F(2,209)=71.37***</td>
<td>-1.09*** (0.092)</td>
<td>-11.94</td>
<td>0.79*** (0.094)</td>
</tr>
<tr>
<td>Ave</td>
<td>0.619</td>
<td>F(2,209)=172.3***</td>
<td>-1.07*** (0.058)</td>
<td>-18.40</td>
<td>0.82*** (0.065)</td>
</tr>
</tbody>
</table>

\[ \ln y_{F(P)} = \psi_2 + (\alpha_2-1)\cdot[\ln \hat{L}(P) - \ln(Ld(P))] + \beta_2\cdot[\ln \hat{K}(P) - \ln(Ld(P))] + \varepsilon_{yF(P)} \]

Comparison 2: Non-migrant sending against permanent migrant sending households

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>Adj. R²</th>
<th>F-stat</th>
<th>( \ln \hat{L}(P) - \ln(Ld(P)) )</th>
<th>( \ln \hat{K}(P) - \ln(Ld(P)) )</th>
<th>-Const.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coeff.</td>
<td>t</td>
<td>Coeff.</td>
</tr>
<tr>
<td>2010</td>
<td>0.685</td>
<td>F(2,174)=192.4***</td>
<td>-1.22*** (0.063)</td>
<td>-19.54</td>
<td>1.03*** (0.08)</td>
</tr>
<tr>
<td>2006</td>
<td>0.540</td>
<td>F(2,174)=104.5***</td>
<td>-1.47*** (0.102)</td>
<td>-14.41</td>
<td>1.20*** (0.113)</td>
</tr>
<tr>
<td>Ave</td>
<td>0.696</td>
<td>F(2,174)=202.5***</td>
<td>-1.24*** (0.062)</td>
<td>-20.06</td>
<td>1.08*** (0.078)</td>
</tr>
</tbody>
</table>

***, **, * Significant at 1%, 5%, and 10%, respectively
Standard errors are in parenthesis (uncorrected)  
Source: Author’s estimation
Annex 5: Determinants of remittance income (with Model 2)

MODEL 2: $Y_R = \gamma_0 + \gamma_1 M_N + \gamma_2 M_D + \gamma_3 M_P + \gamma_4 A_M + \gamma_5 E_d M + \gamma_6 M_M + \gamma_7 N_{HH} + \gamma_8 M_{Sh} + \gamma_9 A_h + \gamma_{10} R_j + \gamma_{11} Y_{fpH} + \epsilon_R$

| Variable | Coeff. | t-stat | P>|t| | Variable | Coeff. | t-stat | P>|t| | Variable | Coeff. | t-stat | P>|t| |
|----------|--------|--------|------|----------|--------|--------|------|----------|--------|--------|------|----------|--------|--------|------|----------|--------|--------|------|----------|--------|--------|------|
| $M_N$    | 1873.94 | 1.06   | 0.293| $M_N$    | 624.39** | 2.24   | 0.027| $M_N$    | 1748.28 | 1.14   | 0.256|
|          | (1775.53)|        |      |          | (278.97)|        |      |          | (1530.25)|        |      |
| $M_D$    | 373.11**| 2.88   | 0.005| $M_D$    | 172.47* | 1.78   | 0.078| $M_D$    | 260.05**| 2.35   | 0.021|
|          | (129.42)|        |      |          | (97.07)|        |      |          | (110.88)|        |      |
| $M_P$    | 661.87  | 1.15   | 0.251| $M_P$    | 505.52  | 1.48   | 0.143| $M_P$    | 596.77  | 1.59   | 0.114|
|          | (573.62)|        |      |          | (342.56)|        |      |          | (374.68)|        |      |
| $A_M$    | -83.03* | -1.91  | 0.058| $A_M$    | 23.03   | 0.76   | 0.452| $A_M$    | -27.41  | -0.84  | 0.4|
|          | (43.45) |        |      |          | (30.5) |        |      |          | (32.48) |        |      |
| $E_d M$  | 145.66  | 0.29   | 0.773| $E_d M$  | 210.08  | 1.0    | 0.321| $E_d M$  | 164.42  | 0.17   | 0.862|
|          | (503.49)|        |      |          | (210.93)|        |      |          | (372.46)|        |      |
| $M_M$    | 524.36  | 0.44   | 0.661| $M_M$    | -846.43**| -2.38  | 0.019| $M_M$    | -224.10 | -0.37  | 0.716|
|          | (1191.96)|        |      |          | (355.77)|        |      |          | (614.04)|        |      |
| $N_{HH}$ | 222.24  | 1.04   | 0.299| $N_{HH}$ | 105.81  | 0.75   | 0.454| $N_{HH}$ | 162.37  | 0.96   | 0.336|
|          | (213.12)|        |      |          | (140.85)|        |      |          | (168.09)|        |      |
| $M_{Sh}$ | 1644.59 | 1.53   | 0.128| $M_{Sh}$ | 1066.35*| 1.84   | 0.069| $M_{Sh}$ | 1398.7**| 2.01   | 0.046|
|          | (1074.16)|        |      |          | (580.17)|        |      |          | (694.56)|        |      |
| $A_h$    | 73.4**  | 2.0    | 0.047| $A_h$    | -2.1    | -0.12  | 0.903| $A_h$    | 34.06   | 1.46   | 0.147|
|          | (36.63) |        |      |          | (17.25) |        |      |          | (23.34) |        |      |
| $R_j$    | 961.77  | 0.954  | 0.342| $R_j$    | -1329.94*| -1.81  | 0.072| $R_j$    | -133.47 | -0.19  | 0.849|
|          | (1008.57)|        |      |          | (733.48)|        |      |          | (699.45)|        |      |
| $Y_{fpH}$| 0.598** | 2.41   | 0.018| $Y_{fpH}$| 0.692***| 3.99   | 0.00 | $Y_{fpH}$| 0.603***| 2.97   | 0.004|
|          | (0.248)|        |      |          | (0.1735)|        |      |          | (0.203) |        |      |
| Const.   | 7646.4**| -2.04  | 0.044| Const.   | -1162.14| -0.71  | 0.479| Const.   | -4577.5***| -1.76  | 0.008|
|          | (3748.79)|        |      |          | (1637.1)|        |      |          | (2595.86)|        |      |

F-stat  F(11,117) = 4.62***

F-stat  F(11,117) = 5.04***

F-stat  F(11,117) = 5.26***

***, **, * Significant at 1%, 5% and 10%, respectively  Robust standard errors are in parenthesis  Source: Author’s estimation
Annex 6: STATA programming procedures for bootstrapping two-step estimations

The programming in STATA for bootstrapping procedure is done for the entire two-step estimators (for analysis in section 5.2) as a convenient method of obtaining valid covariance matrix estimators. The programming is done as follows:

program mytwostep, eclass
  1. regress L M N Nhh Dhh
  2. mat b1 = e(b)
  3. capture drop Lhat
  4. predict double Lhat, xb
  5. replace Lhat = lnLhat
  6. regress K Y R YF MC
  7. mat b2 = e(b)
  8. capture drop Khat
  9. predict double Khat, xb
 10. replace Khat = lnKhat
 11. regress lnYF lnLhat lnKhat lnLd
 12. mat b3 = e(b)
 13. matrix coleq b1 = stage1:
 14. matrix coleq b2 = stage2:
 15. matrix coleq b3 = stage3:
 16. matrix b = b1, b2, b3
 17. local names : colfullnames b
 18. matrix V = I(colsof(b))
 19. mat colnames V = `names'
 20. mat rownames V = `names'
 21. ereturn post b V
end
bootstrap, reps(1000) seed(1): mytwostep

Note
- Lhat is the predicted value of L (i.e. \( \hat{L} \)); Khat is the predicted value of K (i.e. \( \hat{K} \) )
- Observations with missing data on any of the variables have been dropped
- The log conversion for the predicted values of L and K (i.e. lnLhat and lnKhat) in the above step should be pre-determined and available in the data set or they can be estimated/generated using the command “gen lnLhat = ln(Lhat)” and “ gen lnKhat = ln(Khat)” after the 4th and 9th steps, respectively.
Annex 7: Tests for some econometric issues

Section 1
Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Cropping season

\[ L_{(T)} = \alpha_0 + \alpha_1 M_N + \alpha_2 N_{hh} + \alpha_3 D_{hh} + \varepsilon_{LT} \]
\[ L_{(P)} = \beta_0 + \beta_1 M_N + \beta_2 N_{hh} + \beta_3 D_{hh} + \varepsilon_{LP} \]

<table>
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<tr>
<th>Year</th>
<th>Chi2 (1)</th>
<th>Prob. &gt; chi2</th>
<th>Chi2 (1)</th>
<th>Prob. &gt; chi2</th>
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<td>21.54</td>
<td>0.0000</td>
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</tbody>
</table>

Variance Inflating Factor (VIF) test for multicollinearity

Variable | VIF | Variable | VIF |
---------|-----|---------|-----|
2010     |     | M_N     | 1.02 | M_N     | 1.00 |
|         |     | N_{hh}  | 1.24 | N_{hh}  | 1.23 |
|         |     | D_{hh}  | 1.22 | D_{hh}  | 1.23 |
2006     |     | M_N     | 1.03 | M_N     | 1.01 |
|         |     | N_{hh}  | 1.27 | N_{hh}  | 1.22 |
|         |     | D_{hh}  | 1.24 | D_{hh}  | 1.23 |
Aver     |     | M_N     | 1.03 | M_N     | 1.01 |
|         |     | N_{hh}  | 1.26 | N_{hh}  | 1.23 |
|         |     | D_{hh}  | 1.23 | D_{hh}  | 1.24 |

Section 2
Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Cropping season

\[ K_{(T)} = \gamma_0 + \gamma_1 Y_R + \gamma_2 Y_F + \gamma_3 MC + \varepsilon_{KT} \]
\[ K_{(P)} = \delta_0 + \delta_1 Y_R + \delta_2 Y_F + \delta_3 MC + \varepsilon_{KP} \]

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<thead>
<tr>
<th>Year</th>
<th>Chi2 (1)</th>
<th>Prob. &gt; chi2</th>
<th>Chi2 (1)</th>
<th>Prob. &gt; chi2</th>
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Variance Inflating Factor (VIF) test for multicollinearity

Variable | VIF | Variable | VIF |
---------|-----|---------|-----|
2010     |     | M_N     | 1.00 | M_N     | 1.00 |
|         |     | N_{hh}  | 1.23 | N_{hh}  | 1.23 |
|         |     | D_{hh}  | 1.24 | D_{hh}  | 1.24 |
2006     |     | M_N     | 1.01 | M_N     | 1.01 |
|         |     | N_{hh}  | 1.22 | N_{hh}  | 1.22 |
|         |     | D_{hh}  | 1.23 | D_{hh}  | 1.23 |
Aver     |     | M_N     | 1.01 | M_N     | 1.01 |
|         |     | N_{hh}  | 1.23 | N_{hh}  | 1.23 |
|         |     | D_{hh}  | 1.24 | D_{hh}  | 1.24 |
### Section 3

\[ \ln Y_{F(T)} = \eta_1 + \alpha_1 \ln \hat{L}_{(T)} + \beta_1 \ln \hat{K}_{(T)} + \gamma_1 \ln \hat{Ld}_{(T)} + \varepsilon_{YF(T)} \]

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>( \text{Breusch-Pagan/Cook-Weisberg test for heteroskedasticity} )</th>
<th>( \text{Variance Inflating Factor (VIF) test for multicollinearity} )</th>
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</table>

### Section 4

\[ \ln Y_{F(P)} = \eta_2 + \alpha_2 \ln \check{L}_{(P)} + \beta_2 \ln \check{K}_{(P)} + \gamma_2 \ln \check{Ld}_{(P)} + \varepsilon_{YF(P)} \]

<table>
<thead>
<tr>
<th>Cropping season</th>
<th>( \text{Breusch-Pagan/Cook-Weisberg test for heteroskedasticity} )</th>
<th>( \text{Variance Inflating Factor (VIF) test for multicollinearity} )</th>
</tr>
</thead>
<tbody>
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<td>( \chi^2(1) )</td>
<td>( \text{Prob. &gt; } \chi^2 )</td>
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</tbody>
</table>
2006  12.21  0.0005  \ln L_{d(P)}  1.67  \\
       \ln \hat{K}_{(P)}  1.57  \\
       \ln \hat{L}_{(P)}  1.27  \\

Aver  15.21  0.0001  \ln L_{d(T)}  2.30  \\
       \ln \hat{K}_{(T)}  1.99  \\
       \ln \hat{L}_{(T)}  1.26  \\

Section 5

\ln y_{F(T)} = \psi_1 + (\alpha_1-1)\cdot[\ln \hat{L}_{(T)} - \ln(L_{d(T)})] + \beta_1\cdot[\ln \hat{K}_{(T)} - \ln(L_{d(T)})] + \varepsilon_{yF(T)}

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Variance Inflating Factor (VIF) test for multicollinearity

<table>
<thead>
<tr>
<th>Year</th>
<th>Year</th>
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<td>\ln \hat{L}<em>{(T)} - \ln L</em>{d(T)} 1.43</td>
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Section 6

\ln y_{F(P)} = \psi_2 + (\alpha_2-1)\cdot[\ln \hat{L}_{(P)} - \ln(L_{d(P)})] + \beta_2\cdot[\ln \hat{K}_{(P)} - \ln(L_{d(P)})] + \varepsilon_{yF(P)}

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Variance Inflating Factor (VIF) test for multicollinearity

<table>
<thead>
<tr>
<th>Year</th>
<th>Year</th>
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<td>\ln \hat{K}<em>{(P)} - \ln L</em>{d(P)} 1.66</td>
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</table>
Section 7

MODEL 1: \( Y_R = \delta_0 + \delta_1 M_N + \delta_2 M_D + \delta_3 M_P + \varepsilon_R \)

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Variance Inflating Factor (VIF) test for multicollinearity

<table>
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MODEL 2: \( Y_R = \gamma_0 + \gamma_1 M_N + \gamma_2 M_D + \gamma_3 M_P + \gamma_4 A_M + \gamma_5 E_d + \gamma_6 M_M + \gamma_7 N_{HH} + \gamma_8 M_S_h + \gamma_9 A_h + \gamma_{10} R_j + \gamma_{11} Y_{fpH} + \varepsilon_R \)

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

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Variance Inflating Factor (VIF) test for multicollinearity

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Annex 8: Some pictures of focus group discussions and individual interviews
(Source: taken by author)
Annex 9: Questionnaire used for household survey

Questionnaire for Households

Date ________________  
No. ________________

A. GENERAL INFORMATION AND HOUSEHOLD COMPOSITION

1. Village (peasant Association) name ____________  
2. Household number__________________  
3. Respondent name_________________  
4. Respondent number________  
5. Age of respondent_______  
6. Sex of respondent [ ]1=Male , [ ]2=Female  
7. Ethnic group: [ ]1= SNNP ; [ ]2= Amhara; [ ]3 = Tigere ;[ ]4 =Oromo;[ ]5=other  
8. Religion: [ ]1=Ethiopian Orthodox ;[ ]2=Protestant; [ ]3=Catholic; [ ]4=Muslim; [ ]5=Others  
9. Household head [ ]1=Male; [ ]2=Female  
10. Marital status  
    [ ]1=Single  
    [ ]2=Married  
    [ ]3=Divorced/separated ,  
    [ ]4=Widowed  
    [ ]5=spouse left for job  
11. Age of the household head_______  
12. Current size of the household  
    [ ]1= ≤10 years; Male =_____, Female =_______  
    [ ]2= 11-14 years; Male =_____, Female =_______  
    [ ]3= 15-49 years; Male =____, Female=_____  
    [ ]4= 50-65 years; Male =_____, Female =____  
    [ ]5= > 65 years; Male =______, Female =_______  

Summary  
Total number of members in the Household__________  
No. of active/working members of the household ________  
No. of dependents_______

B. EDUCATIONAL BACKGROUND

13. Can you read and write? [ ] 0=No [ ]1=somewhat [ ]2= Yes  
14. How many years of formal education have you completed? (for the head)  
    [ ]1=None  
    [ ]2=primary  
    [ ]3=secondary  
    [ ]4=tertiary (college and above) 4.1[ ]Diploma 4.2[ ]Degree  
15. Did you receive any vocational training? [ ]1= yes; [ ]2=No  
16. If yes, specify the subject of training ___________________  
17. Education level of members in the household  
    [ ]1=None ; Number _______; Male______;Female_______
C. OCCUPATION
18. What is your main occupation?
[ ] 1=Farming only (crop production, animal husbandry)
[ ] 2=Farming+ non-farm business (specify in proportions)
[ ] 5=Other specify

19. What has been your source of income in the past and currently?

<table>
<thead>
<tr>
<th>source</th>
<th>1=Crop sale</th>
<th>2=Livestock sale</th>
<th>4=Remittance</th>
<th>5=Wage from local employment</th>
<th>6=Off-farm business</th>
<th>7=Others such as pension</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D. FARMING SYSTEMS
20. What type of farming are you involved in?
[ ] 1=Crop production only
[ ] 2=Livestock production only
[ ] 3=Crop and livestock production

21. What are the major crops and livestock produced?
Indicate the most important crop and livestock

<table>
<thead>
<tr>
<th>Cereals</th>
<th>Vegetables &amp; fruits</th>
<th>Cash crops</th>
<th>Livestock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>oxen</td>
<td>cows</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. Do you have soil conservation practices? [ ]1=Yes [ ]2=No

23. If yes, which soil conservation practices do you use? (Multiple responses are possible)

<table>
<thead>
<tr>
<th>Practice</th>
<th>2010</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Afforestation (number of trees planted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2=Mulching (rate of mulching per cropping season)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3=Crop rotation (rate of rotation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4=Application of calcium carbonate for acidic soils (Kg per hectare)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5=Other practices</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

173
24. Reasons for poor conservation practices and consequences
1[ ]= Lack of knowledge  2[ ]= Financial problem  3[ ]=lack of labor-time  4[ ]= small land size and 5[ ]=land tenure system  5[ ]=lack of motivation  6[ ]=Others, specify____________________

25. Do you practice-irrigated agriculture
[ ]1=Yes  [ ]2= No

26. If yes, which type of crops are you growing under irrigation? Indicate the priority crop
<table>
<thead>
<tr>
<th>Crop</th>
<th>2010</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27. What have been your major constraints in farming in the past five years?

<table>
<thead>
<tr>
<th>year</th>
<th>1=lack of credit/capital</th>
<th>2=lack of improved seed &amp;fertilizer</th>
<th>3=lack of chemicals</th>
<th>4=lack of farm implements</th>
<th>5=lack of infrastructure (road,marketing)</th>
<th>6=Labor shortage</th>
<th>7=Land holding</th>
<th>8=Animal feed</th>
<th>9=Natural disasters</th>
<th>10=Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28. What kind of natural disasters did you face in the last five years?

<table>
<thead>
<tr>
<th>Disaster</th>
<th>2010</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Total crop failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2=lack of rainfall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3=Disease/pest outbreak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4=Flooding/over precipitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5=Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

29. Mention the main measures/strategies taken by households as a result of the above challenges?
__________________________________________

E. MIGRATION INFORMATION: For migrant sending households

30. Status of the household head  [ ]0= Non-migrant  [ ]1= Migrant

31. How many migrants are there in the household?
[ ]1=1  [ ]2=2  [ ]3=3  [ ]4=more than 3

32. Information about migrants

<table>
<thead>
<tr>
<th>No.</th>
<th>Age</th>
<th>Sex</th>
<th>Marital status</th>
<th>Education status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

174
33. What is/are the reason for migration? (Multiple responses are possible)

[ ] 1 = search for job  [ ] 2 = family affair  [ ] 3 = Marriage  [ ] 4 = Education  [ ] 5 = Drought/famine  [ ] 6 = health issues
[ ] 7 = conflict  [ ] 8 = land shortage  [ ] 9 = unproductive land  [ ] 10 = credit/capital shortage  [ ] 11 = labor shortage
[ ] 12 = death of family member  [ ] 13 = Others, specify

34. Specify the year and duration since sending migrants started

<table>
<thead>
<tr>
<th>Migration pattern</th>
<th>Year started</th>
<th>Number</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Temporary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Permanent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

35. Who decide for migration in the household?

[ ] 1 = Individuals/migrants  [ ] 2 = migrants and households together

36. Do you have a relative/friend/family member in the destination?

[ ] 0 = No  [ ] 1 = Yes

37. If yes, mention the support migrants obtained from them (if there is)

______________________________

38. Enumerate the costs incurred for migrants at the initial periods of migration

<table>
<thead>
<tr>
<th>Cost type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Transporation</td>
<td></td>
</tr>
<tr>
<td>2 = Cost for Living/adjustment in the destination</td>
<td></td>
</tr>
<tr>
<td>Total sum</td>
<td></td>
</tr>
</tbody>
</table>

39. What are the past responsibilities of migrants in the household? (Multiple responses are possible)

[ ] 1 = Land preparation/tillage  [ ] 2 = Planting and fertilizing  [ ] 3 = Weeding  [ ] 4 = Harvesting and threshing
[ ] 5 = crop Marketing  [ ] 6 = Livestock feeding and health care  [ ] 7 = Livestock marketing
[ ] 8 = off-farm business  [ ] 9 = local wage employment  [ ] 10 = Others, specify

40. To which migration pattern are the migrants involved?

<table>
<thead>
<tr>
<th>Pattern</th>
<th>2010</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>1 = Temporary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 = Permanent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 = Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
41. To which migration destination/region are the migrants located?

<table>
<thead>
<tr>
<th>Location</th>
<th>Temporary</th>
<th>Permanent</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Destination Region</td>
<td>Distance from origin</td>
<td>Destination Region</td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Region/Location: [ ]1=Oromia; [ ]2=Amhara; [ ]3=Afar; [ ]4=Addis Ababa; [ ]5=SNNP; [ ]6=Tigray; [ ]7=Somali; [ ]8=Gambela; [ ]9=Dire Dawa

42. Enumerate the number of months absent from home as well as season of migration

<table>
<thead>
<tr>
<th>Year</th>
<th>Months absent</th>
<th>Migration Season</th>
<th>Migration pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Migration season: [ ]1=agricultural peak periods; [ ]2=off-season; [ ]3=All season
Migration pattern: [ ]1=Temporary; [ ]2=Permanent; [ ]3=Other

43. Is there enough labor available to take over the responsibilities of the migrants?
[ ]0=No [ ]1=Yes

44. List any changes/challenges encountered while sending migrants (Multiple responses are possible, detail information can be recorded)

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Challenges faced and possible actions taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Seasonal</td>
<td>2010</td>
</tr>
<tr>
<td>2=Permanent</td>
<td></td>
</tr>
<tr>
<td>3=Others</td>
<td></td>
</tr>
</tbody>
</table>

Challenges: [ ]1=labor shortage; [ ]2=financing migration; [ ]3=burden of activities and re-division of labor [ ]4=change in responsibilities of members [ ]5=increase in per capita physical capital and other resources; [ ]6=others, specify

45. List the measures taken for the above constraints

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Measure 2010</th>
<th>Measure 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Seasonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.Permanent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measure: [ ]0=no measure; [ ]1=measure/s is/are taken, specify

F. HUMAN CAPITAL

46. Source of labor used on the farm (in proportion)
[ ]1=family labor(labor from the members of the household);
[ ]2=Hired labor if any;
[ ]3=Both; number proportion:- family labor _________; Hired labor _________

47. Active labor force in the household

<table>
<thead>
<tr>
<th>year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[ ]1=Male; [ ]2=Female

48. Average Working Hours in a day /working days in a week (at the time of agricultural activities)

<table>
<thead>
<tr>
<th>year</th>
<th>hours/days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
</tbody>
</table>

49. Number of years of experience of the head in farming ____________

50. Number of experienced person/s in the household for agricultural activities (if division of labor exists among members of the household)

<table>
<thead>
<tr>
<th>year</th>
<th>Number of experienced persons for Activities in Crop production</th>
<th>For Activities in Animal production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1=Land preparation/tillage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=Planting and fertilizing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=Weeding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4=Harvesting and threshing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5=Marketing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6=Feeding &amp; health care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7=Marketing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>year</th>
<th>2010</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

G. WORKING CAPITAL

51. List the expenditures for agricultural inputs
## ii. Expenditure of inputs

<table>
<thead>
<tr>
<th>Year</th>
<th>1=Fertilizer Type</th>
<th>Amount used in (kg)</th>
<th>unit cost</th>
<th>2=Improved seed Type</th>
<th>Amount used in (kg)</th>
<th>unit cost</th>
<th>3=Chemical Type</th>
<th>Amount used in (lt)</th>
<th>Unit cost</th>
<th>4=Additional land rented (ha)</th>
<th>Cost per hectare</th>
<th>5=Animal feed type</th>
<th>Amount used in (kg)</th>
<th>Unit cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Total</td>
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<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

52. Mention the source of budget for the above expenditures and contribution from each source

<table>
<thead>
<tr>
<th>Year</th>
<th>1=Agricultural income</th>
<th>Amount</th>
<th>Share %</th>
<th>2=Remittance</th>
<th>Amount</th>
<th>Share %</th>
<th>3=Other sources (such as employment wage, off-farm business&amp; pension)</th>
<th>Amount</th>
<th>Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## H. PHYSICAL CAPITAL

53. List the farm and non-farm assets with their respective values

### i. Farm Assets

<table>
<thead>
<tr>
<th>Year</th>
<th>1= Farm implements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hand tools and ploughs</td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type</td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type</td>
</tr>
</tbody>
</table>
## ii. Farm Household Assets

<table>
<thead>
<tr>
<th>Year</th>
<th>Type</th>
<th>Value</th>
<th>Type</th>
<th>Value</th>
<th>Type</th>
<th>Value</th>
<th>Type</th>
<th>Value</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*value is in Ethiopian Birr (ETB)*

## iii. Non-farm business physical capital by the household (such as non-farm land leased for private business, non-farm machineries purchased)

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of off-farm business</th>
<th>Value in ETB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

54. Do you have a private bathroom?
   - [ ] 0=No
   - [ ] 1=Yes

55. Do you have a separate store (gotera)?
   - [ ] 0=No
   - [ ] 1=Yes
**I. LAND HOLDING**

56. Explain farm size allocation of the household

<table>
<thead>
<tr>
<th>Allocation for:</th>
<th>Farm size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Total farm size</td>
<td></td>
</tr>
<tr>
<td>--&gt; Value (in ETB)</td>
<td></td>
</tr>
<tr>
<td>1=Cereal crops</td>
<td></td>
</tr>
<tr>
<td>2=Cash crops</td>
<td></td>
</tr>
<tr>
<td>3=Vegetables and fruits</td>
<td></td>
</tr>
<tr>
<td>4=Livestock rearing</td>
<td></td>
</tr>
<tr>
<td>5=Fallow</td>
<td></td>
</tr>
<tr>
<td>6=Others specify</td>
<td></td>
</tr>
</tbody>
</table>

57. Do you have a proportion of land rented out?  [ ] 0=No  [ ] 1=Yes

58. If yes, explain the area of land rented out (in ha) and reasons

<table>
<thead>
<tr>
<th>Year</th>
<th>Hectare</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**J. TOTAL INCOME OF HOUSEHOLDS**

59. Explain the farm and non-farm income of the household. Include remittance income for those migrant sending households

**I. Agricultural income**

<table>
<thead>
<tr>
<th>i. Crop type</th>
<th>yield-Qt</th>
<th>Price/Qt</th>
<th>Total (ETB)</th>
<th>yield-Qt</th>
<th>Price/Qt</th>
<th>Total (ETB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] 1=Cereals</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>[ ] 2=Vegetables and fruits</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>[ ] 3=Cash crops</td>
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</tr>
</tbody>
</table>
ii. Livestock type

<table>
<thead>
<tr>
<th>No.</th>
<th>Livestock type</th>
<th>Amount (in ETB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Oxen/heifers sales</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Milk sales</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Equines</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sheep and goats sales</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Chicken</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Egg sale</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>others</td>
<td></td>
</tr>
</tbody>
</table>

ETB - means in Ethiopian Birr (the Ethiopian currency)

II. Total Remittance Income (for migrant sending families)

1) Monetary remittance

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Annual monetary remittance (in ETB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Temporary migrants</td>
<td></td>
</tr>
<tr>
<td>Permanent migrants</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

2) Non-monetary remittance

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-monetary remittance (assets, equipments sent from migrants or purchased)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Value (in ETB)</td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
III. Off-farm income

<table>
<thead>
<tr>
<th>Source</th>
<th>Off-farm income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>1=local employment wage</td>
<td></td>
</tr>
<tr>
<td>2=off-farm business</td>
<td></td>
</tr>
<tr>
<td>3= pension</td>
<td></td>
</tr>
<tr>
<td>4=Others</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

60. Explain the current proportion (share) of allocation of the total budget of the household for investment and consumption in the household

<table>
<thead>
<tr>
<th>Share</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Purchase of Asset/input</td>
<td></td>
</tr>
<tr>
<td>i. farm assets/inputs</td>
<td></td>
</tr>
<tr>
<td>ii. non-farm assets</td>
<td></td>
</tr>
<tr>
<td>2=Food, clothing and cosmetics</td>
<td></td>
</tr>
<tr>
<td>3=Health care &amp; medication</td>
<td></td>
</tr>
<tr>
<td>4=Household bills (such as fuel/kerosene, water, electricity, telephone bills)</td>
<td></td>
</tr>
<tr>
<td>4=Education/training</td>
<td></td>
</tr>
<tr>
<td>7=Social/cultural ceremonial costs: only main events</td>
<td></td>
</tr>
<tr>
<td>8=Others, specify</td>
<td></td>
</tr>
</tbody>
</table>

Thank you very much for your cooperation!

Data collector name_______________________
Signature: __________________________
## Beneberu Assefa Wondimagegnhu

### Education

<table>
<thead>
<tr>
<th>Current status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MA in Development Studies</strong>, Sep. 2008</td>
<td>University of the Western Cape, South Africa</td>
</tr>
<tr>
<td><strong>MA in Development Management</strong>, Dec. 2007</td>
<td>Ruhr University of Bochum, Germany</td>
</tr>
<tr>
<td><strong>B.Sc in Agriculture (Agricultural Extension)</strong>, July 2003</td>
<td>Haramaya University, formerly called Alemaya University, Ethiopia</td>
</tr>
</tbody>
</table>

### Trainings

<table>
<thead>
<tr>
<th>Details</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural Equation Modeling using Mplus</strong></td>
<td>Institute for Development Research and Development Policy, Ruhr University of Bochum (certificate)</td>
</tr>
<tr>
<td><strong>Scientific paper writing</strong></td>
<td>Research school, Ruhr university of Bochum (certificate)</td>
</tr>
<tr>
<td><strong>Media and Instructional methods in Higher Education</strong></td>
<td>Bahir Dar University, Ethiopia (certificate)</td>
</tr>
<tr>
<td><strong>Biometrics in Agriculture</strong></td>
<td>Addis Ababa University, Department of statistics and Ethiopian Biometrics society, Addis Ababa, Ethiopia (certificate)</td>
</tr>
</tbody>
</table>

### Professional experience

<table>
<thead>
<tr>
<th>Details</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lecturer and researcher, since April/2008</strong></td>
<td>Department of Rural Development, Bahir Dar University, Ethiopia</td>
</tr>
<tr>
<td><strong>Researcher and Department Head</strong>, March/2004 – April/2006</td>
<td>Research and Extension Department, Werer research center, Ethiopian Institute of Agricultural research, Ethiopia.</td>
</tr>
</tbody>
</table>

### Computer skill

- Microsoft Word, Excel, PowerPoint, Outlook, STATA, SPSS, Mplus, Inkscape and Internet

### Membership

- Research school, Ruhr university of Bochum, Germany

### Awards

- German Academic Exchange Service (DAAD): scholarship grant for Masters degree studies: 2006
- South African - German Center for Development Research and Criminal Justice (SA-GER CDRCJ): scholarship grant for PhD studies: 2009