

**INCOME DIVERSIFICATION STRATEGY OF POOR URBAN  
HOUSEHOLDS IN THE INFORMAL SECTOR: THE CASE OF MAJOR  
URBAN CENTERS OF ETHIOPIA**

**By**

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**A thesis submitted to the School of Graduate Studies of Addis Ababa  
University in partial fulfillment of the requirements for the Degree of  
Master of Science in Economics  
(Economic Policy Analysis)**



ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES

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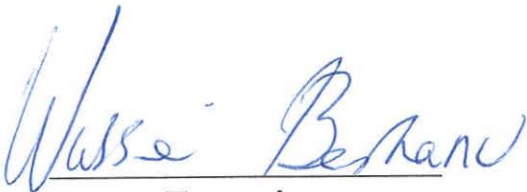
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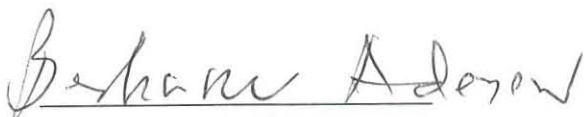
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## ACKNOWLEDGEMENTS

First, I thank God for every thing that He has done for me.

Next, I thank my advisor, Dr. Dejene Aredo, for his advice and support as well as timely response during the whole course of the thesis.

The Department of Economics of Addis Ababa University deserves special appreciation for making available the panel data set used by this study.

I wish to extend my gratitude to all the M.Sc. Program instructors of the department as well as those of the Collaborative MA Programme in Economics of the African Economic Research Consortium for their effort to equip me with the basic knowledge and skills being used as a foundation for the study.

I am also grateful to the current head, Dr. Tekie Alemu, and the ex-head, Ato Tesegaberhan W/Giyorgis, of the department; to the current coordinator, Dr. Hussien Hamda, and the ex-coordinator, Dr. Wasse Birahanu, of the Postgraduate Programme of the department; to the secretaries, W/ro Miseker Getachew and W/ro Fantaye, of the department as well as to the members of the department staff-Ato Atlaw Alemu and Ato Demisse Chanyalew for their valuable facilitation role played from the initial conception up to final completion of this study.

My thanks also go especially to the ECA library, the Ethiopian Economic Association library as well as to the Ethiopian Institute of Agricultural Research for availing me the necessary materials and creating the conducive working environment in the absence of which it might be difficult at best to complete the study by this time.

This list is not exhaustive and my thanks also go to my family as well as to all friends who encouraged me and wished me a success.

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## ABSTRACT

This study is motivated by the existence of limited empirical evidence pertaining to income diversification strategy of urban households in Ethiopia. The specific objectives of the study are to characterize labor income diversification strategy of poor urban households in Ethiopia as well as to identify and explain the major determinants of the same. A longitudinal survey data collected by the Department of Economics of Addis Ababa University in collaboration with Economics Department of Gothenburg University from 1997 to 2004 was used for the study. A conceptual model of moonlighting in a household context was adopted. Various descriptive statistical tools such as frequency distribution were employed. Moreover, a conditional fixed effects Poisson regression model was estimated. Smaller proportion of sample households were found to be dependent on multiple labor income sources compared to some other African urban areas. However, a trend of increased reliance on the same over time was also observed. In general, exposure to an external income shock was not found to have the expected positive and statistically significant effect upon income diversification. However, presence of non labor income source was found to have significant and negative effect up on income diversification efforts as expected. These indicate that income diversification was not an important household strategy for the sample of poor urban households considered in the study. On the other hand, access to credit especially in the capital city was found to be associated with income diversification than with expansion of existing income sources. The study has such policy implications that the practitioners of the informal sector into which most poor urban households diversify their income source for distress and poverty reasons need to be supported. This could be through improving their access to credit, technology, training and marketing in order to strengthen their productive capacity to create jobs and generate income. Moreover, provision of some sort of business risk mitigation scheme for poor urban households of especially the capital city need to be envisaged through facilitating formation of joint ventures or cooperatives.

# CHAPTER ONE INTRODUCTION

## 1.1. Background

Ethiopia's per capita GDP, at US \$200 as indicated on the official website of The World Bank, is much lower than the Sub-Sahara Africa average. The proportion of people in Ethiopia who are absolutely poor (unable to meet their basic needs) during the year 1999/00 was 37% in urban areas (MOFED, 2002). As to a related but not yet official document of MOFED, this proportion decreased only to 35% by 2004/05. Accordingly, the proportion of the population under food poverty in rural areas is about 42% and 39% by 1999/00 and 2004/05 respectively whereas the corresponding figures for urban areas stood at approximately 47% and 35% by the same times.. Moreover, the 2004/05 HICE (Household Income Consumption Expenditure) and WM (Welfare Monitoring) as well as the large-scale Participatory Poverty Assessment (PPA) based poverty analysis shows that overall consumption poverty measured by the head count ratio has witnessed a 2.7% decline between 1995/96 and 1999/00 and a 12.4% decline between 1999/00 and 2004/05. With regard to rural areas consumption poverty has declined by 4.2% between 1995/96 and 1999/00 and by 13.4% between 1999/00 and 2004/05 while urban areas witnessed a corresponding 11% increase and a mere 4.7% decrease during the same period. Furthermore, the same poverty analysis of MOFED shows that the decline in rural food poverty head count index between the nine year period from 1995/96 to 2004/05 is 26% which is substantial and statistically significant (at 1% level). However, the decline in urban food poverty head count index between the same nine year period is only 3.3% which is small and not statistically significant. In

general, though the country managed to reduce food poverty in rural areas, food poverty is somewhat stagnant in urban areas given the substantial increment in food prices. As to recent figures, the poor comprise somewhere in the range of 46 – 70% of the urban population according to “lower” and “upper” poverty lines of World Bank (World Bank, 2007).

Regardless of the absolute level of urban poverty, it is broadly accepted that the last two decades have been a difficult period for the urban poor in most nations (Mitlin et al., 2003). Maxwell et al. (2000), citing OECD (1995), indicated that through higher food and imported goods prices, growing joblessness among middle-class residents, lower wages as well as reductions in basic health, education, and other social services, structural adjustment created a new class of vulnerable people, many of them in urban areas. Even the real wages of urban workers in the formal sector fell, sometimes, so dramatically that a growing proportion of wage-earning households were pushed below the poverty line (Harts – Broekhuis, 1997). In connection with this, governments of developing countries like Ethiopia have also recently focused on new set of reforms known sometimes, according to Rodrik (2004), as “second-generation reforms” which are meant to overcome the apparent inefficiency of the earlier wave of reforms relaying heavily on liberalization, stabilization and privatization. These new set of reforms which aimed accordingly at reducing corruption, improving the regulatory apparatus, rendering monetary and fiscal institutions independent, strengthening corporate governance, enhancing the functioning of the judiciary, and so on are also observed to have similar undesirable short term effects as mentioned before on the urban poor especially.

Furthermore, the relatively wider and increasing spread of HIV/AIDS pandemic in urban areas especially among the economically active population have impoverished many and trapped large number of households in permanent poverty through its effect of eroding the income generating capacity of households (Kedir and McKay, 2003; Nkurunziza and Rakodi, 2005).

On the other hand, there is often an assumption that urban communities are not as supportive as rural ones (Mitlin et al., 2003). For example, Maxwell et al. (2000) suggested that vulnerable groups in cities often have fewer informal safety nets (kinship and community networks). Moreover, Mitlin et al. (2003), citing Beard (2000), indicated that extreme poverty may itself reduce social networks because of an inability to reciprocate. Similarly, Nkurunziza and Rakodi (2005), citing Devereux (2001), also indicated that while 'horizontal' redistributive practices remain widespread, they are highly vulnerable to covariant risk given that they are heavily concentrated among the poor themselves.

Households in urban areas try to manage or cope with adverse situations through various ways. In this regard, coping capacities of urban households largely rest on available asset portfolios and the resources a household is able to mobilize and manage in the face of adversity (Nkurunziza and Rakodi, 2005; Schutte, 2006). The literature on risk and coping thereby mainly distinguishes two different types of dealing with risk and insecurity: precautionary or insurance strategies and response strategies. The former include, for instance, diversification of livelihood activities, building up stocks and savings during peak seasons, or social investments in

reciprocal or redistributive systems among households, whereas the latter is a reactive approach implemented after an event has occurred (Chen and Dunn, 1996; Nkurunziza and Rakodi, 2005; Schutte, 2006). Here, accordingly, depleting physical stocks, drawing upon social relationships, seeking alternative employment (e.g. through seasonal migration) or mobilizing additional household members for income generation, borrowing and, if necessary, reducing consumption are the most common activities observed in the literature. Unlike ex post actions, which are often ad hoc and reactive, ex ante strategies are often deliberate and planned, although some analysts have challenged the level of agency ascribed to the poor in managing their livelihoods and planning risk management measures (Nkurunziza and Rakodi, 2005).

## **1.2. Problem Statement**

A frequent response by poor households to declining real income caused by various shocks is to mobilize additional labor – principally women’s labor, but in the poorest households even children’s labor. Harts-Broekhuis (1997), in his study of how residents of Mopti town of Mali manage to sustain a living, revealed that economic insecurity or crisis could undermine the existence of household units and result in a variety of economic activities being carried out at the household level. In this situation, households seek to maximize their income by engaging as many of their members as possible in different economic activities. Here, it is the relative lack of other assets or capital to fall back (e.g.: physical, social, financial, etc.) which makes this strategy critical in withstanding shocks for poor urban households. In this regard, the study carried out on chronic poverty in urban Ethiopia by Kedir and McKay (2003) asserted that nearly three quarters of the chronic poor own a total value of consumer

durables below 1,000 Birr, compared to only one fifth of the never poor. Furthermore, as mentioned before, social capital is relatively and increasingly becoming less dependable to be mustered for long time as far as the poor households are concerned. Thus, income diversification – driving income from a combination of different activities mainly – can be taken as the major survival or coping strategy of most poor urban households.

Empirically, however, there are few evidence that show the pattern and degree of income diversification at household level over time in urban Ethiopia unlike in rural Ethiopia. In addition, there are also no empirical evidence as to the major motivation and factors that prompt poor urban households to have diversified or multiple sources of income in Ethiopia unlike their rural counterparts. In this regard, Bigsten and Makonnen (1999) attempted to get a picture of the extent of income diversification among individual urban households based on data collected from sample households that reside in seven major urban centers of Ethiopia in 1994. Moreover, Bigsten et al. (2005) tried to see the change in the extent to which urban households rely on multiple sources of income using data collected from sample households that reside in the same seven major urban centers of Ethiopia in 1995 and 1997 in addition to that collected in 1994 and used for the former study. The major finding of the former study indicated that multiple income sources are less common in urban Ethiopia than in some other African urban areas. Accordingly, 81.2% of sampled households depend only on one source of income while the rest 18.8% depend on a combination of mainly two different sources of income (See Table 1.A for more detail in appendix 1). However, according to the finding of the later study that followed similar approach

as to the former of basing its description of the extent of income diversification on the broad income source categories used by the designers of the questionnaire for the data, reliance on only one source of income seemed to be decreasing over time from 59% in 1994 to 55% in 1997 in terms of percent of households. In this regard, only the share of households relying solely on remittances increased from 1994 to 1997. It is further indicated that in 1994, a quarter of the households had remittances as well as income from wages, female household business, or business, and this had increased to 30% by 1997 where wage earners, who increase their share over time, dominated the category. In addition, about 10% combined two income generating activities, excluding remittances, with the most common combination being wages and business income. (See Table 1.B for more detail in appendix 1).

From comparison of the results for the year 1994 between these studies, it is clear to see that there is inconsistency of results. That is, in 1994, 81.2% of sampled households depend on only one source of income as to the former study whereas 59% depend on only one source of income as to the later study. The two studies are believed to generate two different findings concerning the same research issue with respect to the extent of single and multiple income sources of urban households in Ethiopia for the same time of the year 1994 using the same data due to difference in approach followed. That means, the former study is believed to regard income from remittance and pension as income from wage/salary. In addition, the former study is believed not to consider remittance as one separate income source when it happened to be found in combination with other income sources (i.e., wage, business and female household business).

On the other hand, both studies are believed to underestimate the extent of income diversification of urban households in Ethiopia by taking engagement of different members of a household in different activities within the broad categories of wage/salary employment, of formal business, or of female household business as engagement in a single income source. Therefore, it may be possible to say that the available few studies that somehow tried to deal with the issue of income diversification in urban Ethiopia fail to give the full and correct picture of the issue.

On the other hand, both studies are limited to mere description of the extent of and the change in the extent of income diversification of urban households aggregatively. Moreover, even this limited information was available for the time up to 1997 only. Thus, in this regard, there is information gap as to the actual and recent extent of income diversification in urban Ethiopia and as to what motivates and influences urban households of different income groups to have more diversified or multiple income sources so as to be able to derive valuable policy implications regarding income diversification in urban Ethiopia.

In view of the above mentioned limitations and gap in knowledge on income diversification in urban Ethiopia context, this study will try to address the following main research questions:

- ❖ What is the actual extent and pattern of reliance on multiple sources of income among poor households in urban Ethiopia in the past and recently?
- ❖ What are the major reasons and factors that prompt poor urban households in Ethiopia to rely on multiple sources of income?

As such, the study will attempt to describe the degree and pattern of income diversification over time in urban Ethiopia and attempt to examine the major reasons and factors affecting income diversification in urban Ethiopia. In so doing, the study limits its focus on the poor households that reside in major urban centers of Ethiopia.

The main reasons for concentrating on the poor households alone are:

- 1) such poor-focused study would be expected to have important implications for policies targeted to reduce poverty which is the priority agenda of developing countries like Ethiopia.
- 2) it would be more manageable and simple to exclude from the study those non-poor households which are expected to have an additional distinct motive for income diversification.

### **1.3. Objectives of the Study**

In general, the purpose of the study is to explain the nature of income diversification strategies of poor urban households in Ethiopia. Specifically, the study attempts to:

- 1) characterize the, extent, pattern and trend in income diversification strategy of poor urban households in Ethiopia and
- 2) identify and explain the major determinants of activity or labor income diversification among poor urban households in Ethiopia.

## **1.4. Hypotheses**

The study will try to test the following hypotheses:

- ✦ There is increasing reliance on multiple sources of income among poor urban households in Ethiopia over time, mainly, due to current income shortfall and resource constraint rather than income insecurity.

## **1.5. Significance of the Study**

Understanding how the poor respond to economic crisis has become increasingly important as it can help to ensure that interventions aimed at reducing poverty and vulnerability complement and strengthen people own initiative solutions rather than substitute for or block them. In this regard, the study, through identifying major factors those either facilitate or hinder such important risk management and coping strategy of especially the urban poor as income diversification, contributes in giving valuable insights that can be used by policy makers and other stakeholders. Furthermore, the study would also shed some light on such negative impacts of income diversification strategy of especially poor urban households as intergenerational transfer of poverty and expansion of the informal sector.

## **1.6. Organization of the Thesis**

The rest of the paper is organized as follows. Chapter two presents review of relevant theoretical and empirical literatures. Chapter three presents methodology where the later two sections of this chapter include specification of the form of the econometric model to be used, the estimation methods to be employed as well as



description of the data to be used and definition of variables to be analyzed together with their expected effect on the response variable. Chapter four is on the descriptive statistics of the data whereas chapter five deals with the econometric model estimation results and their interpretation as well as possible explanations given for unexpected results. The last chapter briefly presents summary and policy implications. It includes summary of main points from the background of the study up to its findings, important policy implications of the findings, important caveats to any conclusion to be drawn from the findings of the study as well as suggested directions for future research.

## **CHAPTER TWO REVIEW OF LITERATURES**

### **2.1. Theoretical Perspectives**

Both rural and urban households in developing countries face substantial risk resulting in high income variability (Dercon, 2000; Dunn et al., 1996). Especially, low income households make their economic decisions in environments that are uncertain and risky, with risks coming from a variety of sources (Dunn et al., 1996). To start with, risk may be defined, accordingly, as both the chance of a loss (ex ante) and the loss itself (ex post). In this concept of risk, as to Dunn et al. (1996), both the degree of chance/probability of loss and the size of the potential or actual loss are considered.

As mentioned above, households face risks from many different sources. These can be categorized into six general categories, namely market, natural, technological, strategic, political, and personal (Dunn et al., 1996). Accordingly, unfavorable price changes are a key type of market risk. In addition, households face other important types of market risks such as the possibility of job loss. Risks related to nature, such as floods, droughts, etc., are particularly important for production activities that rely heavily on natural processes. Technological risks, on the other hand, are associated with the use of a new process, equipment, etc. In this regard, the possibility of technological risks and the inability of the economic agent involved to accurately assess the probability of a loss can lead to reluctance to adopt new technologies. While strategic risks relate to the existence of information asymmetries and the tendency of individuals to engage in opportunistic behavior, political risks refer to the

chance of loss due to the exercise of power. With respect to the later, micro-enterprises in the urban informal sector may be subject to confiscation by the police or municipal authorities. Finally, personal risks include crises within the household. A primary example of such risks is the illness of a family member, which can pose a risk in two ways. First, the illness may lead to a sudden increase in the need for income for medical treatment. Second, if the ill family member is one of the household's income earners, there can be a simultaneous drop in household income levels. In the case of a fatal illness, such as HIV/AIDS, the loss in income-earning capacity is permanent (Dunn et al., 1996).

Virtually all studies distinguish between recurrent risks, which are usually more predictable and less severe, and periodic risks which are usually less predictable and more severe (Chen and Dunn, 1996). In similar vein, Dercon (2000) asserted that relatively small but frequent shocks are easier to deal with than large, infrequent negative shocks. According to him, examples of the latter are disability or chronic illness; the former are events such as transient illness. Chen and Dunn (1996) added, in these regard, that the predictability of recurrent risk leads households to adopt various precautionary or insurance strategies. Accordingly, from the three critical dimensions to periodic risk which are the likelihood that it will occur, the exact time when it will occur, and the severity with which it will occur, the last two are not predictable. In areas where periodic risk is likely, but not predictable, households adopt precautionary strategies. Where as in areas where periodic risks are less likely, households can afford to be less precautionary (Chen and Dunn, 1996).

There are two other key dimensions of characterizing risk – one temporal and one spatial. First, whether the crisis – and associated period of risk – is short term or prolonged is a key determinant of the ability of communities and individual households to cope (Chen and Dunn, 1996). Second, common (aggregate, economy-wide, covariate) risk is distinguished from individual (idiosyncratic) risk. The former affects everybody in a particular community or region where as the latter only affects a particular individual or household in the community (Dercon, 2000).

Other than the risk environment faced by a household, the risk attitudes of the household also shapes its economic decisions and their corresponding outcomes. Dunn et al. (1996) stated that a household's risk attitudes reflect its relative willingness to operate under different levels of risk. Accordingly, the less tolerance that a household has toward a chance of loss, the greater the risk aversion of the household. Hence, households that are risk averse will seek mechanisms for reducing and managing risk.

With regard to the market structure of most developing countries, many markets do not exist and, of those that do, many work imperfectly (Morduch, 1995). In the context of risk, according to Dunn et al. (1996), it is especially important to note the condition of markets for credit and for insuring against idiosyncratic risk. In this regard, the emerging consensus of the empirical literature is that holes in effective insurance and credit markets exist, especially for the poorest households (Morduch, 1995). When credit and insurance markets are incomplete or imperfect, production and consumption decisions are interlinked, shocks to production (income) can translate

into shocks to consumption and the household must rely on a variety of non-market relations and risk management strategies to fill this void (Dunn et al., 1996).

Furthermore, it is important to note that low-income households, because of their lower levels of resources, are more vulnerable to the effects of risk. For those households that are close to the lower edge of material survival, a loss associated with a risk could have devastating long-term consequences. Even when material survival is not threatened, the detrimental consequences of a loss can be far-reaching. This will lead to the possibility that, in their economic decisions, low-income households with low levels of economic security may behave as if they were more risk averse than households with higher levels of economic security which may be much more willing to take a risk based on the possibility of receiving a large payoff under a positive outcome (Chen and Dunn, 1996; Dunn et al., 1996).

To avoid these negative consequences, households, in the absence of perfect credit and insurance markets, will employ various strategies to reduce the possibility of a loss and to mitigate its harmful effects (Dunn et al., 1996). One category of these strategies comprises risk reduction, precautionary, insurance or income smoothing strategies which are designed to reduce the household's ex ante risk exposure and smooth the flow of income to the household (Chen and Dunn, 1996; Dunn et al., 1996). Here, households take steps to protect themselves from adverse income shocks before they occur (Morduch, 1995). Against the predictability of recurrent risk and the likelihood of periodic risk, households adopt various precautionary or insurance strategies which typically include diversifying economic activities, selection

of low-risk activities, building up of stocks and savings, and social investments in reciprocal or redistributive systems among households (Chen and Dunn, 1996; Dunn et al., 1996; Morduch, 1995). According to Ellis (2000), ex ante risk management is interpreted as a deliberate household strategy to anticipate failures in individual income streams by maintaining a spread of activities. The other category includes loss management, risk-coping, response or consumption smoothing strategies which take force after shocks occur and are designed to improve the household's ex post ability to cope with a loss (Chen and Dunn, 1996; Dunn et al., 1996; Morduch, 1995). One purpose of these strategies is to prevent a loss, or income shock, from leading to a consumption shock. In addition, effective loss management strategies can prevent an income shock from leading to a long-term reduction in the household's productive capacity (Dunn et al., 1996). Major loss management strategies include diversifying income sources, drawing down physical stocks, drawing upon social relationships, borrowing and, if necessary, reducing consumption and human capital investment (Chen and Dunn, 1996; Dunn et al., 1996). In contrast to ex ante risk management, ex post coping with crisis is the involuntary response to disaster of unanticipated failure in major sources of survival (Ellis, 2000).

There is a common sequencing of coping strategies despite a clear overlap and some back-and-forth movement between them. Responses during the early, middle, and late stages of the crisis are characterized as being of low, moderate, and high severity and as involving measures which are most, moderately, or least reversible. Thus, there is a degree to which the strategy is reversible, that is, whether and how easily the household can recover after the period of risk or crisis is over. In this

regard, once a severe crisis hits a household, the most observed responses are (if possible) adapting or intensifying activities and (if not) further reducing or modifying consumption, liquidating savings and stocks, mortgaging or selling assets, entering “asymmetric interpersonal dependencies” and migration. If and when all else fails, households (or individuals) resort to more drastic measures such as distress migration in search of relief, selling children, etc. (Chen and Dunn, 1996; Dunn et al., 1996; Ellis, 1998).

Diversification can be defined as the presence of multiple income generating activities and sources of wage employment within the household economic portfolio (Dunn, 1997). In this regard, the household economic portfolio is defined, by Chen and Dunn (1996), as the set of household resources, the set of household activities, and the circular flow of interaction between household resources and household activities. As can be noted from what is cited before, diversification of activities – of sources of livelihood/income – is both a precautionary strategy against possible fluctuations or shortfalls and a response strategy to actual fluctuations or shortfalls. In other words, households diversify deliberately to protect themselves against risk and, once risk occurs, they diversify as an involuntary response to the crisis/risk to protect themselves from taking more drastic, less-reversible actions (Chen and Dunn, 1996; Ellis, 1998). In connection with this, Ellis (1998) further cited that some branches of the literature are predominantly concerned with diversification as a matter of survival, emphasizing the reasons for diversification born of desperation (poverty, lack of assets, vulnerability, disaster) where as other branches focus, by contrast, on diversification as a matter of choice and opportunity, involving proactive household

strategies for improving living standards. According to Ellis (2000), the reasons that individuals and households pursue diversification as a livelihood strategy are often divided into two overarching considerations, which are necessity or choice. Necessity refers to involuntary and distress reasons for diversifying whereas choice, by contrast, refers to voluntary and proactive reasons for diversifying.

The literature identifies a number of different motives and pressures that contribute to explaining why diversification occurs and the patterns of diversity that are observed. The most frequently cited explanation for diversification relates it to the household's effort to reduce and manage risk (Dunn, 1997). The chance of a sizeable loss of income from any one production activity represents a threat to the economic security of the household. Where insurance markets are absent or incomplete, this risk must be borne privately (Dunn et al., 1996). In such situations, according to Ellis (1998), income instability and consumption smoothing are real problems confronted by households, and therefore reducing income instability would become an important motive for income diversification. The higher the perceived risk attaching to a particular source of income, the more likely it is that the individual or the household will seek to compensate for this by having in place contingency income sources or fallback positions of social support in the event of failure (Ellis, 2000). Under the risk reduction explanation for diversification, households seek to protect themselves from shocks to total income by simultaneously undertaking several distinct income generating activities being selected in such a way that the income from each of the activities is affected by different external risks (Dunn, 1997; Ellis, 2000). In other words, the principal idea underlying diversification here is to develop a portfolio of

investments and activities with returns that are not perfectly correlated (Dunn et al., 1996; Ellis, 2000). As to the elaboration given by Dunn (1997), if total earned income by the household is expressed as the sum of the income generated by each of the  $n$  production and investment activities as:

$$Y = y_1 + y_2 + \dots + y_n \text{ where } y_i \sim N(\bar{y}_i, \delta_i) \text{ and } i=1, \dots, n,$$

diversification reduces the risk of shocks to total income so long as the covariance between any two individual income sources is low or zero, i.e.,

$$\text{cov}(y_i, y_j) \approx 0 \text{ for } (i \neq j).$$

This means that the factors that create risk for one income source are not the same as the factors that create risk for another income source (Ellis, 2000). According to Dunn (1997), this type of portfolio diversification provides the household with lower variance in the amount of total income received, thus protecting the household from income shocks. However, the expected or average income from a diversified portfolio may be lower than the expected or average income that would be earned from a specialized portfolio, i.e.,  $Y_D \leq Y_S$  where  $Y_D$  and  $Y_S$  denote average amount of total income earned in the diversified and specialized portfolio respectively. For this reason, risk reducing diversification can result in lower total income over time (Dunn, 1997; Ellis, 1998; Ellis, 2000). In this connection, as reported by Dunn et al. (1996), Reardon et al. (1992) found that households exhibited greater risk averse behavior as their level of wealth declined resulting in higher levels of portfolio diversification.

Poverty motivation constitutes another principal reason for households to engage in multiple production activities. Accordingly, there may not be any single activity that



can productively and profitably employ all of the household's resources and generate sufficient income to meet the consumption needs of the household members (Dunn et al., 1996). In other words, the household faces resource or market constraints that prevent it from expanding any single income generating activity up to a level that would be sufficient for supporting the basic needs of the members of the household. That means, a household prevented from expanding its primary income generating activity with the greatest profit potential due to lack of financial resources for, say, purchasing additional fixed assets would have underutilized labor resource. In such a situation, the household may allocate this underutilized labor to another income generating activity or wage labor activity in order to generate additional income. Moreover, a similar situation occurs if the household is prevented from expanding its most lucrative income generating activity due to a market constraint. In this case, the household may allocate its underutilized resources to a second income generating activity offering an alternative product or service (Dunn, 1997). Another example of a market constraint occurs when available wage work is limited in hours or restricted to certain members of the household to satisfy the income goal of the household. In this case, the household members may allocate their underutilized time to an alternative income generating activity, such as commerce (Dunn, 1997; Shishko, 1976). The basis for the resource or market constraint is the household's insufficient access to markets and resources. The result is that the household expands horizontally by using the non-constrained resources and exploiting alternative markets to undertake additional income generating activities (Dunn, 1997).

Resource constraint diversification provides a net economic benefit to the household so long as the alternative activity generates a positive return on the non-constrained resources (thus generating a higher return than would have resulted from keeping the resources idle). In other words, the household will only be motivated to diversify its portfolio if total income from the diversified portfolio ( $Y_D$ ) is greater than income from the specialized (constrained) portfolio ( $Y_S$ ), i.e.,  $Y_D > Y_S$  (Dunn, 1997). Income diversification of a household pursued as an ex post coping strategy with extra individuals and/or extra jobs taken on to stem the decline in income can be associated with such motivation for diversification.

In the literature, according to Ellis (2000), there is an implication that diversification for distress reasons is a bad thing. It results in household members undertaking in casual and low productivity activities with poor prospects. Put another way, it is a last resort rather than an attractive alternative livelihood. It may also lead to households adopting a more vulnerable livelihood system than they possessed previously (Ellis, 2000).

Clearly not all diversification represents the continuous struggle for survival of the poor, and households that are on an upward path away from poverty may have other motives for diversification than those already cited. Accumulation may become the motive of diversification once survival and risk loom less large on the horizon of the household (Ellis, 1998). With respect to this, a household might diversify its economic portfolio as part of an effort to expand its economic base. Such motivation for diversification known as expansion motivation represents a strategy of responding to

new economic opportunities and it involves the allocation of household or outside resources to a new activity (Dunn, 1997).

The other type of diversification, being motivated by the so-called intergenerational launching motivation, is related to the expansion motivation but is specifically used by parents to provide their children with economic opportunities as the children come of age. In countries or regions with high rates of unemployment, the maturing child may have a low probability of finding formal sector wage or salary employment. Recognizing this, the parent initiates a separate income generating activity, say a microenterprise, that grows along with the maturing child. Over time, several such income generating activities may be initiated, one for each child that will be launched into an entrepreneurial activity (Dunn, 1997).

In terms primarily of economic objectives, the typology of portfolio systems in any specific area can be hypothesized to fall within a broad continuum of different household objectives. The poorest households, which fall at one end of the continuum, would be expected to pursue short-term survival objectives (most likely, a great intensification and diversification of labor activities). Encompassed within the survival objective would be the desire not only to meet daily subsistence needs but also to save for contingencies and to avoid risk or forced sale of assets. Status considerations would necessarily be sacrificed to income or survival concerns. The richer households at the opposite end of the objectives continuum with stable resource bases would be expected to pursue longer-term mobility objectives: diversifying their assets and investing their resources. Encompassed within the

mobility objective would probably be significant calculation of the trade-offs between increased income, power, or status and between investments in known or unknown areas of production. Those households in the middle level of income and welfare falling at the midpoint of the continuum will probably pursue stability or security objectives: attempting to maintain or stabilize the household's resources and social networks. Encompassed within the stability objective would probably be the desire not only to stabilize assets and incomes but also to minimize risk while looking ahead to possible avenues of economic and social mobility. The calculation of trade-offs between status, risk aversion, and income or between consumption, savings, and investment would most likely be less straightforward than for those households at either end of the continuum (Chen and Dunn, 1996).

Thus, given the target of this study being those poorest, poorer and poor households, the most relevant theoretical explanations as to why income diversification occurs and as to the pattern of diversification that is observed among such households are those associated with risk and poverty.

As a concept, the informal sector refers to home based or individual establishment/activity operated by the owner with few or no employees (CSA, 2003). The official Ethiopian definition of informality encompasses enterprises that meet all of the following three criteria: no book of accounts; no license; and fewer than ten employees (World Bank, 2007). Accordingly, citing ILO and MTI/WAD (2003), being "licensed" essentially means becoming a formal business; an intermediate step, "registering," means becoming known to the authorities, but still informal. However,

the official definition is quite restrictive and may understate the size of Ethiopia's informal sector in international comparisons forcing one to adopt a looser definition (World Bank, 2007). Accordingly, in addition to employees of enterprises that meet the three criteria above, this would include anyone who is a domestic employee, self-employed, an apprentice, an unpaid family worker, or who is only paid in kind. Since only a handful of the self-employed are in professional occupations (such as law, architecture, etc), the scope for error of inclusion seems limited (World Bank, 2007). Informal sector establishments/activities are operating on a very small scale and with a low level of organization. Most of them have very low level of productivity and income. They tend to have little or no access to organized markets, to credit institutions, to modern technology and to formal training. They are not recognized, supported or regulated by the government. They are beyond social protection, labor legislation and protective measures at the workplace. They are also characterized by labor intensive methods of production, family ownership and ease of entry (CSA, 2003). Moreover, ownership of major factors of production (i.e., money, time, labor and space) by family implies that these resources are fungible (Hansen and Vaa, 2004). Accordingly, the fungibility of time, for example, means that those who are unable to work full time (such as women and children) and those who are formally employed but have some spare time or require extra income can also engage in informal income generating activities.

## **2.2. Review of the Empirical Evidence**

As can also be evidenced by almost all of the few relevant empirical literatures of income diversification in urban settings (e.g.:- Bigsten and Makonnen, 1999 : 1; Ersado, 2003 : 8; Escobal et al., 2005 : 1 and 3) that can be found from an exhaustive search of the same, this issue of income diversification has not been studied extensively in urban contexts unlike in rural areas although, according to Ersado (2003), urban poor households share some of the same risks as their rural counterparts such as varying returns to labor, market failures and the risks of structural adjustment as well as other macroeconomic policy changes.

To somehow fill this gap, the empirical literature review and examination exercise of this study encompassed three distinct groups of empirical literatures on the area to be investigated. These are: - (i) those relevant literatures that somehow incorporate at least most of the major variables or constructs which are going to be present in this proposed study; (ii) those related literatures that relate some of the variables (e.g.:- two) of interest and (iii) those literatures that deal with only one of the variables of interest, perhaps in conjunction with other, less relevant variables. Some of the empirical literatures on rural income diversification that have been consulted when they deem helpful so far can also be seen together with this last group of literatures. This is because such studies were undertaken in rural area context which is quite distinct from that of urban areas. Moreover, the way income diversification was measured in these studies is totally different from what one should instead follow in the case of urban areas. That is, as to Ersado (2003), citing Block and Webb, 2001;

Barrett and Webb, 2001 and Lanjouw et al., 2001, studies on rural income diversification attempt to quantify income diversification based on estimating the share of non-farm income in the total household income. Accordingly, the assumption in these studies is that higher share of non-farm income amounts to higher income diversification and less vulnerability to weather related shocks, the main risk factor in rural areas where agriculture is the mainstay of livelihood. However, the share of non-farm income as a measure of diversification has less relevance in urban areas where most income sources tend to be non-farm anyway Ersado (2003). This would in turn have an implication on the irrelevance of their methodology for an urban area income diversification study. Accordingly, first, a mere short description of those related literatures (those mentioned under group ii above, i.e.) will be presented in what follows. Next, those relevant literatures being subjected to careful and critical examination are presented. However, the remaining less related literatures which were largely used as background for the topic and were referenced as such are not included in this section of the thesis.

Harts-Broekhuis (1997) examined the living conditions of urban households in Mopti—a town in central Mali with over 70,000 inhabitants, as well as the ways by which households in the town coped with general economic adversity. Accordingly, using descriptive analysis, the author found out that three out of five households had more than one source of income and the most popular jobs were those requiring little or no initial capital. The author also found positive relationship between household size and the number of income sources pursued. It is indicated further that the response mechanisms to economic crisis are similar to those noted among rural households. In

the first place, households sought additional new activities or fell back on any reserves they could muster. At the same time, or subsequently, expenses were cut back and, failing alternatives, others were asked for help. In this regard, it is also reported that while diversification of labor did occur it was mainly at the household level.

Beegle et al. (2003), using a panel data set for Kagera region in Tanzania, examined the relationship between transitory income shocks, access to credit and child labor. In so doing, they have also employed fixed effects specification in their empirical analysis in order to control for unobservable characteristics of households. Accordingly, they found that an income shock is associated with significantly higher child labor with a one standard deviation income shock being associated with a 10% increase in mean hours in the last week. They also found that the availability of credit mitigates the effect of shocks. In this regard, the availability of a typical level of collateral, which they employed in their study as a measure of access to credit, offsets half the effect of a shock.

Aredo (2005), using four rounds of panel data collected from sample households residing in seven major urban centers (cities and towns) of Ethiopia including the capital Addis Ababa, investigated the response of both domestic and international remittances to the level and variability of household incomes. Employing the linear probability model with fixed effects and the probit model with random effects in his empirical/regression analysis, he indicated in his results that the probability of getting access to both domestic and international remittances was quite high with female

headed households which were used in the study as a proxy for households with low average income. On the other hand, he found that a downward deviation of household income from its mean value would lead to a rise in the likelihood of getting access to domestic remittances. However, the coefficient of per capita income volatility has been found to be statistically significant for the capital city, Addis Ababa only. Moreover, the level of education of the household head has been found to be significantly and positively related with the flow of international remittances. But, an inverse relationship was observed between educational level of the household head and the probability of getting remittances from domestic sources. From these major findings of his study, the author finally concluded that vulnerable households attempt to smooth their consumption by partially relying on both sources of remittances, while households with stable and high incomes rely heavily on international remittance transfers for investment or other purposes (other than for consumption smoothing purposes).

Basically, review of such related literatures helped in getting exposed to important and alternative ways of proxying some of the variables which are intended to be encompassed in this proposed study.

Escobal et al.(2005) in their paper "Does having a newborn child affect income diversification opportunities? Evidence from the Peruvian Young Lives study" described the pattern of income diversification in a group of households with a newborn child in both urban and rural areas as well as assessed whether the presence of a one-year-old child has an impact on a household's diversification. In

doing so, they have used a cross-sectional data collected from sentinel sites in urban and rural districts of Peru in 2002 on a sample of 6 to 18-months-old and 7.5 to 8.5-year-old children, their families and their communities and employed various descriptive as well as empirical analysis methods. Their major finding was that in urban areas, households having a one-year-old child have lower capabilities to diversify incomes than households who do not have to care for a young child. Their result further indicated, in this connection, that unlike in rural areas, having a one-year-old child reduces by 24.2% the probability of a biological mother engaging in income-earning activities in urban areas. This finding, according to them, is consistent with it being more likely that a mother takes her baby along with her when performing labor chores in rural settings (e.g., agricultural chores) than in urban settings, especially when she is engaged in waged labor.

Owusu (2001) tried to highlight and examine the livelihood strategies of salaried employees and factors influencing participation in such strategies using a mere descriptive analysis of data from a nationwide survey being undertaken between 1991 and 1992 as well as from field work conducted by the author between 1995 and 1996 in two district capitals called Wenchi and Techiman in the Brong Ahafo Region of Ghana. One major finding of the study was that 63.5% of salaried employees in the case study undertaken between 1995 and 1996 are involved in multiple modes of livelihood. However, on the basis of the nationwide survey undertaken between 1991 and 1992, 17.8% of salaried employees are involved in the same. Such different participation rates were partly attributed to the difference in objectives of the two surveys as a result of which the rate from the nationwide survey data may have been

inadvertently underestimated. In addition, according to the author, time may also be an explaining factor. With regard to major findings about the different factors influencing participation of salaried employees in multiple income generating activities, it was found that there is a positive correlation between employee's household size and multiple modes of livelihood participation as well as between number of years in salaried employment and the same. It was also found that generally government employees are more likely to be involved in multiple modes of livelihood than private and 'other' employees are where low salaries and general laxity of government institutions in supervision were forwarded as possible explanations. The result of the study further indicated that high-income salaried employees are more likely to be involved in multiple modes of livelihood than those who earn lower income which, according to the study, could suggest among others the importance of capital in participating in multiple modes of livelihood and that involvement in the same might not be entirely for survival purposes.

Ersado (2003) in his paper "Income diversification in Zimbabwe: welfare implications from urban and rural areas" tried to look at the degree of diversification and analyzed the determinants of income and activity diversification before and after the shocks of economic policy reform and droughts that hit Zimbabwe in the early 1990s. For such purposes, he used two comparable household level data from the national income, consumption and expenditure survey of the country in 1990/91 and 1995/96 as well as a time series rainfall data from 1951 to 1996. Following a before-after approach, he employed both descriptive as well as empirical analysis (a two-stage least squares instrumental variables regression, i.e.) methods. His major findings indicated that

unlike rural areas that have a more diversified income base with less than 17% depending on a single income source at either time period, about 38% of urban households depend on a single income source. According to his other findings, while the number of income sources is positively associated with household asset ownership in rural areas, it is either negatively associated or insignificant in urban areas suggesting that it is easier for the asset rich to diversify in rural areas and the poorer pursue multiple income sources in urban areas. In connection with this, it was found that unlike in rural areas, female-headed households tend to have more income sources in urban areas. In addition, access to credit appears to improve conditions for diversification in rural areas, but not so in urban areas. On the other hand, higher rainfall variability leads to pursuit of multiple income sources as would be expected since diversification may be pursued in response to risk such as income variance.

One limitation of this study is associated with its inability to use panel structure so as to control for such unobservable individual specific but largely time invariant effects or variables as risk preference that may bias its cross-sectional results. The other limitation is related to its mere use of rainfall variability as a proxy for urban income variability which is known to fail to capture the other part of urban income variability brought about by a multitude of covariate and idiosyncratic shocks as well as stresses other than the indirect rainfall shocks.

Bigsten and Makonnen (1999) in their paper "The anatomy of income distribution in urban Ethiopia", using the first (or the 1994) round cross-section data collected from

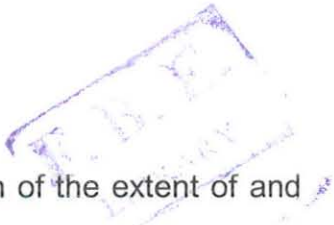
sample households that reside in seven major urban centers of Ethiopia, tried to get a picture of the extent of income diversification among individual households. Bigsten et al. (2005) in their study "Dynamics of income distribution in urban Ethiopia 1994 – 1997", using the first three rounds (the 1994, 1995 and 1997 rounds, i.e.) of panel data collected from sample households of the same seven major urban centers of Ethiopia, tried to see the change in the extent to which households rely on multiple sources of income. In both these studies, descriptive analysis was employed to meet such objectives. As to the major finding of the former study, multiple incomes are less common in urban Ethiopia than in some other African urban areas. Accordingly, 81.2% of sampled households depend only on one source of income though the rest 18.8% depend on a combination of mainly two different sources of income (See Table 1.A for more detail in appendix 1). However, according to the finding of the later study that followed similar approach as to the former of basing its description of the extent of income diversification on the broad income categories used by the designers of the questionnaire for the data and that used the same data of Addis Ababa University for the year 1994 as to the former in addition to using the additional data of Addis Ababa University for the years 1995 and 1997, reliance on only one source of income seemed to be decreasing over time from 59% in 1994 to 55% in 1997 in terms of percent of households. In this regard, only the share of households relying solely on remittances increased from 1994 to 1997. It is further indicated that in 1994, a quarter of the households had remittances as well as income from wages, female household business, or business, and this had increased to 30% by 1997 where wage earners, who increase their share over time, dominated the category. In addition, about 10% combined two income generating activities, excluding

remittances, with the most common combination being wages and business income. (See Table 1.B for more detail in appendix 1).

From comparison of the results for the year 1994 between these studies, one can clearly see that there is inconsistency in the results. That is, in 1994, 81.2% of sampled households depend on only one source of income as to the former study whereas 59% depend on only one source of income as to the later study. The two studies are believed to generate two different findings concerning the same research issue with respect to the extent of single and multiple income sources of urban households in Ethiopia for the same time of the year 1994 using the same data due to difference in approach followed. That means, the former study is believed to regard income from remittance and pension as income from wage/salary. In addition, the former study is believed not to consider remittance as one separate income source when it happened to be found in combination with other income sources (i.e., wage, business and female household business).

On the other hand, both studies are believed to underestimate the extent of income diversification of urban households in Ethiopia by taking engagement of different members of a household in different activities within the broad categories of wage/salary employment, of formal business, or of female household business as engagement in a single income source. For example, a household that previously employed some, say two, of its members in its single female household business income generating activity, say making and selling 'injera', might face resource constraint that prevent it from expanding this single income generating female

household business activity up to a level that would be sufficient for supporting the basic needs of its members. In this case, the other household members may allocate their underutilized time to an alternative income generating activity, such as another female household business activity, say making and selling 'tella' or handicraft. Both studies treat such a household to have only one income source previously as well as currently. However, as to the operational definition of diversification given by Dunn (1997), expansion of an existing income generating activity (not considered to be diversification) should be distinguished appropriately from the creation of a new income generating activity (considered to be diversification or deriving income from a combination of different activities). Accordingly, though there may be situations in which the distinction is not obvious, expansion of an existing activity could in general be defined as adding different types of products or services, but within the same general line of products and services already offered. Diversification, on the other hand, can be said to occur when the household initiates a different type of activity or the same activity in a different site. Thus, the above-mentioned household should be treated to have two income sources under the current resource-constrained situation. Moreover, such approach followed by these studies in the quantification of the extent of income diversification is also believed to be incorrect even with mere consideration of the risk reduction role of income diversification as, for example, different types of wage income sources held by different household members can reduce or mitigate risk as good as equal number of income sources combination each in these different broad categories of income sources as far as they have low or zero covariance.



On the other hand, both studies are limited to mere description of the extent of and the change in the extent of income diversification of urban households aggregatively. Thus, in this regard, there is an information gap as to what motivates and influence urban households of different income groups in Ethiopia to have more diversified income source so as to be able to derive valuable policy implications regarding income diversification in urban Ethiopia. Furthermore, according to Ersado (2003), as a household with more economically active adults, all things being equal, will be more likely to have more income sources reflecting household labor supply decisions as much as a desire for diversification, there is a need to address this concern through empirical analysis by using appropriate techniques (to control for this effect).

In a nutshell, the issue of income diversification has not yet been studied extensively in urban contexts unlike in rural areas although especially poor urban households share the same risks as their rural counterparts. In this regard, the few empirical studies carried out in some developing countries of Latin America and Africa excluding Ethiopia indicated that income diversification is a widespread phenomenon with at least 60% of urban households depending on more than one source of income. Moreover, the studies tried to identify and analyze the factors being positively or negatively related to the issue. Accordingly, households facing economic adversity, large-sized households and female-headed households were found to have more number of income sources. On the other hand, household access to credit and asset ownership as well as presence of a child aged below one year in a household were found to be negatively related with household income diversification. The few empirical studies undertaken in Ethiopia, however, indicated that multiple

income sources are not as widespread in urban Ethiopia as in some other African urban areas though reliance on only one source of income seemed to be decreasing over time from 59% in 1994 to 55% in 1997 in terms of percent of households. In this regard, these studies are believed to underestimate the extent of reliance of Ethiopian urban households on multiple sources of income by following an inappropriate approach of measuring income diversification. The studies are also limited to mere description of the extent of and the change in the extent of income diversification at household level and this information was available for the time up to 1997 only. In addition, there are also no empirical evidences as to the major motivations and factors that prompt urban households in general and poor urban households in particular to have diversified or multiple sources of income in Ethiopia. Thus, in view of such limitations and gap in knowledge on income diversification in urban Ethiopia context, this study is expected to add value in terms of (1) appropriately describing the extent and pattern of income diversification in urban Ethiopia over time until as recently as possible and (2) identifying and examining factors that either positively or negatively affect income diversification in urban Ethiopia.

## CHAPTER THREE METHODOLOGY

### 3.1. Conceptual/Theoretical Model

Following/adopting the Krishnan (1990) model of moonlighting in a household context/perspective, a household consisting of two members – husband and wife – was considered for simplicity. The husband and wife are assumed to jointly maximize their household utility function:

$$U = U (I_m, I_f, c)$$

where  $I_m$  is husband's leisure time,  $I_f$  is wife's leisure time and  $c$  is consumption.

Suppose the husband holds a primary job on which the hours of work are fixed at a given rate. Moreover, suppose he does not work sufficient hours on the primary job to guarantee him a level of income that optimizes his utility.

The household aims at maximizing its utility subject to the constraints it confronts – the budget and the time constraints. Adopting a one period model, the budget constraint states that expenditure on the composite consumption good  $c$  cannot exceed the household income:

$$c \leq w_1 h_1 + w_2 h_2 + w_f f + y$$

where the price of  $c$  is taken as the numeraire and  $h_i$ ,  $i = 1, 2$  represent hours of work on the first and second jobs of the husband,  $w_i$ ,  $i = 1, 2$  represent wage rates on the first and second jobs of the husband,  $f$  represent hours of work of the wife,  $w_f$  represent wage rate on the work of the wife and  $y$  is non-labor income (e.g.: property income or welfare benefits).

The household faces two separate time constraints stating that the amount of time spent by person  $i$  on work in the market and leisure (including work at home for consumption, for simplicity) cannot exceed the total amount of time available  $T$ :

$$T = h_1 + h_2 + l_m$$

$$T = f + l_f$$

Maximizing  $U(l_m, l_f, c)$  subject to these three constraints and non-negativity constraints  $h_2, f \geq 0$  yields the following first order conditions:

From  $T = h_1 + h_2 + l_m$ , I can have  $h_2 = T - h_1 - l_m$  and from  $T = f + l_f$ , I can similarly have  $f = T - l_f$ .

Thus, it is possible to collapse the budget constraint and the two separate time constraints into one constraint as:

$$c \leq w_1 h_1 + w_2 (T - h_1 - l_m) + w_f (T - l_f) + y$$

$$\Rightarrow c \leq w_1 h_1 + w_2 T - w_2 h_1 - w_2 l_m + w_f T - w_f l_f + y$$

This can be rearranged as:

$$c + w_2 l_m + w_f l_f \leq w_1 h_1 + w_2 (T - h_1) + w_f T + y$$

In addition, the non-negativity constraint  $h_2 \geq 0$  implies that:

$$T - h_1 - l_m \geq 0 \text{ or } l_m \leq T - h_1$$

and the non-negativity constraint  $f \geq 0$  similarly implies that:

$$T - l_f \geq 0 \text{ or } l_f \leq T$$

Therefore, the maximization problem with two equality constraints, one inequality constraint and two non-negativity constraints can be collapsed and rearranged into the following maximization problem with three inequality constraints:

$$\text{Maximize } U = U(l_m, l_f, c)$$

$$\text{subject to: } c + w_2 l_m + w_f l_f \leq w_1 h_1 + w_2(T - h_1) + w_f T + y$$

$$l_m \leq T - h_1$$

$$l_f \leq T$$

The Lagrangean function would then become:

$$\text{Maximize } L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) = U(l_m, l_f, c) + \lambda_1[w_1 h_1 + w_2(T - h_1) + w_f T + y - c - w_2 l_m - w_f l_f] + \lambda_2(T - h_1 - l_m) + \lambda_3(T - l_f)$$

where  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$  are Lagrangean multipliers.

The Kuhn – Tucker conditions would then be:

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial l_m = U_{lm} - \lambda_1 w_2 - \lambda_2 = 0 \dots\dots\dots (1)$$

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial l_f = U_{lf} - \lambda_1 w_f - \lambda_3 = 0 \dots\dots\dots (2)$$

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial c = U_c - \lambda_1 = 0 \dots\dots\dots (3)$$

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_1 = w_1 h_1 + w_2 T - w_2 h_1 + w_f T + y - c - w_2 l_m - w_f l_f \geq 0 \dots\dots\dots (4)$$

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_2 = T - h_1 - l_m \geq 0 \dots\dots\dots (5)$$

$$\partial L(l_m, l_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_3 = T - l_f \geq 0 \dots\dots\dots (6)$$

$$\lambda_i \geq 0, i = 1, 2, 3 \dots\dots\dots (7)$$

$$\lambda_1 \partial L(I_m, I_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_1 = \lambda_1 (w_1 h_1 + w_2 T - w_2 h_1 + w_f T + y - c - w_2 I_m - w_f I_f) = 0 \dots\dots\dots(8)$$

$$\lambda_2 \partial L(I_m, I_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_2 = \lambda_2 (T - h_1 - I_m) = 0 \dots\dots\dots(9)$$

$$\lambda_3 \partial L(I_m, I_f, c, \lambda_1, \lambda_2, \lambda_3) / \partial \lambda_3 = \lambda_3 (T - I_f) = 0 \dots\dots\dots(10)$$

where  $U_{I_m} = \partial U(I_m, I_f, c) / \partial I_m$ ,  $U_{I_f} = \partial U(I_m, I_f, c) / \partial I_f$  and

$$U_c = \partial U(I_m, I_f, c) / \partial c.$$

From (1) and (3), one can have:

$$U_{I_m} - \lambda_2 = \lambda_1 w_2 \text{ and } U_c = \lambda_1 \Rightarrow U_{I_m} / U_c - \lambda_2 / \lambda_1 = w_2.$$

The husband moonlights (take on a second job) and hence  $T - h_1 - I_m > 0$  or  $I_m < T - h_1$  [ implying  $\lambda_2 = 0$  from (9) ] if  $U_{I_m} / U_c = w_2^* = w_2$  where  $w_2^* = U_{I_m} / U_c$  is the reservation wage of the husband on the second job (the husband's marginal rate of substitution of income for leisure at zero hours of work on the second job, i.e.).

However, he would not take on a second job and hence  $T - h_1 - I_m = 0$  or

$$I_m = T - h_1 \text{ [ implying } \lambda_2 > 0 \text{ from (9) ] if } U_{I_m} / U_c = w_2^* > w_2.$$

From (2) and (3), one can similarly have:

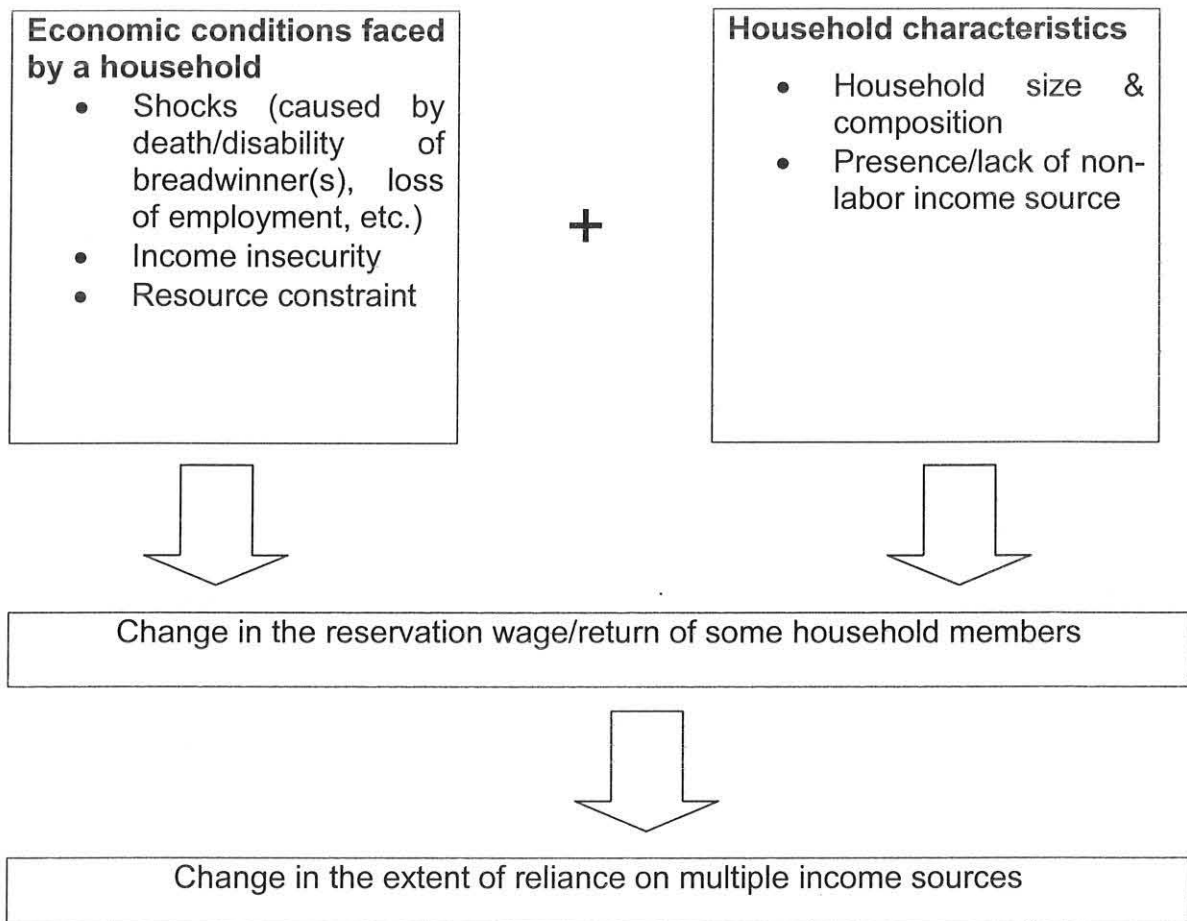
$$U_{I_f} - \lambda_3 = \lambda_1 w_f \text{ and } U_c = \lambda_1 \Rightarrow U_{I_f} / U_c - \lambda_3 / \lambda_1 = w_f.$$

The wife would work or take on a market work and hence  $T - I_f > 0$  or  $I_f < T$  [ implying  $\lambda_3 = 0$  from (10) ] if  $U_{ff} / U_c = w_f^* = w_f$  where  $w_f^* = U_{ff} / U_c$  is the reservation wage of the wife (the wife's marginal rate of substitution of income for leisure at zero hours of work in the market, i.e.).

However, she would not take on a market work and hence  $T - I_f = 0$  or  $I_f = T$  [ implying  $\lambda_3 > 0$  from (10) ] if  $U_{ff} / U_c = w_f^* > w_f$ .

Thus, the husband will take on a second job if the offered wage rate is at least equal to his marginal rate of substitution between consumption and leisure at zero hours of work on the second job, the second job reservation wage. Similarly, the wife will take on a market work if the offered wage rate is at least equal to her marginal rate of substitution between consumption and leisure at zero hours of work in the market, the market-work reservation wage (Shishko et al., 1976). The reservation wage/return is assumed to be a function of demographic characteristics, non-labor income sources, the primary job wage rate, the primary job hours, variables reflecting the economic conditions which the household faces, and an unobservable component (Shishko et al., 1976 ; Foley, 1997). Changes in the incidence of multiple income sourcing are likely to result from altered reservation wage/return (Foley, 1997).

This conceptual framework of the study can somehow be summarized through the use of the following flow chart:



### **3.2. Econometric Model and Estimation Methods**

Owusu (2001) tried to figure out the relationship between different characteristics of urban households (such as household size), different employment characteristics (such as type of employer, number of years in salaried employment and level of salary), etc. and multiple modes of livelihood participation through the mere use of co-relational analysis between extent of multiple modes of livelihood participation and one of such variables at a time.

Escobal et al. (2005) tried to quantify the impact of a one-year-old child on household diversification capabilities by controlling for other covariates such as potential household labor force, asset holding and town size as a proxy for market size. In so

doing, it uses the number of income sources as a measure of diversification and correspondingly employed a Poisson regression as the number of income sources is a count variable and hence it needs to be estimated through a Poisson regression. In addition, it also uses the Herfindahl index (H index) measure of diversification that takes into account not only number of income sources but also their relative importance in terms of income and correspondingly employed both standard regression and a tobit-censored regression to account for the fact that a number of households show zero diversification.

On the other hand, Ersado (2003) in its attempt to examine the determinants of income diversification taking into account several household characteristics variables (such as age, sex and educational level of the household head, size of household as well as number of household members in different age, sex and education category) and at the same time investigate the impact of income diversification on household welfare, employed a model that contemporaneously determines income diversification and per capita consumption as a function of explanatory variables. As such, a two-stage least squares instrumental variables regression is used as the system of equations in the model employed is endogenous.

The methodology envisaged to be adopted in this study is similar to these previous studies with respect to trying to control for several household characteristics variables. Moreover, it is expected to be similar to one of the above-mentioned previous studies with respect to using appropriate regression model of count data such as the Poisson regression model or the negative binomial model in line with the use of number of income sources of a household as a preferred measure of the extent of income diversification of the same which may take on such non-negative

count values as 0, 1, 2, etc. However, it differs with all the above-mentioned previous studies with regard to its attempt to use panel structure so as to control for such unobservable individual specific but largely time invariant effects as risk preference that may bias cross-sectional results.

The dependent variable of interest, namely number of labor income sources of a household, which this study wish to attempt to explain or analyze in terms of a set of covariates is a non-negative integer or count. As to be described later, such a response variable is concentrated on a few small discrete values, say 0, 1 and 2; skewed to the left; and intrinsically hetroskedastic with variance increasing with the mean. In such situations where the dependent variable is a count, the econometric all purpose regression tool, the linear regression model, has a number of serious shortcomings. If the linear regression model was used, one would be wrongly approximating the counts with a normal distribution as well as wrongly ignoring the non-constant variances. Furthermore, the specification of linear least square regression tat  $E[Y/X] = X'\beta$  is inadequate for count data as it permits negative values of  $E[Y/X]$ . However, the exponential form employed by such appropriate count data models as the Poisson regression model ensures that  $\lambda$  (the mean number of occurrences of events) remains positive for all possible combinations of parameters and explanatory variables.

Dichotomization of the count data into non-zero count groups just like such models for binary response dependant variable as probit and logit is not ideal because dichotomization ignores the meaningful variation among counts of 1, 2, 3, and so

forth. That is, when counts are dichotomized, all positive counts are treated as if they are equivalent, and that might not be the case in reality. Differences in the frequency of counts will be modeled if one instead uses a count data framework, however. On the other hand, transformation of the dependent variable might also be considered as a solution to the short comings of OLS. In particular, the logarithmic transformation for Y Poisson regresses  $\ln Y$  on  $\mathbf{X}$  which can give something reasonably close to the normal distribution. This transformation is problematic if the data contain zeros, as is often the case like this study. Though the standard solution of adding a constant, such as 0.5, and modeling  $\ln(Y + 0.5)$  by OLS is possible, this method often produces unsatisfactory results and complicates the interpretation of coefficients (Cameron and Trivedi, 1999; Winkelmann, 2008). Moreover, for prediction one want to predict  $E[Y]$ , but  $\exp(E[\ln y]) \neq E[Y]$  even though  $\exp(\ln Y) = Y$ . Hence, a count data framework is appropriate for the analysis of count dependent variable having the above mentioned characteristics.

For count models for panel data, the starting point is the Poisson regression model with exponential mean function and multiplicative individual specific term:

$$Y_{it} \sim P[\mu_{it} = \alpha_i \lambda_{it}]$$

$$\lambda_{it} = \exp(\mathbf{X}_{it}'\beta), \quad i = 1, \dots, n, \quad t = 1, \dots, T.$$

As in the linear case, both fixed effects and random effects model are possible. Moreover, the strengths and weaknesses of fixed effects versus random effects models in the linear case carry over to non linear models. For the random effects model, coefficient estimates may be inconsistent if the random effects are correlated with regressors (Cameron and Trivedi, 1998).

As such unobserved heterogeneity factors as risk preference or attitude of a household constituting  $\alpha_i$  among others which can be assumed to remain constant over a seven-year period of consideration from 1997 to 2004 are thought to be correlated with at least one explanatory variable (e.g.:- income variability) of the econometric model to be estimated, the fixed effects model was preferred because of this potential problem.

One approach to estimation of fixed effects count data models is direct estimation by maximum likelihood. This could be done by simply including  $n$  individual specific dummy variables, that is, one intercept for each individual (Cameron and Trivedi, 1998; Winkelmann, 2003). Like the linear model, estimation is also possible by eliminating the individual fixed effects  $\alpha_i$  through either one of the following approaches. One of these approaches called the conditional maximum likelihood approach which requires the fully parametric assumption that  $Y_{it} \text{ iid } P[\alpha_i \lambda_{it}]$  eliminates the fixed effects by conditioning the distribution of counts on the individual-specific totals  $T\bar{Y}_i = \sum_{t=1}^T Y_{it}$  which are the sufficient statistics for  $\alpha_1, \dots, \alpha_n$  in such linear exponential family (LEF) densities as the Poisson. An alternative to the conditional likelihood approach is a moment based approach that requires only first-moment assumptions and that bases estimation on a differencing transformation called quasi-differencing, which differs from that in the linear model, as here the effects are multiplicative, not additive (Cameron and Trivedi, 1998, 1999).

The Poisson MLE has robustness to distributional misspecification similar to OLS in the linear regression model under normality: if  $E(Y_{it} | \mathbf{X}_{it}, \alpha_i) = \alpha_i \exp(\mathbf{X}_{it}'\beta)$ , so the conditional mean is correctly specified, the Poisson MLE estimate is consistent even if  $Y_{it}$  is not Poisson distributed. Valid statistical inference using computed maximum likelihood standard errors and t statistics requires, however, correct specification of both the conditional mean and variance. This requires equidispersion, that is, equality of conditional mean and variance, but not Poisson distribution for  $Y$ . Thus, the Poisson model restricts the conditional variance to equal the conditional mean. Unless count data are equidispersed, the usual Poisson MLE standard errors are wrong. Such failure of the Poisson assumption of equidispersion has similar qualitative consequences to failure of the assumption of homoskedasticity in the linear regression model. But the magnitude of the effect on reported standard errors and t-statistics can be much larger (Cameron and Trivedi, 1998).

Count data are often very overdispersed (the variance exceeds the mean, i.e.) which causes computed Poisson maximum likelihood t-statistics to be considerably over inflated. This can lead to very erroneous and overly optimistic conclusions of statistical significance of regressors. The opposite holds true for the case of underdispersion, in which the conditional variance is less than the conditional mean. In both cases, the resulting inference is invalid (Cameron and Trivedi, 1998; Winkelmann and Zimmermann, 1995).

An indication of the magnitude of overdispersion or underdispersion can be obtained simply by comparing the sample mean and variance of the dependent count variable.

Subsequent Poisson regression decreases the conditional variance of the dependent variable some what. If the sample variance is less than the sample mean, the data necessarily are even more underdispersed once regressors are included. If, on the other hand, the sample variance is more than twice the sample mean, the data are likely to remain overdispersed after inclusion of regressors. This is particularly so for cross-section data, for which regressors usually explain less than half the variation in the data. A statistical test of overdispersion is therefore highly desirable after running a Poisson regression.

In Poisson,  $Y$  has mean  $\mu_{it} = \alpha_i \exp(\mathbf{X}_{it}'\beta)$  and variance  $\mu_{it}$ . One should relax the variance assumption as data almost always reject such restriction that variance equals mean. It is natural to continue to model the variance as a function of the mean  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = v(\mu_{it}, w)$  which is specialized into  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = \mu_{it} + w\mu_{it}^a$ . Analysis is usually restricted to two special cases, in addition to the Poisson case of  $w = 0$  in  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = \mu_{it} + w\mu_{it}^a$ . The NB1 variance function sets  $a = 1$  and the variance would be  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = \mu_{it} + w\mu_{it} = (1 + w)\mu_{it}$ . The NB2 variance function, on the other hand, sets  $a = 2$  and the variance would be  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = \mu_{it} + w\mu_{it}^2$ . It is assumed that under both null and alternative hypothesis, the mean is correctly specified as, for example,  $\alpha_i \exp(\mathbf{X}_{it}'\beta)$ , while under the null hypothesis  $w = 0$  so that  $V[Y_{it}/\mathbf{X}_{it}, \alpha_i] = \mu_{it}$ . A simple test statistic for  $H_0: w = 0$  versus  $H_1: w \neq 0$  or  $H_1: w > 0$

can be computed by estimating the Poisson model, constructing fitted values  $\hat{\mu}_{it} = \alpha_i \exp(\mathbf{X}_{it}'\beta)$  and running the auxiliary OLS regression (without constant):

$$[(Y_{it} - \hat{\mu}_{it})^2 - Y_{it}] / \hat{\mu}_{it} = w g(\hat{\mu}_{it}) / \hat{\mu}_{it} + u_{it},$$

where  $u_{it}$  is an error term. The reported t-statistic for  $w$  is asymptotically normal under the null hypothesis of no overdispersion and this test can also be used for underdispersion (Cameron and Trivedi, 1998, 1999).

There are a number of methods for correcting the failure of a data to meet the equidispersion assumption of the Poisson regression model. Most of them involve modifying the assumption of the conditional variance being equal to the conditional mean. For example, the negative binomial model assumes a Poisson mean but a gamma-distributed variance term (Cameron and Trivedi, 1998). That is, there is an unobserved variable that affects the distribution of the count. The model is then of a Poisson mean but with a 'longer tail' variance function. As another example, the zero-inflated Poisson model assumes a Poisson function combined with a degenerate function with a probability of 1 for zero counts. Such mixed function models are a current topic of research. In general, though, they are complicated and require estimating several parameters. Moreover, the negative binomial model can only accommodate overdispersion. There is, however, a simple correction for overdispersion or underdispersion that usually works (Cameron and Trivedi, 1998). The model proceeds in two steps. In the first, the Poisson model is fitted to the data and the degree of over-(or under-) dispersion is estimated. In the second step, the Poisson standard error is multiplied by the square root of the dispersion parameter to

produce an adjusted standard error. The new standard error is then used in the t–test to produce an adjusted t–value. Such standard errors which could be computed using the so-called sandwich estimator of the covariance matrix are known as robust standard errors and they deal with any kind of dispersion.

### **3.3. Data and Variables**

The empirical analysis of this study uses data from the urban socio-economic survey conducted by the Department of Economics of Addis Ababa University in collaboration with Economics Department of Goteborg University. The survey covers around 1,500 households in each round from 1994 to 2004, with the intention to resurveying the same households in subsequent rounds. The sample frame used in the surveys with a view to this intention misses, however, an important social group from the point of view of studying urban poverty in general and chronic urban poverty in particular as emphasized in various studies of urban poverty carried out in the past in urban Ethiopia through using this survey's data (e.g.: Kedir and Mckay, 2003; Bigsten and Makonnen, 1999). Accordingly, the shanty towns' dwellers of especially Addis Ababa as well as households without a fixed address were excluded from the survey which is believed to underestimate the proportion of poor households somewhat in the sample. In spite of this, the data set of the survey is a unique panel data set containing a very rich array of information including household demographics, income by source, consumption expenditure, credit, dwelling conditions and durable goods, health as well as subjective evaluation of welfare being collected from sample of households intended to be representative of the main socio-economic

characteristics of the country's major cities and towns during a month considered to represent average conditions. These features make the data set especially suited for such studies like this which are expected to be accomplished under serious constraints of logistics, time as well as technical capacity. Moreover, the panel nature of the data allow to control for individual heterogeneity and to increase the size of data points substantially. It was also made possible to investigate the impact of important explanatory variables (e.g.: variability of total household income and shock) upon the dependent or response variable of interest which cannot be achieved by using a single cross-sectional data.

This study basically includes the last three waves (1997, 2000 and 2004, i.e.) of the data and it concentrates on poor (both chronic and transitory) households only. As such, the criteria for households to be included in the study's sample are:

- (i) households must be present in at least two rounds and
- (ii) households must be food poor in at least one round as to the available per adult equivalent unit food consumption expenditure data.

In order to implement the second criteria, food poverty lines for 1997, 2000 and 2004 are needed. Given the information that the food poverty line is Birr 647.81 per adult equivalent unit per year at 1995/96 national average prices obtained from the 2004/05 Poverty Analysis Report of the Ministry of Finance and Economic Development as well as the information that the 2000 national average consumer price index (CPI) of food was 111.6 using 1995/96 as a base year where as that for 2004 was 130.5 using 2000 as a base year as obtained from the country level, rural and urban consumer price indices reports of the Central Statistical Agency (CSA)

(see Appendix 2), the appropriate CPI measures for 1997 and 2004 using 1995/96 only as a base year were first computed. The food poverty lines can then easily be set at Birr 614.99, at Birr 722.96 and at Birr 971.97 per adult equivalent unit per year for 1997, 2000 and 2004 respectively. To compute per adult equivalent unit annual food consumption expenditure of households, the adult equivalent unit scale adopted by Bigsten et al. (2005) was used (see Appendix 3).

Accordingly, 648 households among those households being surveyed in 1997, 687 households among those households being surveyed in 2000 and 649 households among those households being surveyed in 2004 met the aforementioned criteria. However, as 23 households among the 648 households of the 1997 round have missing value in the dependent variable of the study and as it is not possible to impute the missing values of a dependent variable, the number of households to be studied must be further reduced. In this regard, 17 households among the 23 are present in all the three rounds where as 5 households are present in 1997 and 2000 and 1 household is present in 1997 and 2004. Hence, the number of households contained in the sample of this study would finally be 625 households for the 1997 round, 682 households for the 2000 round and 648 households for the 2004 round. In general, the total sample size (or n) would constitute 737 different households of which 481 households (65.26%) are observed in all the three rounds considered where as the rest 256 households (34.74%) are observed only in either two of the three rounds considered (See Appendix 4). Hence, the total number of observations or data points ( $n \times t$ , i.e.) would be 1955 ( $481 \times 3 + 256 \times 2$ , i.e.). On the other hand,

the transitory poor constitute the bulk, around 73%, i.e., of the sample (See Appendix 5).

The econometric model of this study that is believed to be estimated in order to give some insight as to which factors and household characteristics have some impact on the response variable of interest can be specified as shown below so that one can see the set of explanatory variables together with their expected functional form:

$$\begin{aligned} \text{INCDIV}_{it} = & \beta_1 \text{INCVAR}_{it} + \beta_2 \text{DSHOHH}_{it} + \beta_3 \text{DCREDRAT}_{it} + \\ & \beta_4 \text{DCREDRAT}_{it} \cdot \text{DSHOHH}_{it} + \beta_5 \text{DNLABINC}_{it} + \beta_6 \text{HS}_{it} + \beta_7 \text{DBABY}_{it} + \beta_8 \text{DSEXHH}_{it} + \\ & \beta_9 \text{AGEHH}_{it} + \beta_{10} \text{AGEHH}_{it}^2 + \beta_{11} \text{DEDHH1}_{it} + \beta_{12} \text{DEDHH2}_{it} + \beta_{13} \text{NBOYS}_{it} + \\ & \beta_{14} \text{NGIRLS}_{it} + \beta_{15} \text{NMADPRI}_{it} + \beta_{16} \text{NMADSEC}_{it} + \beta_{17} \text{NFADPRI}_{it} + \beta_{18} \text{NFADSEC}_{it}. \end{aligned}$$

The dependent or response variable of the study is the extent of household labor income diversification. It will be measured by the number of different labor income sources upon which a household  $i$  derives its labor income at time  $t$ .

**INCVAR<sub>it</sub>** stands for household income variability. It will be arrived at by first dividing gross household income from various labor and non labor income sources by the number of household members, and then by taking the deviation of per capita income from its mean value computed for the three rounds of the survey data to be employed for the study. A household with relatively higher income variability is expected to be

more concerned about its future economic security than one with more or less stable income. As income diversification might serve as a 'hedge' against partial or full income loss and may be, as such, pursued to reduce the household's ex ante exposure to risk such as income variance, it may theoretically be appropriate to expect a household with higher income variability to have more diversified income sources. However, under the practical situations of poor urban households who lack good employment or income generating opportunities that effectively serve such purpose in a favorable working conditions, the effect of household income variability on household income diversification is expected to be insignificant.

**DSHOHH<sub>it</sub>** is a dummy variable indicating whether a significant expenditure shock was occurred to a household. A household *i* was defined as having experienced shock in time *t* if its per adult equivalent unit food consumption expenditure in time *t* has shown a substantial drop of 50% or more from its level in *t-1*.

The related variable **DCREDRAT<sub>it</sub>** indicates whether a household is "credit rationed". "Credit rationed" households are defined as those who did not apply for credit for one of the following reasons: (a) lack of collateral, (b) interest and other costs to high, (c) take long time to process, (d) no chance of success or did not think I would get one, (e) borrowing process is too difficult. Those households that applied for, but were denied, credit are also classified as being credit rationed. In order to ensure the exogeneity of such credit constraint measure, a credit accessed through credit association and "equb" membership was excluded from the measurement of this variable. That is, credit program participation might be caused by a set of factors that

also affect income diversification. In this regard, credit association and “equb” membership are expected to be related to occurrence of economic shock to a household. This is because a household that experience an economic shock is expected to have higher demand for credit. However, such supply-side factors as interest rate, collateral and processing time requirement of lenders are better measures of an exogenous credit constraint. Poor urban households when confronted with transitory income shock in the absence of or with little access to credit which has the potential to bring about a significant income shortfall making it unable to meet the basic consumption needs of such households are expected to try to cope with the shock through mobilizing additional household members for income generation and/or through taking on extra jobs or activities as one major means of overcoming such time of economic hardship. As the employment and income generation options largely available to poor urban households in the absence of or with little access to credit are those no/little capital requiring, entry-barrier-less and low-return informal sector activities, the household has to pursue a number of income generating activities in the face of such shock in order to be able to stem the income shortfall and hence meet basic consumption needs. Thus, the effect of occurrence of a shock on income diversification especially with no/little credit access is expected to be significant and positive. On the other hand, credit access is expected to significantly and negatively affect the need to have multiple sources of income especially in the face of a shock because credit access to poor urban households may mitigate their resource constraint so that they would be able to expand an income generating activity with the greatest profit potential up to a level that would be sufficient for supporting the basic needs of their members. Accordingly, the sign of

the coefficient for the dummy variable  $DSHOHH_{it}$  (which is  $\beta_2$ ) as well as the sign of the coefficient of the variable  $DCREDRAT_{it}$  (which is  $\beta_3$ ) is expected to be positive. Moreover, the sign of the coefficient of the interaction term between shock and credit access ( $\beta_4$ , i.e.) which captures the differential impact of a shock between households which were credit rationed and not rationed is also expected to be positive because lack of access to credit is expected to aggravate the effect of shocks on income diversification.

**$DNLABINC_{it}$**  is a dummy variable indicating whether a household  $i$  has got some non-labor income in time  $t$  from such non-labor income sources as remittance, gift and food aid, pension and house rent. Households who have got access to some non-labor income would have members having increased reservation wage leading them to withdraw themselves from adopting such active household strategies like labor income diversification. Thus, this variable is expected to significantly and negatively affect household labor income diversification.

**$HS_{it}$**  stands for size of a household. Large households tend to require larger expenditure to support even the mere basic needs of household members which often is difficult to be achieved by one income source unless it is quite large by itself. Moreover, such households are likely to have more number of other mature members who could be engaged in some income generating activities. Thus, household size is expected to significantly and positively affect income diversification at household level.

**DBABY<sub>it</sub>** is a dummy variable indicating the presence of a child or children aged below one year in the household. Households having a child or children aged below one year are expected to have reduced capacity to pursue multiple sources of income than households that do not have the same because the biological mother of the child or children would become unable to be engaged in especially waged labor. Accordingly, the expected sign of the coefficient for **DBABY<sub>it</sub>** is negative though it might be insignificant as, in the poorest households, the mother might be obliged to take her baby along with her when performing self-employed income generating activities like female household business, petty trade, etc.

**DSEXHH<sub>it</sub>** is a dummy variable indicating the sex of the household head where **DSEXHH<sub>it</sub>** = 1 if the head is female and 0 if otherwise. In female headed households where the main bread winner is, in most of the cases, the female head, the head is expected on average to earn relatively lower wage or return compared with the male head. Thus, female headed households are expected to have more income sources than male headed households. Accordingly, the expected sign of the coefficient for **DSEXHH<sub>it</sub>** is positive.

**AGEHH<sub>it</sub>** is the age of the household head. As a household head who in most cases is the main bread winner of the household gets older, his/her income earning capacity would change at a diminishing rate due to the interplay between the opposing effects on income of decreasing physical capacity, and of increasing experience and good reputation especially on few skill requiring activities up on which few heads of poor

urban households are expected to be engaged. In direct contrast with this, as the household head gets older, the household's propensity to have multiple sources of income would change at an increasing rate. Accordingly, the expected sign of the coefficient for  $AGEHH_{it}$  ( $\beta_9$ , i.e.) is negative whereas the expected sign of the coefficient for  $AGEHH_{it}^2$  ( $\beta_{10}$ , i.e.) is positive. Moreover, the size of  $\beta_9$  is expected to be larger than the size of  $\beta_{10}$ .

**DEDHH1<sub>it</sub>** is a dummy variable indicating whether the household head has attended primary/secondary education or not whereas **DEDHH2<sub>it</sub>** is a dummy variable indicating whether the household head has attended higher education or not. Generally, a more-educated household head is expected to have wider as well as better employment opportunities and to earn higher income than the less-educated household head. Thus, households with a more-educated head tend to depend on fewer income sources than households with a less-educated or illiterate head. Accordingly, the expected sign of the coefficient for **DEDHH1<sub>it</sub>** is negative. However, that for **DEDHH2<sub>it</sub>** might not be significant due to (1) the interaction between the opposing forces of the possibility of generating better income from a single income source and newly available opportunities for accumulation-motivated diversification and (2) such highly-educated heads-headed households are expected to be very few in a sample of poor households.

**NBOYS<sub>it</sub>** and **NGIRLS<sub>it</sub>** indicate the number of boys and of girls in the household respectively. **NMADPRI<sub>it</sub>** is the number of male adults with primary education in the

household whereas  $\text{NMADSEC}_{it}$  is the number of male adults with secondary/higher education in the household.  $\text{NFADPRI}_{it}$  is the number of female adults with primary education in the household whereas  $\text{NFADSEC}_{it}$  is the number of female adults with secondary/higher education in the household. As one way to address the criticism against the use of number of income sources as a measure of diversification that arise from the argument that a household with more economically active adults will, all things being equal, be more likely to have more income sources reflecting household labor supply decisions as much as a desire for diversification, these variables are included in the econometric model just to control for this effect. As such, though it can generally be expected that number of boys and number of adults with secondary/higher education would have positive effect on the number of sources of income of a household, it is somewhat difficult to suggest the sign of each of these variables on a priori grounds.

It is indicated previously in the theoretical literature review that the reasons for which individuals and households pursue diversification as a livelihood strategy are often divided into two overarching considerations – necessity versus choice or push versus pull reasons. In line with the conceptual framework of the study, push reasons are conceptualized to bring about positive changes in the incidence of multiple income sourcing of a household through their effect of lowering the reservation wage/return of one or more household members. On the other hand, pull reasons are conceptualized to do the same through their effect of raising the wage/return of employment/income generating activities open to one or more household members.

A household with higher income variability would have some members that lowered their additional/new market-work reservation wage/return, leading to more household members to be engaged in income generating activities. However, under such practical situations of poor urban households where most of the available employment or income generating opportunities do not probably give a wage/return that lie above even the lowered reservation wage/return of such household members, it might be difficult to expect engagement of additional household members in employment/income generating activities. Moreover, the unfavorable working conditions under which such activities has to be undertaken (such as police harassment of informal sector activities' practitioners) would also either block the further decline of their reservation wage/return or lower the return of the available informal sector income generating activities. A household facing a shock large enough to bring about a significant income shortfall making it unable to meet the basic consumption needs of the household members would be expected to have many members that significantly lowered their additional/new market-work reservation wage/return, leading them to take up even any available employment or income generating opportunity so far as it can give some positive return. A household with limited income from its main source caused by various household demographic characteristics (e.g.: higher age and lower educational level of the household head as main income earner, sex of the head where female heads are confronted mostly with narrowed and low paying opportunities) would similarly have at least some members that lowered their additional/new market-work reservation wage/return, leading to more household members to be engaged in income generating activities. A household having a child aged below one year would have one member (the

biological mother of the child) with increased reservation wage/return for a market-work since the shadow value of her non-labor time rises, leading to a reduced number of household members that could be engaged in income generating activities.

Thus, most of such reasons (causes, motivations and constraints, i.e.) explaining the income diversification behavior of poor urban households can be conceptualized as being largely push, distress or necessity reasons.

## CHAPTER FOUR DESCRIPTIVE STATISTICS

This chapter presents the description of the data whereas the next chapter presents the Poisson regression model estimation. As both approaches were applied on the same data, the agreement between their results verifies the validity of the study. Moreover, some important insights are expected to be obtained from this descriptive part that can be used in the next part of the study.

Table 4.1 presents the summary statistics (mean, standard deviation, minimum and maximum values) for the dependent as well as explanatory variables of the study.

**Table 4.1- Summary statistics (of all rounds)**

Variables		Mean	Std. Dev.	Mini- mum	Maxi- mum
<b>Dependent Variable</b>					
Number of labor income sources of a household (INCDIV)	overall	1.46	1.06	0	7
	between		0.77		
	within		0.74		
<b>Explanatory Variables</b>					
Dummy for credit rationed household (DCREDRAT)	overall	0.35	0.48	-	-
	between		0.29		
	within		0.38		
Dummy for presence of non labor income source (DNLABINC)	overall	0.46	0.50	-	-
	between		0.37		
	within		0.34		
Dummy for shock (DSHOHH)	overall	0.16	0.36	-	-
	between		0.21		
	within		0.30		
Dummy for sex of the household head (DSEXHH)	overall	0.48	0.50	-	-
	between		0.44		
	within		0.23		
Dummy for presence of a child aged below 1 year (DBABY)	overall	0.05	0.21	-	-
	between		0.13		
	within		0.17		

**Table 4.1- Summary statistics (of all rounds) (Cont.)**

<b>Variables</b>		<b>Mean</b>	<b>Std. Dev.</b>	<b>Mini- mum</b>	<b>Maxi- mum</b>
Dummy for a head with primary/secondary education (DEDHH1)	overall	0.64	0.48	-	-
	between		0.35		
	within		0.33		
Dummy for a head with higher education (DEDHH2)	overall	0.07	0.26	-	-
	between		0.19		
	within		0.18		
Household size (HS)	overall	6.19	2.62	1	17
	between		2.35		
	within		1.25		
Age of the household head (AGEHH)	overall	49.63	13.68	12	98
	between		12.02		
	within		6.69		
Income variability (INCVAR)	overall	1163.42	4870.36	0	77782.6
	between		4988.82		
	within		1220.12		
No. of boys (NBOYS)	overall	1.20	1.18	0	8
	between		1.03		
	within		0.60		
No. of girls (NGIRLS)	overall	1.23	1.15	0	6
	between		0.99		
	within		0.59		
No. of male adults with primary education (NMADPRI)	overall	0.47	0.75	0	5
	between		0.51		
	within		0.55		
No. of male adults with secondary/higher education (NMADSEC)	overall	0.96	1.02	0	6
	between		0.84		
	within		0.59		
No. of female adults with primary education (NFADPRI)	overall	0.52	0.71	0	5
	between		0.46		
	within		0.55		
No. of female adults with secondary/higher education (NFADSEC)	overall	0.87	0.91	0	6
	between		0.73		
	within		0.56		

The mean of a dummy variable indicates the odd ratio of the event occurred.

Source: Own Computation

The dependent variable of the study, number of total labor income sources of a household, is a count variable that takes on very few non-negative integers ranging from 0 to 7. Table 4.2 displays the frequency distribution of the dependent variable.

**Table 4.2- Frequency distribution of the dependent variable**

Number of total labor income sources	Overall		Between		Within Percent
	Frequency	Percent	Frequency	Percent	
0	282	14.42	226	30.66	46.38
1	896	45.83	561	76.12	59.10
2	493	25.22	372	50.47	48.67
3	200	10.23	172	23.34	42.37
4	56	2.86	52	7.06	39.72
5	22	1.13	22	2.99	37.29
6	5	0.26	5	0.68	38.46
7	1	0.05	1	0.14	33.33
<b>Total</b>	<b>1955</b>	<b>100.00 (n = 737)</b>	<b>1411</b>	<b>191.45</b>	<b>51.13</b>

*Source: Own Computation*

It is possible to see that the bulk of households in the sample depend on few number of different labor income sources. Table 4.3, on the other hand, displays the frequency distribution of the dependent variable for each of the three years of the panel considered in the study. In general, dependence on few number of different labor income sources seems to decrease over time between 1997 and 2004. In 1997, 62.6% of households depend on no or one labor income source. However, this proportion of households decreased to 56.5% by 2004. In line w/t this, the proportion of households that depend on two or three different labor income sources increased from 33.8% to 38.3% between 1997 and 2004. Moreover, the proportion of households that depend on relatively large number of different labor income sources (four up to seven, i.e.) has shown a slight increase from 3.6% to 5.2% between the same time.

**Table 4.3 – Frequency distribution of the dependent variable in 1997, 2000 and 2004**

No. of Labor Income Sources	No. of Households			Percent of Households		
	1997	2000	2004	1997	2000	2004
0	86	103	93	13.8%	15.1%	14.4%
1	305	318	273	48.8%	46.6%	42.1%
2	163	164	166	26.1%	24.1%	25.6%
3	48	70	82	7.7%	10.3%	12.7%
4	14	20	22	2.2%	2.9%	3.4%
5	9	5	8	1.4%	0.7%	1.2%
6	-	1	4	-	0.2%	0.6%
7	-	1	-	-	0.2%	-
Total	625	682	648	100	100	100

*Source: Own Computation*

In order to be able to see the pattern of income diversification of the sampled households, the number as well as proportion of households that exhibit the various combinations of different labor income sources was tabulated in Appendix 6. The two important insights that can be drawn from the various patterns of combinations of different labor income sources are as follows:

First, wage constitutes the major income source portfolio for the majority of households in the sample in almost all of the three years considered. That is, combination of two different wages as well as combination of wage with business were dominant among households that have a mix of two different labor income sources. Combination of three different wages, combination of two different wages with business as well as with female household business were dominant among households that have a mix of three different labor income sources. Combination of four different wages were dominant among households that have a mix of four

different labor income sources. Combination of five different wages as well as combination of four different wages with business were dominant among households that have a mix of five different labor income sources. Combination of six different wages was dominant among households that have a mix of six different labor income sources.

Second, among households that have one labor income source, the proportion of households that depend on one female household business has shown a sharp decline from its level of 11% in 1997 to 7.3% in 2000 and to 6% in 2004. Among households that have a mix of two different labor income sources, the proportion of households that depend on two different female household businesses as well as the proportion of households that depend on one business and one female household business has shown a sharp decline from its level of 4% in 1997 to 1.9% in 2000 and to 1.1% in 2004. Among households that have a mix of three different labor income sources, the proportion of households that depend on one wage, one business and one children income generating activity, the proportion of households that depend on two different businesses and one female household business as well as the proportion of households that depend on two different children income generating activities and one female household business has shown a sharp decline from its level of 0.8% in 1997 to 0% in 2000 and to 0.2% in 2004. Among households that have a mix of four different labor income sources, the proportion of households that depend on one wage, two different businesses and one female household business as well as the proportion of households that depend on three different wages and one children income generating activity has shown a sharp decline from its level of 0.5%

in 1997 to 0.2% in 2000 and to 0% in 2004. Among households that have a mix of five different labor income sources, the proportion of households that depend on one business, three different female household businesses and one children income generating activity as well as the proportion of households that depend on three different wages, one female household business and one children income generating activity has shown a sharp decline from its level of 0.4% in 1997 to 0% in 2000 and in 2004.

To get some useful insights as to which of the hypothesized variables determine the extent to which poor urban households in Ethiopia depend for their living on different labor income sources, it might be useful to compare the values of these variables between those households with relatively less and more number of different labor income sources. For ease of such comparison, households that depend on no labor income source, on one as well as two different labor income sources were defined as being households with relatively less number of different labor income sources or as being non-diversifiers. On the other hand, households that depend on three or more different labor income sources were defined as being households with relatively more number of different labor income sources or as being diversifiers. Furthermore, attempt will be made to do this comparison not only for the whole sample but also for the Addis Ababa and for the rest six major towns separately because Addis Ababa, the capital and by far the largest city of Ethiopia, is expected to be different in many respects from the other major towns of the country.

Large size households account for about 82% of those households with relatively more number of different labor income sources. In general, households with large family size tend to depend on relatively more number of different labor income sources. Moreover, similar pattern exists in both the capital and in the rest other major towns of the country with regard to the relation of household size with number of different labor income sources upon which a household derives its livelihood.

Moreover, age seems to be positively related with income diversification strategy at household level. This relation seems to be more pronounced in the capital, but in the other towns, such positive relationship between head age and income diversification seems to hold up to a certain level after which a negative relationship seems to exist.

Income variability also seems to have some positive relation with income diversification strategy at household level. This relation seems to be more pronounced in the capital, but in the other towns, such positive relationship between income variability and income diversification seems to hold up to a certain level after which a negative relationship seems to exist similarly.

Near half of the sampled households have some non labor income source and hence it is appropriate to expect that social network strategies (or relying on assistance from friends, family, relatives, NGOs, etc.) might probably constitute one important strategy to be employed in response to crisis by the households under consideration other than such active household strategies as adding new workers and working more hours. Moreover, in line with theoretical predictions, presence of non labor

income source seems to have negative effect on income diversification strategy at household level in general. However, this tendency is more evident in the other major towns.

In connection with this, sex of the household head does not seem to have effect on income diversification strategy at household level in the capital city. In the rest other major towns of the country, however, male-headed households rather seem to some how depend on more number of different labor income sources. In the overall, female-headed households do not seem to depend on more number of different labor income sources.

Moreover, income shock seems to have some negative effect on income diversification strategy at household level only in the case of the other major towns. But, in the capital, it seems to have no relationship at all.

**Table 4.4. Percentage of diversifying & non-diversifying households**

Variable	For the whole sample			For the A.A. sample			For the other towns' sample		
	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total
<b>Household size</b>									
1 – 5	46.44	17.96	42.30	43.83	18.36	39.85	51.72	16.88	47.46
> 5	53.56	82.04	57.70	56.17	81.64	60.15	48.28	83.12	52.54
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Age of the household head</b>									
Young head	15.56	7.04	14.32	14.58	5.31	13.13	17.54	11.69	16.83
Medium age head	40.81	42.96	41.13	42.22	39.13	41.74	37.97	53.25	39.84
Old head	43.63	50.00	44.55	43.20	55.56	45.13	44.48	35.06	43.33
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table 4.4. Percentage of diversifying & non-diversifying households (Cont.)

Variable	For the whole sample			For the A.A. sample			For the other towns' sample		
	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total
<b>Income variability</b>									
Households with little income variability	57.03	51.06	56.16	54.56	46.86	53.36	62.03	62.34	62.06
Households with medium income variability	17.12	21.13	17.70	17.71	20.29	18.11	15.91	23.38	16.83
Households with high income variability	25.85	27.82	26.14	27.73	32.85	28.53	22.06	14.29	21.11
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Presence of non labor income source</b>									
Households with no non labor income source	53.68	58.10	54.32	55.72	54.59	55.55	49.55	67.53	51.75
Households with some non labor income source	46.32	41.90	45.68	44.28	45.41	44.45	50.45	32.47	48.25
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Sex of the household head</b>									
Male	51.65	54.58	52.07	50.36	50.72	50.42	54.25	64.94	55.56
Female	48.35	45.42	47.93	49.64	49.28	49.58	45.75	35.06	44.44
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Income shock</b>									
Un-shocked households	84.02	85.92	84.30	85.78	85.99	85.81	80.47	85.71	81.11
Shocked households	15.98	14.08	15.70	14.22	14.01	14.19	19.53	14.29	18.89
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Household access to credit</b>									
Not credit rationed	63.73	69.72	64.60	62.70	70.53	63.92	65.82	67.53	66.03
Credit rationed	36.27	30.28	35.40	37.30	29.47	36.08	34.18	32.47	33.97
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 4.4. Percentage of diversifying & non-diversifying households (Cont.)**

Variable	For the whole sample			For the A.A. sample			For the other towns' sample		
	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total	Non-diversifiers	Diversifiers	Total
<b>Educational level of the household head</b>									
Illiterate head	30.64	29.93	30.54	30.14	31.88	30.42	31.65	24.68	30.79
Little educated head	62.12	62.32	62.15	62.52	61.35	62.34	61.30	64.94	61.75
More educated head	7.24	7.75	7.31	7.33	6.76	7.25	7.05	10.39	7.46
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Presence of baby</b>									
Households with no baby	94.97	96.48	95.19	95.44	97.10	95.70	94.03	94.81	94.13
Households with baby	5.03	3.52	4.81	4.56	2.90	4.30	5.97	5.19	5.87
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

*Source: Own Computation*

The large proportion of households (about 65%, i.e.) in both the capital as well as the other major towns of the country are not credit rationed which is surprising given that the sampled households are in general poor as to the criterion of per adult equivalent food consumption expenditure being used in the study to separate the poor from the not poor households. Moreover, in contrast to theoretical predictions and explanations, access to credit seems to facilitate diversification rather than expansion and this tendency is more evident in the capital city.

On the other hand, educational level of the household head seem to have some positive effect on income diversification strategy at household level only in the case of

the other major towns. In the capital where there is the bulk of the sample (around 67%, i.e.), it seems to have no relationship at all.

The large proportion of households (about 95%, i.e.) in both the capital as well as the other major towns of the country do not have a child aged below one year. In addition, presence of a child aged below one year in the household does not seem to have pronounced effect on income diversification strategy at household level.

Furthermore, statistical tests of significant difference between mean numbers of different labor income sources of such groups of households can also be carried out for more objective judgment as to the presence of relationship and the direction of relationship between the same explanatory variables and the response variable of interest (See tables 4.5 from page 74 to 79 for more detail).

With respect to household size, the test for the whole sample, for the capital city sample and for the other towns' sample indicate that there is a significant difference between mean no. of different labor income sources of the two groups (small and large size households, i.e.) at 1% significance level and the second group (or large size households) has probably large no. of income sources implying positive relation between household size and the response variable.

With respect to head age, however, the test for the whole sample indicates that there is no significant difference between mean no. of different labor income sources of the two groups (younger and older head headed households, i.e.) even at 10%

significance level implying no relation between head age and the response variable. The separate test for the capital city sample and for the other towns' sample indicate, however, that there is a significant difference between mean no. of different labor income sources of the two groups at 1% significance level. Moreover, the second group (or older head headed households) for the capital city sample where as the first group (or younger head headed households) for the other towns' sample has probably large no. of income sources implying positive relation for the capital city sample where as negative relation for the other towns' sample between head age and the response variable.

With respect to income variability, on the other hand, the test for the whole sample, for the capital city sample and for the other towns' sample indicate that there is no significant difference between mean no. of different labor income sources of the two groups (households with lower and higher income variability, i.e.) even at 10% significance level implying no relation between income variability and the response variable.

With regard to presence of some non labor income source, the test for the whole sample, for the capital city sample and for the other towns' sample indicate that there is a significant difference between mean no. of different labor income sources of the two groups (households with no and some non labor income source, i.e.) at 1% significance level and the first group (or households with no non labor income source) has probably large no. of income sources implying negative relation between presence of non labor income source and the response variable.

With respect to sex of the household head, the test for the whole sample, for the capital city sample and for the other towns' sample also indicate that there is a significant difference between mean no. of different labor income sources of the two groups at 1%, at 10% and at 1% significance level respectively and the first group (or male-headed households) has probably large no. of income sources implying negative relation between head sex and the response variable.

With respect to income shock, on the other hand, the test for the whole sample, for the capital city sample and for the other towns' sample indicate that there is no significant difference between mean no. of different labor income sources of the two groups (un-shocked and shocked households, i.e.) even at 10% significance level implying no relation between income shock and the response variable.

With respect to household access to credit, the test for the whole sample and for the capital city sample indicate that there is a significant difference between mean no. of different labor income sources of the two groups (households that are not and that are credit rationed, i.e.) at 10% and at 1% significance level respectively and the first group (or households that are not credit rationed) has probably large no. of income sources implying negative relation between credit constraint and the response variable. The test for the other towns' sample indicates, however, that there is no significant difference between mean no. of different labor income sources of the two groups even at 10% significance level implying no relation between access to credit and the response variable.

**Table 4.5.a. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the whole sample)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr( T &gt; t )</b>
<b>Household size</b>				-12.1	0.0000
1 – 5	1.13	0.81	827		
> 5	1.70	1.15	1128		
<b>Age of the household head</b>				-1.45	0.1463
Younger head	1.42	0.95	813		
Older head	1.49	1.13	1142		
<b>Income variability</b>				-0.90	0.3672
Households with lower income variability	1.44	1.03	1370		
Households with higher income variability	1.49	1.12	585		
<b>Presence of non labor income source</b>				7.15	0.0000
Households with no non labor income source	1.61	0.99	1062		
Households with some non labor income source	1.28	1.10	893		
<b>Sex of the household head</b>				2.77	0.0057
Male	1.52	1.07	1018		
Female	1.39	1.04	937		

**Table 4.5.a. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the whole sample)(Cont.)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr(&gt; t )</b>
<b>Income shock</b>				1.47	0.1410
Un-shocked households	1.47	1.06	1648		
Shocked households	1.38	1.05	307		
<b>Household access to credit</b>				1.65	0.0988
Not credit rationed	1.49	1.09	1263		
Credit rationed	1.41	0.99	692		
<b>Educational level of the household head 1</b>				0.17	0.8662
Illiterate/little educated head	1.45	1.09	700		
Medium level educated head	1.46	1.04	1112		
<b>Educational level of the household head 2</b>				-0.61	0.5402
Illiterate/little educated head	1.45	1.09	700		
Highly educated head	1.51	0.99	143		
<b>Baby presence</b>				0.22	0.8275
Households with no baby	1.46	1.06	1861		
Households with baby	1.44	0.93	94		

*Source: Own Computation*

**Table 4.5.b. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the A.A. sample)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr(&gt; T &gt; t )</b>
<b>Household size</b>				-8.90	0.0000
1 – 5	1.21	0.80	528		
> 5	1.73	1.17	797		
<b>Age of the household head</b>				-3.46	0.0006
Younger head	1.41	0.92	540		
Older head	1.61	1.15	785		
<b>Income variability</b>				-0.69	0.4907
Households with lower income variability	1.51	1.02	892		
Households with higher income variability	1.56	1.17	433		
<b>Presence of non labor income source</b>				4.47	0.0000
Households with no non labor income source	1.64	0.98	736		
Households with some non labor income source	1.38	1.15	589		
<b>Sex of the household head</b>				1.78	0.0751
Male	1.58	1.08	668		
Female	1.47	1.05	657		

**Table 4.5.b. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the A.A. sample)(Cont.)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr(&gt; T &gt; t )</b>
<b>Income shock</b>				0.60	0.5468
Un-shocked households	1.53	1.07	1137		
Shocked households	1.48	1.07	188		
<b>Household access to credit</b>				2.69	0.0072
Not credit rationed	1.59	1.11	847		
Credit rationed	1.42	0.99	478		
<b>Educational level of the household head 1</b>				2.29	0.0220
Illiterate/little educated head	1.62	1.12	472		
Medium level educated head	1.47	1.05	757		
<b>Educational level of the household head 2</b>				0.97	0.3331
Illiterate/little educated head	1.62	1.12	472		
Highly educated head	1.50	0.97	96		
<b>Baby presence</b>				0.643	0.5206
Households with no baby	1.53	1.07	1268		
Households with baby	1.44	1.04	57		

Source: Own Computation

**Table 4.5.c. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the other towns' sample)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr( T &gt; t )</b>
<b>Household size</b>				-8.02	0.0000
1 – 5	0.99	0.81	299		
> 5	1.61	1.09	331		
<b>Age of the household head</b>				2.76	0.0059
Younger head	1.44	0.99	273		
Older head	1.22	1.03	357		
<b>Income variability</b>				0.09	0.9262
Households with lower income variability	1.32	1.03	478		
Households with higher income variability	1.31	0.97	152		
<b>Presence of non labor income Source</b>				6.05	0.0000
Households with no non labor income source	1.55	1.01	326		
Households with some non labor income source	1.07	0.97	304		
<b>Sex of the household head</b>				2.73	0.0065
Male	1.41	1.04	350		
Female	1.19	0.98	280		

**Table 4.5.c. Statistical tests of significant difference between mean numbers of different labor income sources of various groups (for the other towns' sample) (Cont.)**

<b>Group types and groups</b>	<b>Mean of the response variable</b>	<b>Std. Dev.</b>	<b>No. of observations</b>	<b>t-value</b>	<b>Pr(&gt; t )</b>
<b>Income shock</b>				1.26	0.2078
Un-shocked households	1.34	1.02	511		
Shocked households	1.21	0.98	119		
<b>Household access to credit</b>				-0.94	0.3458
Not credit rationed	1.29	1.03	416		
Credit rationed	1.37	0.99	214		
<b>Educational level of the household head 1</b>				-3.82	0.0002
Illiterate/little educated head	1.10	0.95	228		
Medium level educated head	1.43	1.03	355		
<b>Educational level of the household head 2</b>				-2.79	0.0057
Illiterate/little educated head	1.10	0.95	228		
Highly educated head	1.53	1.04	47		
<b>Baby presence</b>				-0.72	0.4727
Households with no baby	1.31	1.03	593		
Households with baby	1.43	0.77	37		

Source: Own Computation

With respect to educational level of the household head, the test for the whole sample also indicates that there is no significant difference between mean no. of different labor income sources of each of the two groups (illiterate/little educated and medium level educated head headed households as well as illiterate/little educated and highly educated head headed households) even at 10% significance level implying no relation between head education and the response variable. The test for the capital city sample, on the other hand, indicates that there is a significant difference between mean no. of different labor income sources of the two groups (illiterate/little educated and medium level educated head headed households) at 5% significance level and the first group (or illiterate/little educated head headed households) has probably large no. of income sources. However, similar test for the capital city sample indicates that there is no significant difference between mean no. of different labor income sources of the other two groups (illiterate/little educated and highly educated head headed households) even at 10% significance level. These imply negative relation between head education and the response variable up to a certain level of education in the capital. The test for the other towns' sample indicates, however, that there is a significant difference between mean no. of different labor income sources of each of the two groups (illiterate/little educated and medium level educated head headed households as well as illiterate/little educated and highly educated head headed households) at 1% significance level and the second groups (or medium level educated and highly educated head headed households) have probably large no. of income sources compared to households headed by illiterate/little educated head implying positive relation between head education and the response variable.

With regard to presence of baby in the household, the test for the whole sample, for the capital city sample and for the other towns' sample also indicate that there is no significant difference between mean no. of different labor income sources of the two groups even at 10% significance level implying no relation between presence of baby in the household and the response variable.

In general, the major findings from the descriptive statistical analysis of factors hypothesized to have some effect on the dependent variable of interest can be summarized as shown below.

**Table 4.6. Summary of major findings from the descriptive statistics of hypothesized explanatory variables**

<b>Variable</b>	<b>Positive relation</b>	<b>Negative relation</b>	<b>No relation</b>	<b>Level of statistical significance</b>	<b>Remark</b>
Household size	√			1%	
Age of the household head	√			Not significant even at 10% for the whole sample.	In the other major towns, the positive relationship seems to hold up to a certain level.
Income variability	√			Not significant even at 10% for any sample.	This positive relationship is more evident in the capital city. In the other major towns, the positive relationship seems to hold up to a certain level.
Presence of non labor income source		√		1%	This negative relationship is more evident in the other major.
Sex of the household head (Female-headed households)		√		1%	In the capital city, it seems to have no relation at all and the significance level is 10%.

**Table 4.6. Summary of major findings from the descriptive statistics of hypothesized explanatory variables (Cont.)**

<b>Variable</b>	<b>Positive relation</b>	<b>Negative relation</b>	<b>No relation</b>	<b>Level of statistical significance</b>	<b>Remark</b>
Shock			√	Not significant even at 10% for any sample.	In the other major towns, it seems to have some negative relationship.
Access to credit (Credit rationed households)		√		10%	This negative relationship is more evident in the capital city and the significance level is 1%.
Educational level of the household head			√	Not significant even at 10% for the whole sample.	In the other major towns, it seems to have some positive effect and the significance level is 1%.
Presence of a child aged below 1 year			√	Not significant even at 10% for the whole sample.	

The distribution of the dependent variable, as can be seen from its histogram in Appendix 7, is positively skewed. Moreover, examining the distribution of the non dummy explanatory variables, namely, income variability, number of boys, number of girls, number of male adults with primary education, number of male adults with secondary education, number of female adults with primary education, number of female adults with secondary education as well as the derived variable square of age of the household head reveals that they are also more or less positively skewed. However, two of such variables, namely, household size and age of the household head, have a distribution that looks more normal. Hence, some transformation of these two variables that is capable of making their normal distribution more positively skewed might be necessary to help in fitting the variables into the model. In view of this, inverse transformation of household size and age of the household head makes their distribution look positively skewed (See Appendix 7).

## **CHAPTER FIVE**

### **RESULTS OF THE EMPIRICAL ANALYSIS**

The results of estimation of the standard Poisson regression model show that the majority of the explanatory variables except three (presence of non labor income source, household size and number of male adults with primary education, i.e.) are statistically insignificant (See Table 4.7 below).

**Table 4.7. Conditional fixed effects Poisson regression results**

Dependent Variable : No. of labor income sources of a household (INCDIV)

Independent Variables	Coefficient	Standard Error	P> z
Income variability (INCVAR)	5.70e-06	0.000016	0.721
Dummy for shock (DSHOHH)	-0.084	0.086	0.329
Dummy for credit rationed household (DCREDRAT)	-0.081	0.054	0.131
Interaction between dummy for shock & credit rationed household (DCREDRATDSHOHH)	0.004	0.139	0.975
Dummy for presence of non labor income source (DNLABINC)	-0.170	0.056	0.003***
Inverse of household size (InvHS)	-1.029	0.354	0.004***
Dummy for presence of a child aged below 1 year (DBABY)	0.051	0.118	0.669
Dummy for sex of the household head (DSEXHH)	-0.042	0.088	0.635
Inverse of age of the household head (InvAGEHH)	0.028	1.027	0.978
Age of the household head squared (AGEHH2)	-0.000018	0.000034	0.597
Dummy for a household head with primary/secondary education (DEDHH1)	-0.075	0.061	0.217
Dummy for a household head with higher education (DEDHH2)	0.047	0.111	0.671
No. of boys (NBOYS)	0.015	0.035	0.668
No. of girls (NGIRLS)	0.016	0.035	0.654
No. of male adults with primary education (NMADPRI)	0.072	0.038	0.061*
No. of male adults with secondary/higher education (NMADSEC)	0.043	0.035	0.223

**Table 4.7. Conditional fixed effects Poisson regression results (Cont.)**

<b>Independent Variables</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P&gt; z </b>
No. of female adults with primary education (NFADPRI)	0.056	0.038	0.144
No. of female adults with secondary/higher education (NFADSEC)	0.056	0.036	0.118
Log likelihood	-1257.729		
Number of obs.	1911		

\*\*\*Significant at 1 percent and \*Significant at 10 percent.

Source: Computed from sample survey data

But, one should bear in mind that the Poisson model calculates a standard error as if the variance equals the mean. In order to get an indication as to whether such assumption of the Poisson regression model was met by the data under consideration, comparison of the sample mean and variance of the dependent count variable can be carried out and this exercise indicates that, in the real data of this study, the sample variance  $[(1.06)^2 = 1.124, \text{ i.e.}]$  is less than the sample mean (1.46, i.e.) (see Table 4.1 on page 61). Under such situations, the standard errors will be overestimated using a Poisson model and, therefore, the significance tests (the coefficients divided by their standard errors) will be smaller than what they really should be. This would have the effect of treating variables as being less statistically significant in a model than what they actually should be. In other words, in a Poisson multiple regression model, one would end up with neglecting variables that really should not be neglected because one think that they are statistically insignificant when, in fact, they are not. Thus, this can at this stage be taken to account for the reason why only three out of eighteen variables are significant in the aforementioned standard Poisson regression model.

Even though subsequent Poisson regression decreases the conditional variance of the dependent variable somewhat and the data necessarily are even more underdispersed once regressors are included in such situations of this study where the sample variance is less than the sample mean making a further formal test for underdispersion not mandatory as in the case of overdispersed data, a formal test of absence of equidispersion will be executed below following the auxiliary OLS regression test of Cameron & Trivedi (1998, 1999).

To test against the NB2 variance function, the LM test statistics can be computed as  $T_{LM} = (1/\sqrt{0.5})(1/\sqrt{1336.04})(0.5)(-38.412) = -0.744$ . Similarly, to test against the NB1 variance function, the LM test statistics can be computed as  $T_{LM} = (\sqrt{2}/2)(-151.561) = -107.17$ . Considering first test of Poisson against NB2 at significance level of 1%, the LM test statistics computed using the auxiliary regression  $[(Y_{it} - \hat{\mu}_{it})^2 - Y_{it}]/\hat{\mu}_{it} = \text{wg}(\hat{\mu}_{it})/\hat{\mu}_{it} + u_{it}$  (without constant) for  $g(\hat{\mu}_{it}) = \hat{\mu}_{it}^2$  is greater than the 1% critical value of  $-Z_{.99} = -2.33$ . But, in test of Poisson against NB1 at significance level of 1%, the LM test statistics computed using the auxiliary regression  $[(Y_{it} - \hat{\mu}_{it})^2 - Y_{it}]/\hat{\mu}_{it} = \text{wg}(\hat{\mu}_{it})/\hat{\mu}_{it} + u_{it}$  (without constant) for  $g(\hat{\mu}_{it}) = \hat{\mu}_{it}$  fall below the 1% critical value of  $-Z_{.99} = -2.33$ , strongly rejecting the null hypothesis of Poisson. Clearly, some correction is necessary for the underdispersion known to exist in the data. In this regard, the simple and one possible correction of using robust standard errors was chosen. Thus, robust standard errors being computed using the sandwich estimator of the covariance matrix will be presented below. Moreover, based on the insight obtained from the descriptive statistics part in favor of the expectation that Addis

Ababa, the capital and by far the largest city of Ethiopia, is different in many respects from the other major towns of the country, separate models for the capital & the rest towns will also be estimated and presented below (See Table 4.8 on page 93 – 94). However, the six major towns other than the capital (Awassa, Bahir Dar, Dessie, Dire Dawa, Jimma and Mekele, i.e.) are expected to be largely similar with one another with respect to the subject of interest making the need to estimate separate models for each of these towns less necessary . In this regard, for instance, there is little difference among these towns with respect to annual per adult equivalent unit food consumption expenditure of the sampled poor households (where the median annual per adult equivalent unit food consumption expenditure averaged over the three rounds ranges between Birr 509.00 and Birr 804.00 as well as there is no significant difference between mean annual per adult equivalent unit food consumption expenditure of two towns having the smallest and the largest food consumption expenditure in 1997 and 2004 rounds even at 10% significance level). Moreover, as the sample size for especially some towns is relatively as smaller as 77, the precision in estimates of various properties of the population of interest could correspondingly be smaller.

The coefficient for the dummy variable indicating whether a household is credit rationed is significant but it is negative unlike prior expectation in the equations estimated for Addis Ababa alone and for all cities and towns. It is, on the other hand, insignificant at any conventional level of significance in the equation estimated for the other major towns of the country though it is positive as expected. These results imply that poor households having permanent residence in the capital especially

tended to engage them in income diversification when they get access to credit. However, such tendency doesn't seem to hold in those poor households having permanent residence in the other major towns of the country. One possible explanation for the unexpected negative sign of this variable on the total sample equation is the possibility that other problems like market constraint might be the additional cause for income diversification in the capital city than in other major towns of the country. That means, the capital city might be suitable in providing vast types of income sources easier to be pursued as sources of livelihood for the chronic and transitory poor households having permanent residence in it especially when they have some access to credit than providing one or few higher capital requiring and higher income generating income sources. In other words, a household in the capital city might probably be required to invest higher sum of money and hence get higher amount of credit as well as need to bear higher risk if it has to depend successfully on one or two expanded and especially own account business income sources. As the majority of such households are expected to have high risk averse inclination on the basis of the fact that they are poor and generally tend to be highly risk averse as supported by literatures written on the poor and as the amount of credit that they needed and accessed is expected not to be that high (beyond what they needed and what they accessed from such "mini-credit" sources as micro-finance institutions, friends and relatives, i.e.) in relation to their higher risk averting tendency, it might be possible to say that the market environment of the capital city compared to that of the other major towns that face such-natured households is one constraint that needs prior attention than the credit constraint facing these households that prohibit such households from effective expansion. With regard to the magnitude of the coefficient

for this variable, a credit-rationed household would have an expected number of different labor income sources which is 0.92 ( $e^{-0.081}$ , i.e.) times smaller than that of a household which is not credit rationed considering the overall sample. But a credit-rationed household in the capital city would have an expected number of different labor income sources which is 0.87 ( $e^{-0.144}$ , i.e.) times smaller than that of a household which is not credit rationed.

Moreover, the other contrasting result that can be seen in the equations being run for the capital city and for the other towns separately has to do with income variability which was being used in the study as a proxy to the degree of exposure of households to risk. In general, the coefficient of this variable is not statistically significant in all the three equations estimated in accordance with prior expectation. This result implies that risk exposure is not a major factor to motivate poor urban households to pursue income diversification as a hedge against household's ex ante exposure to risk such as income variance in line with the hypothesis of the study. However, the fact that it is close to the 90% significance level & positive though its magnitude is very small in the capital city equation unlike its other towns' counterpart is also believed to be supportive of the above-mentioned notion regarding the probably different nature of market facing poor households that have permanent residence in the capital city and in the other major towns.

The coefficient for the other key variable of interest, shock, is not statistically significant in the equations estimated for Addis Ababa alone as well as for all towns altogether unlike prior expectation. Moreover, though it is statistically significant at the

5% significance level in the equation estimated for the other major towns, it is negatively related with the response variable again in contrast with expectation. Accordingly, a household having experienced a shock in the other major towns of the country would have an expected number of different labor income sources which is 0.78 ( $e^{-0.254}$ , i.e.) times smaller than that of a household which have not experienced a shock. Possible explanations for such unexpected results obtained with respect to this variable will be given later after first discussing the results obtained with regard to the other related variable, presence of non labor income source.

The coefficient for the dummy variable indicating whether a household has got some non-labor income form such non-labor income sources as remittance, gift and food aid, pension and house rent is significant and negative as expected in all the three estimated equations. However, it is more statistically significant and its magnitude is almost twice as large in the equation estimated for the other major towns compared to that estimated for the capital. Accordingly, a household having some non labor income source would have an expected number of different labor income sources which is 0.84 ( $e^{-0.170}$ , i.e.) times smaller than that of a household which have no non labor income source considering the overall sample. On the other hand, a household having some non labor income source in the other major towns of the country would have an expected number of different labor income sources which is 0.78 ( $e^{-0.252}$ , i.e.) times smaller than that of a household which have no non labor income source. The same household in the capital would, however, have an expected number of different labor income sources which is 0.87 ( $e^{-0.139}$ , i.e.) times smaller than that of a household which have no non labor income source.

This result can be seen in conjunction with the result obtained with regard to occurrence of transitory external shocks. That means, such non labor incomes as gift, food aid and remittance which in most cases respond during times of economic hardship faced by especially poor households are more important in the other major towns of the country to make the sampled poor households of these towns less dependent on such active household strategies as income diversification than on such social network strategies as relying on assistance from friends, family, etc. in the face of hardship. Moreover, it is possible to say that poor households having permanent residence in the other major towns of the country and having four or more different labor income sources tend to withdraw themselves from one labor income source in the face of a significant income shock probably because they were able to at the same time get a non labor income large enough to make them comfortable to take such action. In general, these complimentary results on the coefficients of the dummy variable indicating whether a household has got some non-labor income and the dummy variable indicating whether a household has experienced shock, together with the result obtained in the descriptive statistics part that income diversification is not a widespread phenomenon for the sampled households, can probably be taken to imply that social network strategies are one major strategies of such households.

**Table 4.8. Conditional fixed effects robust Poisson regression results**

Dependent Variable : No. of labor income sources of a household (INCDIV)

Independent Variables	All cities and towns			Addis Ababa			Other towns <sup>1</sup>		
	Coefficient	Bootstrap St. Error	P> z	Coefficient	Bootstrap St. Error	P> z	Coefficient	Bootstrap St. Error	P> z
Income variability (INCVAR)	5.70e-06	0.000015	0.696	.000018	0.000015	0.255	-7.75e-06	0.000047	0.869
Dummy for shock (DSHOHH)	-0.084	0.068	0.220	-0.005	0.084	0.957	-0.254	0.111	0.022**
Dummy for credit rationed household (DCREDRAT)	-0.081	0.034	0.017**	-0.144	0.042	0.001*	0.081	0.082	0.325
Interaction between dummy for shock & credit rationed household (DCREDRATDSHOHH)	0.004	0.101	0.966	-0.036	0.129	0.778	0.117	0.228	0.609
Dummy for presence of non labor income source (DNLABINC)	-0.170	0.045	0.000***	-0.139	0.054	0.009***	-0.252	0.084	0.003**
Inverse of household size (InvHS)	-1.029	0.253	0.000***	-1.204	0.393	0.002***	-0.910	0.385	0.018**
Dummy for presence of a child aged below 1 year (DBABY)	0.051	0.083	0.543	0.055	0.129	0.668	-0.005	0.111	0.961
Dummy for sex of the household head (DSEXHH)	-0.042	0.065	0.517	0.028	0.081	0.726	-0.298	0.160	0.063*
Inverse of household head age (InvAGEHH)	0.028	2.992	0.992	0.086	4.143	0.983	-11.667	18.169	0.521

**Table 4.8. Conditional fixed effects robust Poisson regression result (Cont.)**

Independent Variables	All cities and towns			Addis Ababa			Other towns <sup>1</sup>		
	Coefficient	Bootstrap St. Error	P> z	Coefficient	Bootstrap St. Error	P> z	Coefficient	Bootstrap St. Error	P> z
Household head age squared (AGEHH2)	-0.000018	0.000032	0.577	-.000019	0.000034	0.586	-0.000099	0.00011	0.343
Dummy for a head with primary/secondary education (DEDHH1)	-0.075	0.040	0.059*	-0.129	0.056	0.021**	0.040	0.104	0.700
Dummy for a head with higher education (DEDHH2)	-0.028	0.074	0.709	-0.010	0.090	0.913	-0.009	0.186	0.962
No. of boys (NBOYS)	0.015	0.026	0.560	-0.00087	0.039	0.982	0.005	0.045	0.916
No. of girls (NGIRLS)	0.016	0.029	0.585	0.025	0.032	0.441	-0.022	0.057	0.705
No. of male adults with primary education (NMADPRI)	0.072	0.028	0.010**	0.040	0.036	0.276	0.158	0.056	0.005***
No. of male adults with secondary/higher education (NMADSEC)	0.043	0.026	0.107	0.040	0.031	0.202	0.060	0.078	0.443
No. of female adults with primary education (NFADPRI)	0.056	0.029	0.050*	0.050	0.039	0.198	0.023	0.058	0.694
No. of female adults with secondary/higher education (NFADSEC)	0.056	0.029	0.056*	0.038	0.031	0.221	0.113	0.049	0.022**
	Log likelihood	-1257.729		Log likelihood	-884.340		Log likelihood	-364.910	
	Number of obs.	1911		Number of obs.	1305		Number of obs.	606	

\*\*\*Significant at 1 percent, \*\*Significant at 5 percent and \*Significant at 10 percent.

<sup>1</sup>Though conditional fixed effects robust Poisson regression equation was estimated for each of the six major towns other than the capital separately, no coefficient was found to be statistically significant at any conventional level of significance in each of the equations estimated for all towns other than Dire Dawa and Jimma.

Source: Computed from sample survey data

The coefficient for sex of the household head, just like that for shock, is not statistically significant in the equations estimated for Addis Ababa alone as well as for all towns altogether unlike prior expectation. Furthermore, even though it is statistically significant at the 10% significance level in the equation estimated for the other major towns, it is negatively related with the response variable in contrast with prior expectation. Accordingly, a female-headed household in the other major towns of the country would have an expected number of different labor income sources which is 0.74 ( $e^{-0.298}$ , i.e.) times smaller than that of a male-headed household. Similar possible explanation can be given with respect to these unexpected results as follows. Such non labor incomes as gift, food aid and remittance (which in most cases were found to be positively associated with female-headed households as they are poorer than male-headed households) are more important in the other major towns of the country. Thus, it is not surprising to observe female-headed households having permanent residence especially in the other towns to be more dependent on assistance from friends, relatives, etc. Furthermore, female-headed households in the other major towns have access to a non labor income large enough to make them comfortable to have been depended upon relatively lower number of different labor income sources compared with their male-headed counterparts.

The coefficient for inverse of household size is significant and is found to be negatively related to the response variable in all the three estimated equations as expected. That means, larger households tend to have more number of distinct income sources than smaller households. Specifically, at average household size of 6, a 1% change in the size of a household leads to 17.2% change in the expected

number of different labor income sources of a household and its effect would be as higher as 20.1% in the case for the capital city.

The coefficient for the dummy variable indicating whether the household head has attended primary/secondary education or not is significant and negative as expected in all the estimated equations except that for the other towns alone. Accordingly, a household having a head with primary/secondary level education would have an expected number of different labor income sources which is 0.93 ( $e^{-0.075}$ , i.e.) times smaller than that of a household having an illiterate or a little-educated head considering the overall sample. But a household having a head with primary/secondary level education in the capital city would have an expected number of different labor income sources which is 0.88 ( $e^{-0.129}$ , i.e.) times smaller than that of a household having an illiterate or a little-educated head. In addition, the coefficient for the dummy variable indicating whether the household head has attended higher education is insignificant as expected in all the estimated equations.

The coefficient for the dummy variable indicating the presence of a child or children aged below one year in the household is also insignificant as expected in all the estimated equations. Moreover, age of the household head was not found to have a significant impact upon income diversification.

Furthermore, these econometric model estimation results generally agree with corresponding results from the descriptive statistical analysis.

The findings of this study can also be compared with findings from the related empirical literature as follows:

Income diversification was not found to be a widespread phenomenon unlike the finding of other studies being undertaken in similar African countries like Mali, Ghana and Zimbabwe. This difference is believed to be caused by the major limitation of the data used by this study that it excludes the poorest urban households which are expected to be more dependent upon income diversification strategy for various reasons.

Income diversification was not as such found to be positively affected by economic adversity faced by a household unlike the finding of other studies (e.g.; Harts-Broekhuis, 1997) because this study considered idiosyncratic shocks in which case households being exposed to such type of shock have the better possibility of using other alternative response mechanisms other than income diversification.

Similarly, income diversification was not as such found to be positively affected by female-headedness unlike the finding of other studies (e.g.; Ersado, 2003) because the study do not considered a time of study in which covariate or common shocks occurred (in contrast with such other studies which considered times of general economic adversity like drought and economic policy reform) in which case female-headed households would have similar better possibility of using other alternative response mechanisms other than income diversification.

Access to credit was found to improve conditions for diversification while presence of a child or children aged below one year in the household was not found to negatively affect households' capabilities for diversification unlike other studies which can

generally be attributed to the different behavior of households and the different nature of urban areas considered.

However, the finding of the study that labor income diversification is positively related to household size are in agreement with that of other studies carried out in similar African countries. Moreover, the study's general finding that dependence on multiple sources of income is less common in major urban centers of Ethiopia compared to some other African urban areas though it tended to increase over time is in agreement with that of similar studies being undertaken in the same urban centers of the country for the period between 1994 and 1997.

In view of this comparison of the findings of the study with that of others, the major contributions of the study to the related literature were the following:

- ❖ The study indicated that the same factors (economic shock and sex of the household head, i.e.) would be related to income diversification in the opposite direction compared to that indicated by other studies if the type of shock (covariate versus idiosyncratic, i.e.) considered differs.
- ❖ The study also indicated that the same factor, access to credit, i.e., could be found to be related to income diversification in the opposite direction compared to that indicated by theoretical predictions and other studies depending upon the different nature of urban areas considered.

On the other hand, the major contributions of the study to the related literature of the issue for Ethiopia were the following:

- ❖ The study point out an additional probable reason as to why income diversification is less common in urban Ethiopia than in some other African

countries that Ethiopian studies on the issue were undertaken in a limited scope which excludes the poorest households of the country's major urban centers.

- ❖ The study has also made a first attempt to identify and explain the factors that were related to income diversification behavior of poor urban households having permanent residence in seven major urban centers of Ethiopia in the near past that can mainly be used as a basis for further similar studies to be carried out in the future especially on poorest, poorer and poor urban households of the country.

## **CHAPTER SIX**

### **SUMMARY AND POLICY IMPLICATIONS**

#### **6.1. Summary**

Households in urban areas try to manage or cope with adverse situations through various ways. In this regard, coping capacities of urban households largely rest on available asset portfolios and the resources a household is able to mobilize and manage in the face of adversity. The literature on risk and coping thereby mainly distinguishes two different types of dealing with risk and insecurity: precautionary or insurance strategies and response strategies. The former include, for instance, diversification of livelihood activities, building up stocks and savings during peak seasons, or social investments in reciprocal or redistributive systems among households, whereas the latter is a reactive approach implemented after an event has occurred. Here depleting physical stocks, drawing upon social relationships, seeking alternative employment (e.g. through seasonal migration) or mobilizing additional household members for income generation, borrowing and, if necessary, reducing consumption are the most common activities observed in the literature. A frequent response by poor households to a situation of economic insecurity or crisis caused by various shocks is to mobilize additional labor – principally women’s labor, but in the poorest households even children’s labor. In this regard, it is the relative lack of other assets or capital to fall back (e.g.: physical, social, financial, etc.) which makes this strategy critical in withstanding shocks for poor urban households.

Empirically, however, there are few evidences that show the pattern and degree of income diversification at household level over time in Ethiopia. The available

recent time of consideration between 1997 and 2004. This indicates that income diversification as a livelihood strategy was not still that important for the sample of urban households considered in the study. However, a clear trend of increased reliance on multiple labor income sources was also observed between this same time. In this regard, the proportion of sampled households that depend on two to three different labor income sources has shown a 4.5 percentage point increase from 33.8% in 1997 to 38.3% in 2004. The proportion of those that depend on four to seven different labor income sources has also shown a slight increase from 3.6% to 5.2% between the same time.

Income variability being used as a proxy to the degree of exposure to risk was not found to have any effect on the tendency of poor urban households to depend on multiple and different labor income sources in accordance with prior expectation. Similarly, exposure to an external income shock was not in general found to have the expected positive and statistically significant effect upon the propensity of sampled poor urban households to depend on more number of different labor income sources. However, presence of such non labor income sources as remittance, gift and food aid was found to have significant and negative effect up on poor households' tendency to depend on relatively large number of different labor income sources as expected. Thus, the possible reason as to why an external income shock does not have the expected positive effect up on income diversification among the sampled poor urban households is expected to be associated with the aforementioned two major related findings of the study. First, income diversification was not such an important mechanism to most of the sampled households. This can be attributed to the following two possible reasons: One, the majority (or about 73%) of the sampled

households are transitory poor. In addition, 72.6% of the transitory poor sampled households were found to be poor in only one of the three years considered. (See appendix 5 for more detail). In other words, the proportion of households which are chronic poor (poor in all the three years considered, i.e.) as well as those which are poor in two of the three years considered is relatively small. Moreover, almost all of the sample households have permanent residence and hence probably have their own dwelling or house in the major urban centers of the country. These characteristics of the sampled households would probably made available other and better mechanisms other than income diversification up on which the households could depend during times of economic hardship. Among such other and better mechanisms, drawing up on saving accumulated during times of economic prosperity, depleting physical stocks and borrowing could be adopted by such households. Two, no covariate or common shock has occurred in the time of the study within which such households' behavior (income diversification, i.e.) was observed. During such times, a household that experienced an idiosyncratic or individual shock would probably have at its disposal another alternative of relaying on assistance from other households that have not experienced similar shock. However, such a strategy would not be that dependable if covariate or common shock that affected the entire community had been occurred. Second, those households that have got some non labor income were found to be less associated with income diversification strategy. Moreover, some studies including one being undertaken on similar sample of households indicated that such non labor incomes as remittances in most cases flow to households that face economic hardship.

The other unexpected, surprising and quite interesting finding of the study is that access to credit to the sampled poor urban households of especially the capital city was found to be associated with households' dependence on relatively more and distinct labor income sources rather than on relatively few and expanded labor income sources. This is believed to be explained by the following two plausible reasons. First, a household in the capital city might probably be required to invest higher sum of money and hence get higher amount of credit as well as to bear higher risk if it has to depend successfully on one or two expanded business income sources. Second, the majority of the sampled households are expected to be risk averse on the basis of the fact that they are poor and hence are not expected to have a demand for higher amount of credit. Furthermore, most of the households that are taken not to be credit rationed have access to small amount of credit being made available by such entities as friends and relatives which can probably fall short of serving as a basis for effective business expansion especially in such markets as those in the capital city.

## **6.2. Policy Implications**

Two policy implications can be drawn from the findings of this study. It was indicated earlier that higher household size was found to have strong and positive impact on the number of distinct labor income sources of a household. In addition, a household with an illiterate or a little-educated household head was also indicated to have depended on relatively more number of different labor income sources than a household having a head with primary/secondary level education. Moreover, it is

widely known that a relatively large household size as well as a relatively little educated household head are among the common characteristics of poorer households. These findings, together with that associated with income insecurity, imply that income diversification especially in the informal sector in major urban centers of Ethiopia was mainly undertaken for distress and poverty reasons. This dictates the need to support the practitioners of the informal sector. This support could aim at improving access to credit, technology, training and marketing in order to strengthen their productive capacity to create jobs and generate income. This is expected to have an added benefit of limiting the further rapid expansion of the informal sector as well as of reducing incidence of child labor and hence intergenerational transfer of poverty other than raising the current income and living standard of the practitioners. On the other hand, mere provision of even unlimited access to credit might not by itself help poor urban households to undertake effective expansion of existing businesses depending on the particular nature of market confronted by the households. Thus, if say, for example, control of expansion of the informal sector is envisaged, the intervention strategy to be followed should be based on the actual nature of each urban center. Moreover, concerned governmental and non governmental organizations in their effort to reduce poverty in general and urban poverty in particular should follow a holistic problem solving approach based on studies designed to identify and examine the various problems/constraints of the poor. With respect to poor urban households having permanent residence especially in the capital city, provision of some sort of affordable and suitable business insurance scheme need also be envisaged in addition to mere provision of access to micro-credit. This could be achieved through facilitating formation of joint ventures or

cooperatives among such households so that the higher risk of an expanded business in the capital city could be shared by all the households involved.

Finally, it is worthy to mention the two important caveats to any conclusion to be drawn from the findings of this study. First, as it was mentioned earlier, the sampling frame employed in the surveys producing the data used by this study excludes an important social group from the point of view of studying a critical and frequently employed strategy to a situation of economic insecurity or crisis by especially the poorest urban households. That is, the shanty towns' dwellers of especially the capital city as well as households having no fixed address were excluded from the surveys despite these are expected to be the poorest urban dwellers. Second, the time covered by the study do not include those from 2005 onward in which some mild covariate or common shock, inflation, i.e., arose to affect especially the poor, poorer and poorest urban dwellers of the country. This covariate or common shock can be expected to some how erode the feasibility of such social network strategies as relying on assistance from others that were known to remain important at least among those poor households having permanent residence in the major urban centers of the country till 2004.

In view of these, this study has not exhausted the necessary information about income diversification strategy of poor urban households in Ethiopia. Thus, similar studies are suggested to be conducted based on proper sampling frame that takes into account such obvious limitations of this study in order to enable concerned bodies to have sufficient and more usable information on the issue of interest attempted to be explained by the study.

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## Appendix 1

### Tables of results for previous studies

**Table 1.A: Distribution of households by activity combination**

<b>Activity combination</b>	<b>Number</b>	<b>%</b>
Wage and salaries only	735	56.6
Formal business only	169	13
Female household business only	147	11.3
Farming only	4	0.3
Wage/salaries and formal business	157	12.1
Wage/salaries and female household business	67	5.1
Formal business and female household business	13	1
Wage/salaries and farming/livestock	2	0.2
Wage/salaries, formal business and female household business	4	0.3
Formal business and farming/livestock	1	0.1
<b>Total</b>	<b>1299</b>	<b>100</b>

*Source: Bigsten and Makonnen (1999)*

**Table 1.B: Number and percent of households with different income combinations by year**

	<b>Source</b>	<b>1994</b>	<b>1995</b>	<b>1997</b>
One source	Wages only	348	291	301
		31%	26%	26%
	Business only	110	133	97
		10%	12%	9%
	Female household business only	67	79	58
		6%	7%	5%
	Remittances and pensions only	141	132	174
12%		12%	15%	
Total one source	666	635	630	
		59%	57%	55%
One source + remittances	Wage and remittances	183	159	227
		16%	14%	20%
	Business and remittances	45	65	58
		4%	6%	5%
	Household female business and remittances	58	48	58
		5%	4%	5%
Total one source + remittances	286	272	353	
		25%	24%	30%
Two sources	Wage and business	54	66	49
		5%	6%	4%
	Wage and household female business	30	57	25
		3%	5%	2%
	Business and household female business	7	24	20
		1%	2%	2%
Total two sources	91	147	94	
	9%	13%	8%	
Other combinations		94	83	70
		8%	7%	6%
<b>Total</b>		<b>1137</b>	<b>1137</b>	<b>1137</b>

Source: Bigsten et al. (2005)

## Appendix 2

### The country level general and food CPI (December 2003 - November 2004)

<b>Budget Year and Month</b>	<b>General</b>	<b>Total Food Index</b>
December 2000	100.0	100.0
December 2003	116.1	123.1
January 2004	114.9	119.8
February 2004	116.2	121.2
March 2004	118.7	124.7
April 2004	122.3	130.4
May 2004	122.6	131.3
June 2004	123.8	133.0
July 2004	123.3	134.3
August 2004	124.6	135.9
September 2004	125.8	136.7
October 2004	126.9	139.0
November 2004	125.9	136.4

Source : Central Statistical Agency(CSA)

### Appendix 3

#### Adult equivalence scale

Age in years	Weight	
	Male	Female
< 1	0.328	0.328
1	0.46	0.46
2	0.54	0.54
3 - 4	0.62	0.62
5 - 6	0.74	0.70
7 - 9	0.84	0.72
10 - 11	0.88	0.78
12 - 13	0.96	0.84
14 - 15	1.06	0.86
16 - 17	1.14	0.86
18 - 29	1.04	0.80
30 - 59	1.00	0.82
60 -	0.84	0.74

Source : Bigsten et al. ( 2005)

*Appendix 4*

**Pattern of presence of sampled households in the three rounds considered**

<b>No. of Households</b>	<b>Percent of Households</b>	<b>Pattern of Presence of Households</b>		
		<b>Present in 1997</b>	<b>Present in 2000</b>	<b>Present in 2004</b>
481	65.26	√	√	√
112	15.20	X	√	√
89	12.08	√	√	X
55	7.46	√	X	√
<b>737</b>	<b>100.00</b>	<b>625</b>	<b>682</b>	<b>648</b>

*Source: Own Computation*

## Appendix 5

### Poverty status of sampled households

<b>Poverty Status</b>	<b>No. of Households</b>	<b>Percent of Households</b>
<b>Chronic Poor</b>	<b>200</b>	<b>27.14</b>
Two Period Transitory Poor	147	19.95
One Period Transitory Poor	390	52.92
<b>Total Transitory Poor</b>	<b>537</b>	<b>72.86</b>
<b>Grand Total</b>	<b>737</b>	<b>100.00</b>

*Source: Own Computation*

**Appendix 6**

**Income diversification pattern of sampled households**

No. of Labor Income Sources	Type of Labor Income Sources	No. of Households			Percent of Households		
		1997	2000	2004	1997	2000	2004
<b>No Source</b>		<b>86</b>	<b>103</b>	<b>93</b>	<b>13.8%</b>	<b>15.1%</b>	<b>14.4%</b>
<b>One Source</b>	1 wage	165	188	173	26.4%	27.6%	26.7%
	1 business	65	77	61	10.4%	11.3%	9.4%
	1 female household business	69	50	39	11%	7.3%	6%
	1 children income generating activity	5	3	-	0.8%	0.4%	-
	<b>Total One Labor Income Source</b>	<b>304</b>	<b>318</b>	<b>273</b>	<b>48.6%</b>	<b>46.6%</b>	<b>42.1%</b>
<b>Two Sources</b>	1 wage & 1 business	29	23	36	6.4%	3.4%	5.5%
	1 wage & 1 female household business	28	35	26	4.5%	5.1%	4%
	1 business & 1 female household business	18	10	7	2.9%	1.5%	1.1%
	1 wage & 1 children income generating activity	4	9	3	0.6%	1.3%	0.5%
	1 female household business & 1 children income generating activity	5	8	2	0.8%	1.2%	0.3%
	1 business & 1 children income generating activity	3	-	2	0.5%	-	0.3%
	2 d/f wages	56	64	82	9%	9.4%	12.7%
	2 d/f businesses	8	10	8	1.3%	1.5%	1.2%
	2 d/f female household businesses	7	3	-	1.1%	0.4%	-
	<b>Total Two Labor Income Sources</b>	<b>158</b>	<b>162</b>	<b>166</b>	<b>25.3%</b>	<b>23.8%</b>	<b>25.6%</b>
<b>Three Sources</b>	1 wage & 1 business & 1 female household business	3	11	5	0.5%	1.6%	0.8%
	1 wage & 1 business & 1 children income generating activity	2	-	-	0.3%	-	-
	1 wage & 1 female household business & 1 children income generating activity	1	-	1	0.2%	-	0.2%
	1 business & 1 female household business & 1 children income gen. activity	-	2	2	-	0.3%	0.3%
	1 wage & 2 d/f businesses	1	3	2	0.2%	0.4%	0.3%
	2 d/f wages & 1 business	9	12	19	1.4%	1.8%	2.9%
	1 wage & 2 d/f female household businesses	1	2	1	0.2%	0.3%	0.2%
	1 wage & 2 d/f children income gen. activities	-	2	-	-	0.3%	-
	2 d/f female household businesses & 1 children income generating activity	-	1	-	-	0.2%	-
	2 d/f businesses & 1 children income generating activity	-	1	-	-	0.2%	-
	2 d/f wages & 1 female household business	10	14	13	1.6%	2.1%	2%
	2 d/f businesses & 1 female household business	2	-	1	0.3%	-	0.2%

Income diversification pattern of sampled households (Cont.)

No. of Labor Income Sources	Type of Labor Income Sources	No. of Households			Percent of Households		
		1997	2000	2004	1997	2000	2004
<b>Three Sources</b>	1 business & 2 d/f female household businesses	-	-	1	-	-	0.2%
	2 d/f wages & 1 children income generating activity	2	3	1	0.3%	0.4%	0.2%
	1 female household business & 2 children income generating activities	1	-	-	0.2%	-	-
	3 d/f wages	12	18	34	1.9%	2.6%	5.3%
	3 d/f businesses	-	-	2	-	-	0.3%
	<b>Total Three Labor Income Sources</b>		<b>44</b>	<b>69</b>	<b>82</b>	<b>7%</b>	<b>10.1%</b>
<b>Four Sources</b>	1 wage & 1 business & 1 fem. household busin. & 1 children income gen. activity	-	2	-	-	0.3%	-
	1 wage & 2 d/f businesses & 1 female household business	1	-	-	0.2%	-	-
	2 d/f wages & 1 business & 1 female household business	-	1	-	-	0.2%	-
	2 d/f wages & 1 female household business & 1 children income gen. activity	-	1	1	-	0.2%	0.2%
	2 d/f businesses & 1 fem. household business & 1 children income gen. activity	-	-	1	-	-	0.2%
	1 wage & 1 business & 2 children income generating activities	-	1	-	-	0.2%	-
	3 d/f wages & 1 children income generating activity	2	1	-	0.3%	0.2%	-
	3 d/f wages & 1 business	2	3	4	0.3%	0.4%	0.6%
	3 d/f wages & 1 female household business	-	1	7	-	0.2%	1.1%
	2 d/f wages & 2 d/f businesses	1	1	-	0.2%	0.2%	-
	4 d/f wages	7	9	9	1.1%	1.3%	1.4%
<b>Total Four Labor Income Sources</b>		<b>13</b>	<b>20</b>	<b>22</b>	<b>2.1%</b>	<b>2.9%</b>	<b>3.4%</b>
<b>Five Sources</b>	1 wage & 1 business & 2 fem. household busin. & 1 children income gen. activity	-	1	-	-	0.2%	-
	1 business & 3 d/f fem. household busin. & 1 children income gen. activity	1	-	-	0.2%	-	-
	3 d/f wages & 1 fem. household businesses & 1 children income gen. activity	1	-	-	0.2%	-	-
	3 d/f wages & 1 business & 1 female household business	-	1	-	-	0.2%	-
	2 d/f wages & 2 d/f businesses & 1 female household business	-	-	1	-	-	0.2%
	1 wage & 3 d/f businesses & 1 female household business	-	-	1	-	-	0.2%
	3 d/f wages & 2 d/f businesses	-	-	2	-	-	0.3%
	4 d/f wages & 1 business	3	1	1	0.5%	0.2%	0.2%
	4 d/f wages & 1 female household business	-	1	-	-	0.2%	-
4 d/f wages & 1 children income generating activity	-	1	-	-	0.2%	-	

Income diversification pattern of sampled households (Cont.)

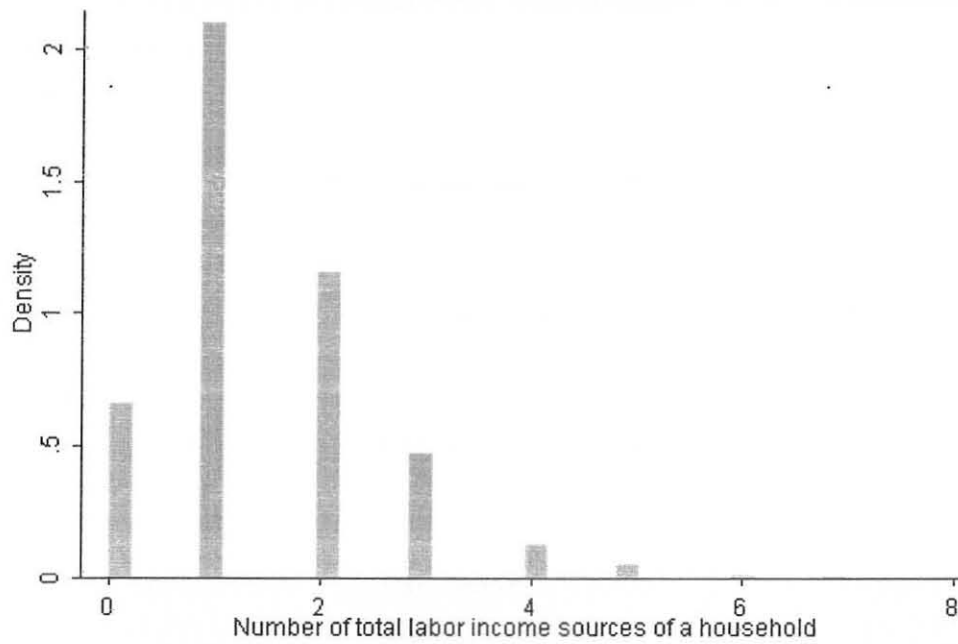
No. of Labor Income Sources	Type of Labor Income Sources	No. of Households			Percent of Households		
		1997	2000	2004	1997	2000	2004
Five Sources	3 d/f wages & 2 d/f businesses	1	-	-	0.2%	-	-
	5 d/f wages	3	-	3	0.5%	-	0.5%
	<b>Total Five Labor Income Sources</b>	<b>9</b>	<b>5</b>	<b>8</b>	<b>1.4%</b>	<b>0.7%</b>	<b>1.2%</b>
Six Sources	4 d/f wages & 1 business & 1 female household business	-	-	1	-	-	0.2%
	5 d/f wages & 1 female household business	-	-	1	-	-	0.2%
	6 d/f wages	-	1	2	-	0.2%	0.3%
	<b>Total Six Labor Income Sources</b>	<b>-</b>	<b>1</b>	<b>4</b>	<b>-</b>	<b>0.2%</b>	<b>0.6%</b>
Seven Sources	5 d/f wages & 1 fem. household businesses & 1 children income gen. activity	-	1	-	-	0.2%	-
Other Income Source Combinations		11	3	-	1.8%	0.4%	-
<b>TOTAL</b>		<b>625</b>	<b>682</b>	<b>648</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: Own Computation

## Appendix 7

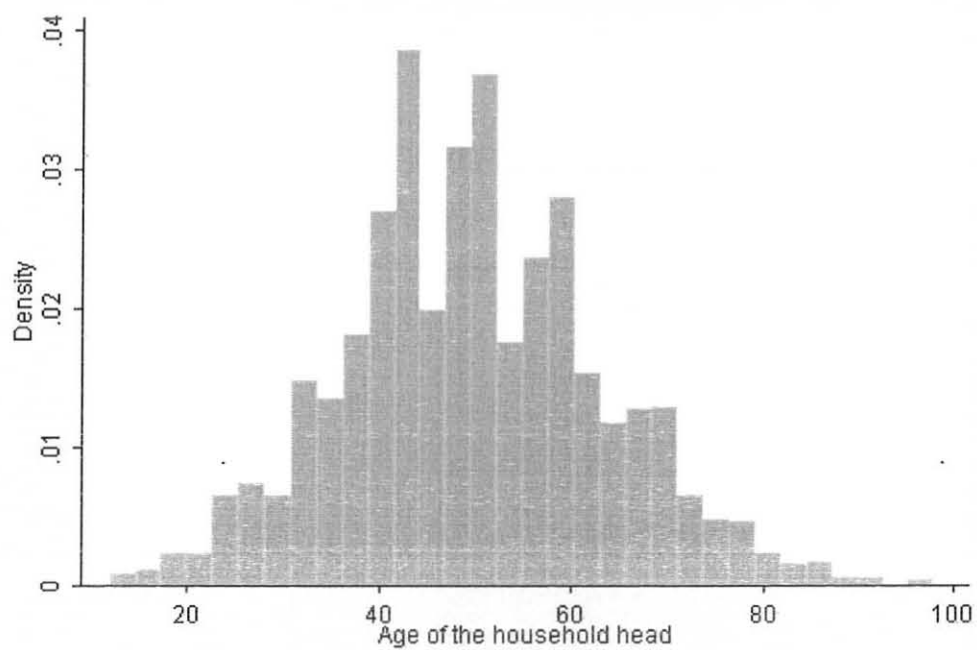
### Histogram of the dependent and non-dummy explanatory variables

#### Histogram of the dependent variable

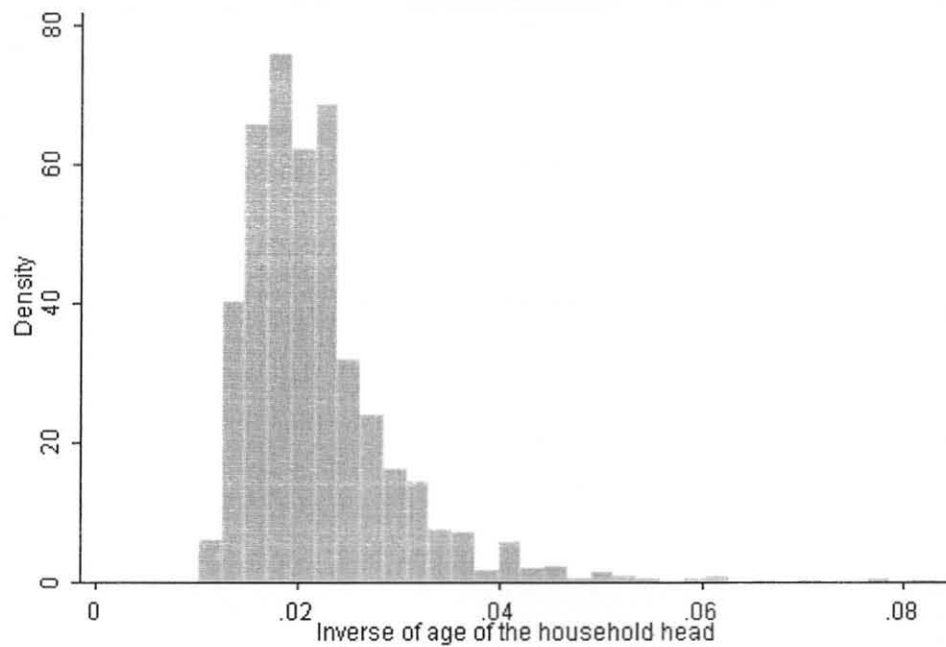


Source: Own Computation

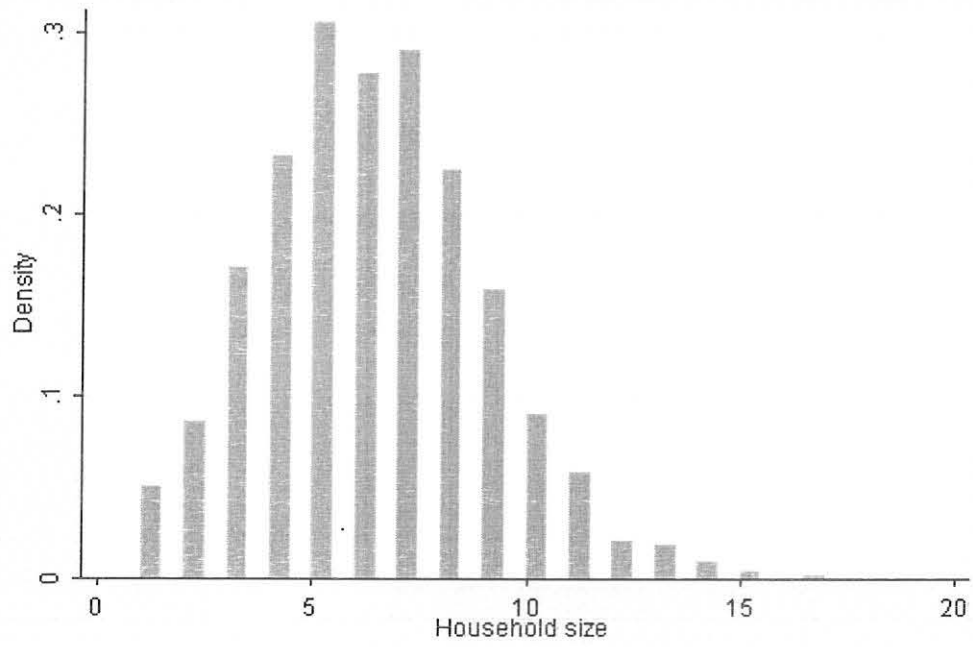
## Histograms of the non-dummy explanatory variables



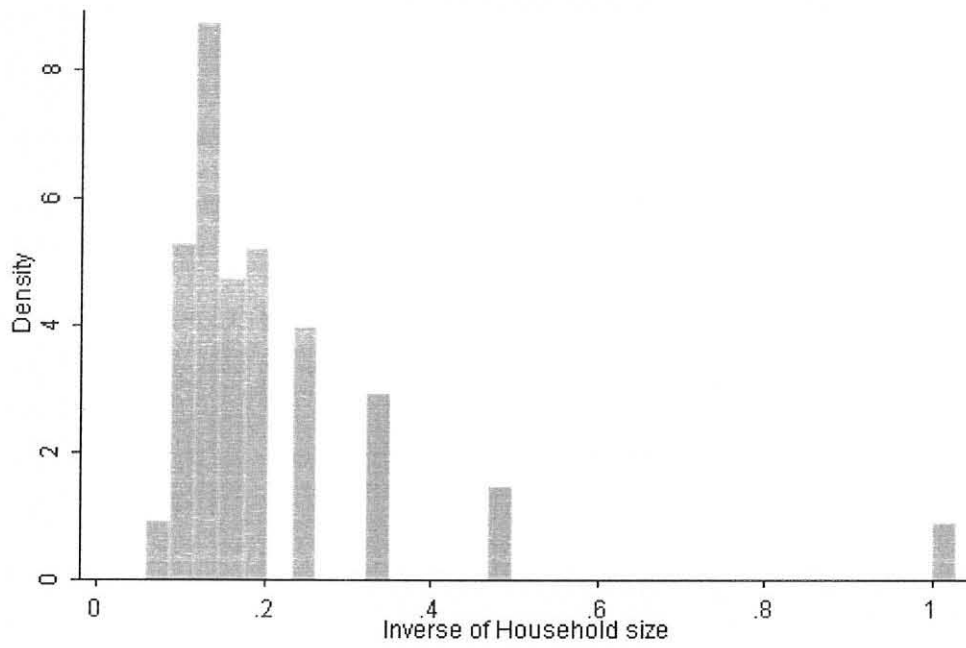
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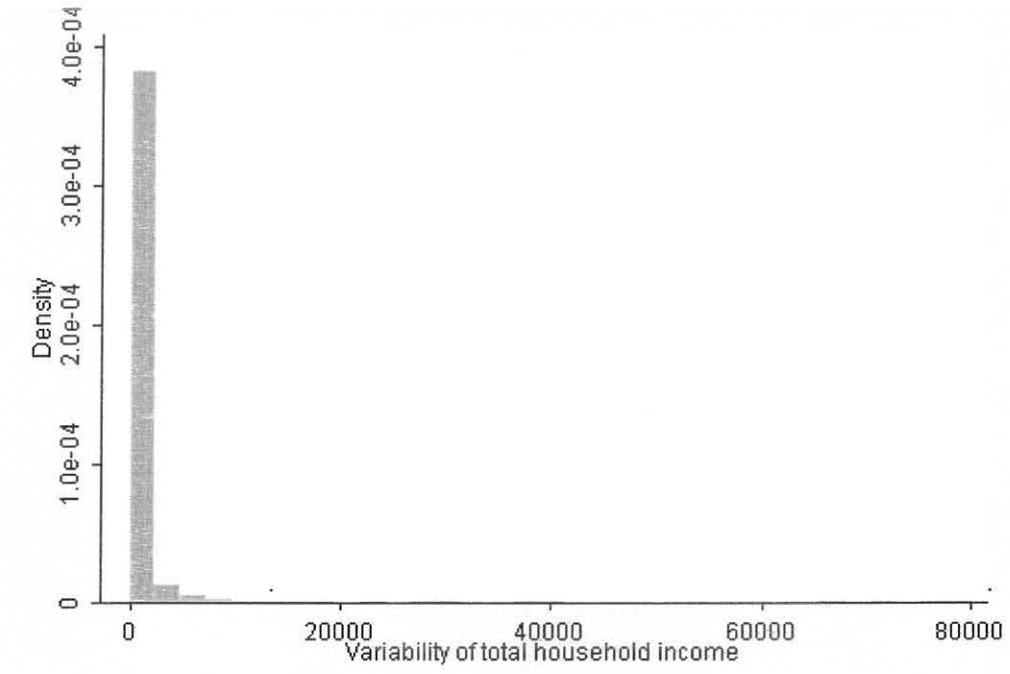
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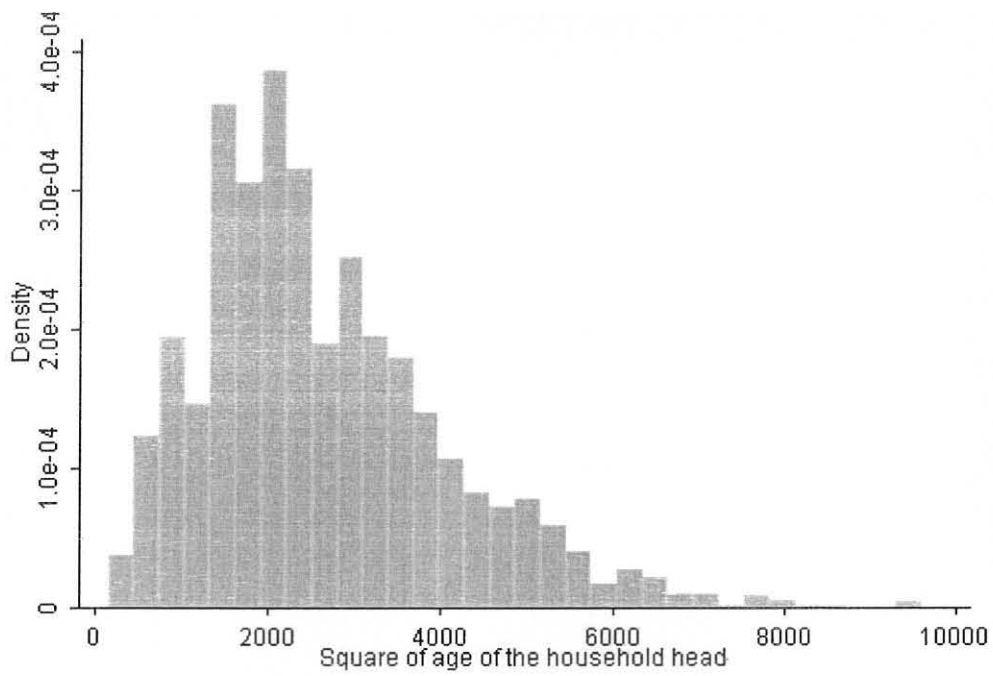
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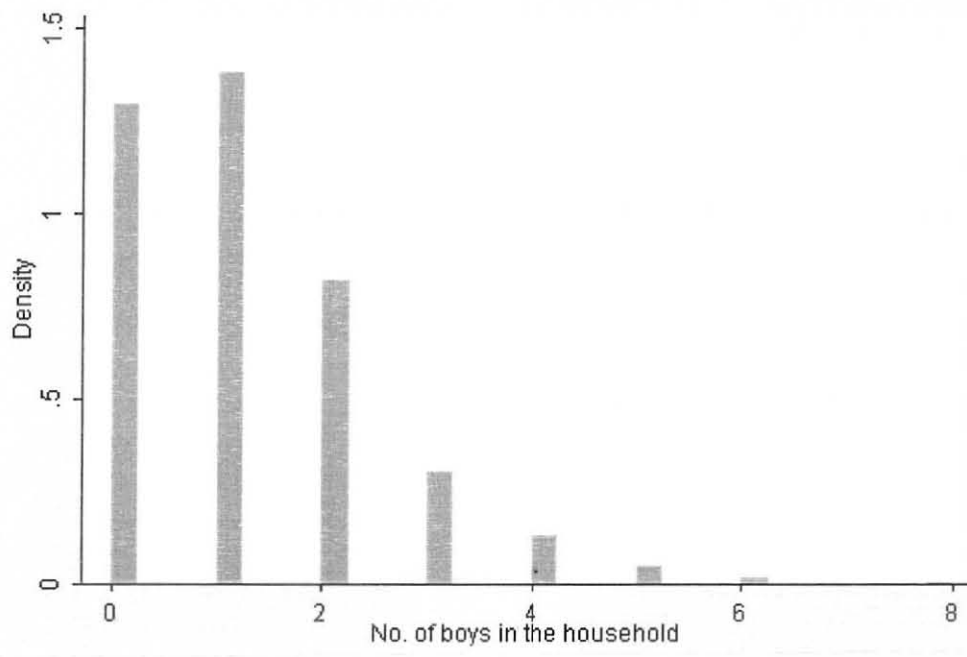
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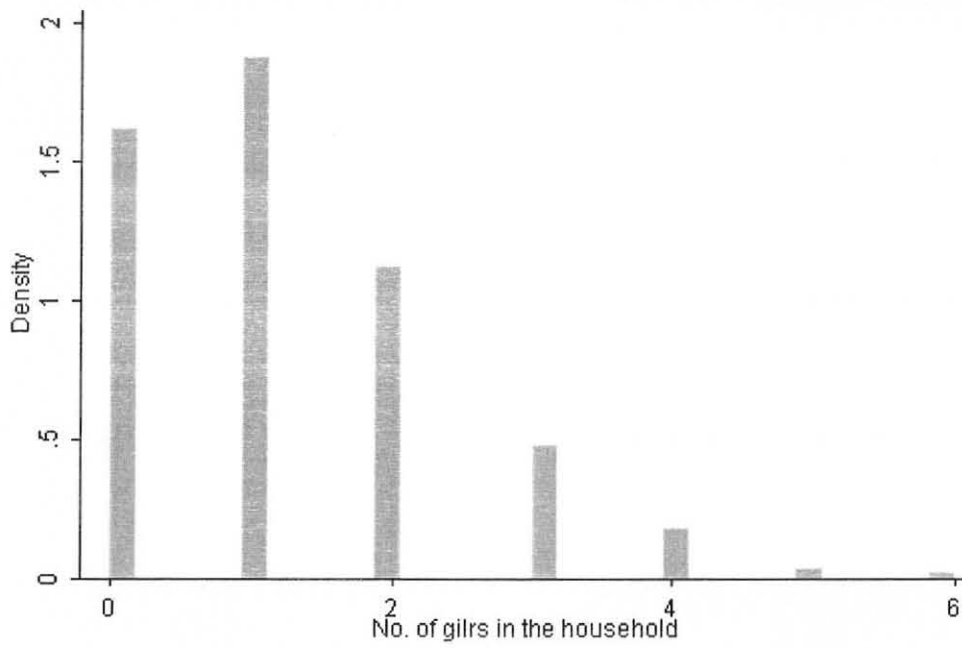
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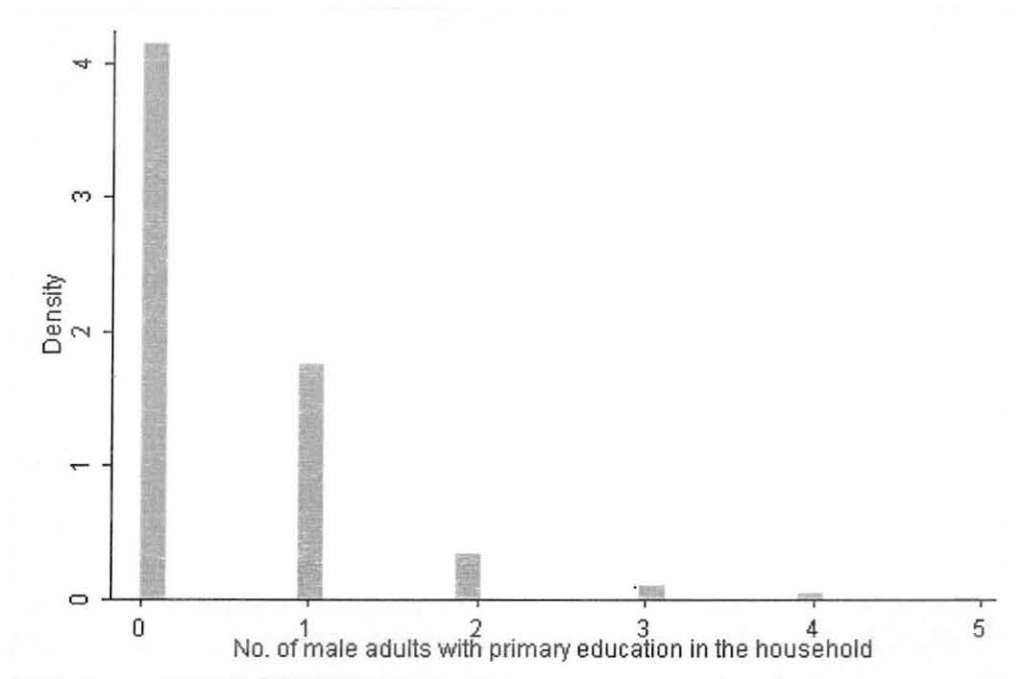
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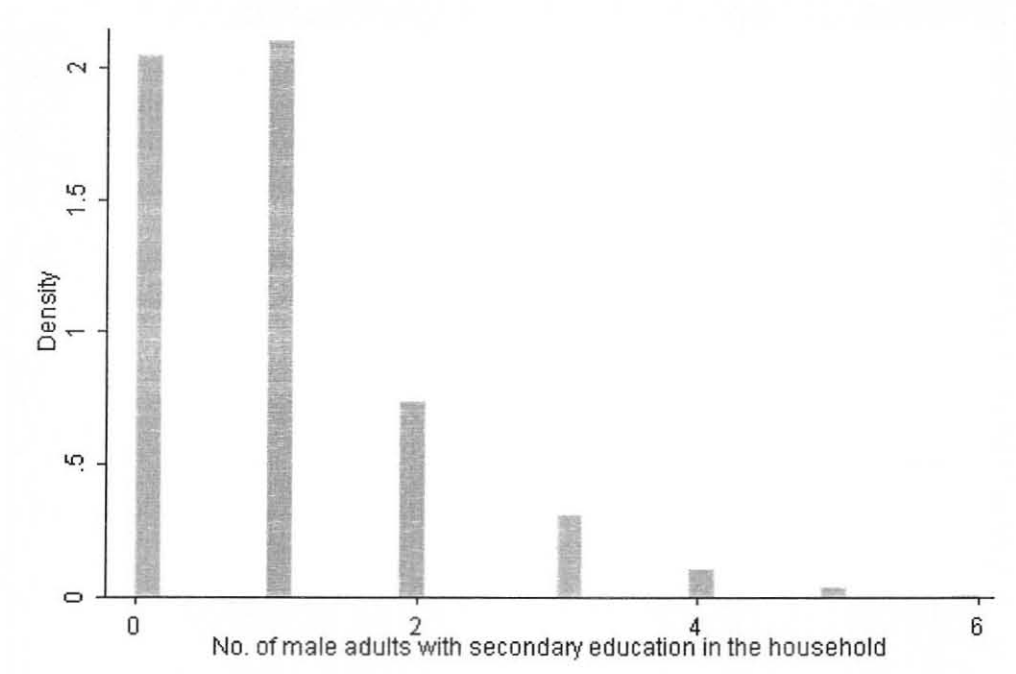
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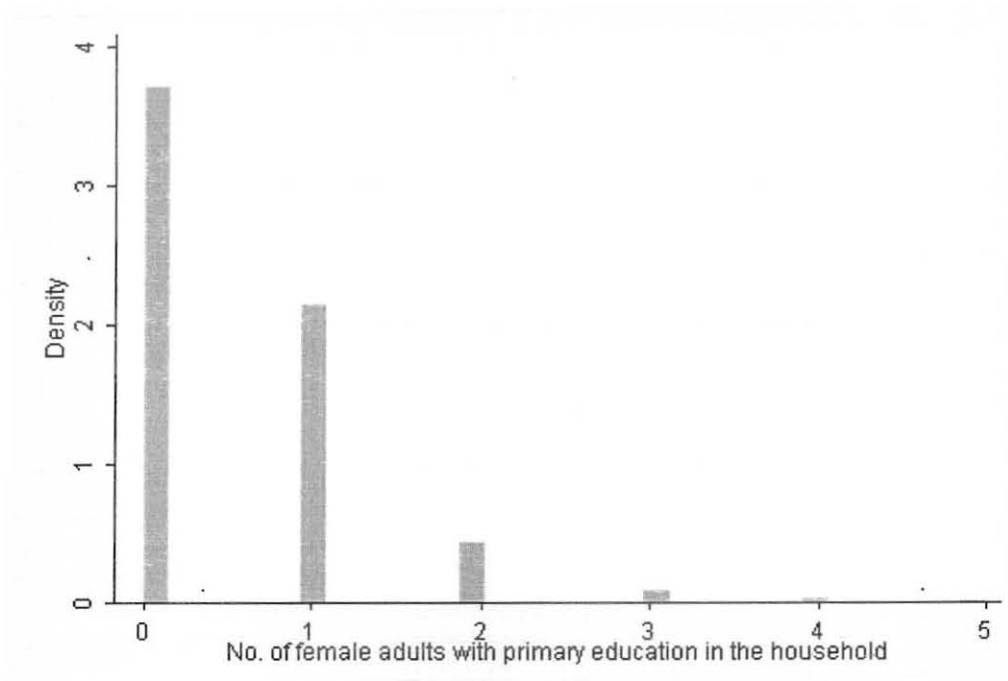
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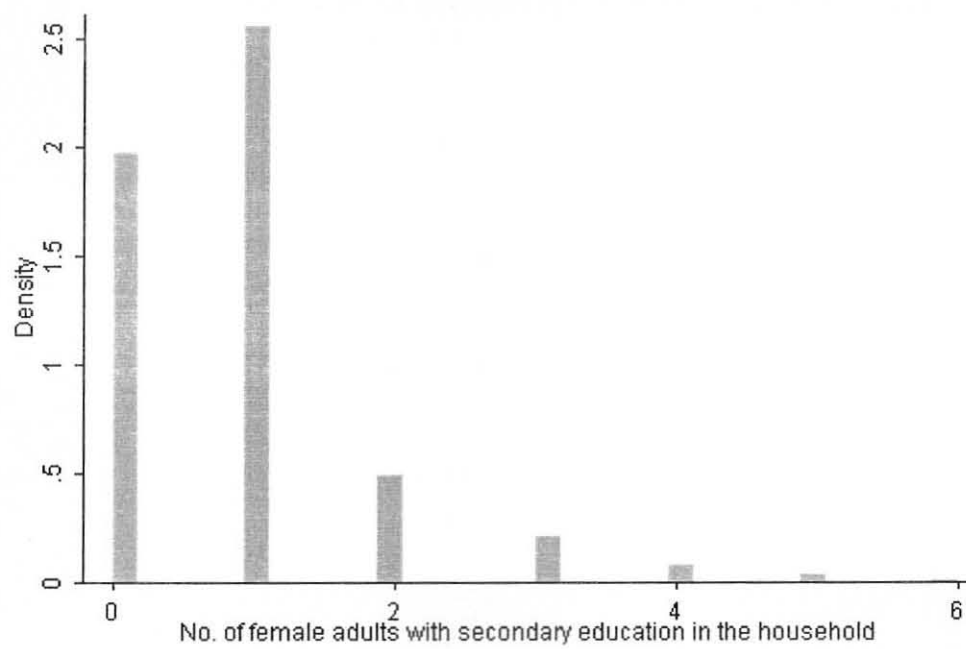
Source: Own Computation



Source: Own Computation



Source: Own Computation



Source: Own Computation

## Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other University, and that all source of materials used for the thesis have been duly acknowledged.

The examiners' comments have been dully incorporated.

### Declared by:

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Signature: 

Date: 10/11/2009

### Confirmed by Advisor:

Name: Dejene Aredo (PhD)

Signature: 

Date: 10/10/09

Place and date of submission: Addis Ababa; November 13, 2009.