

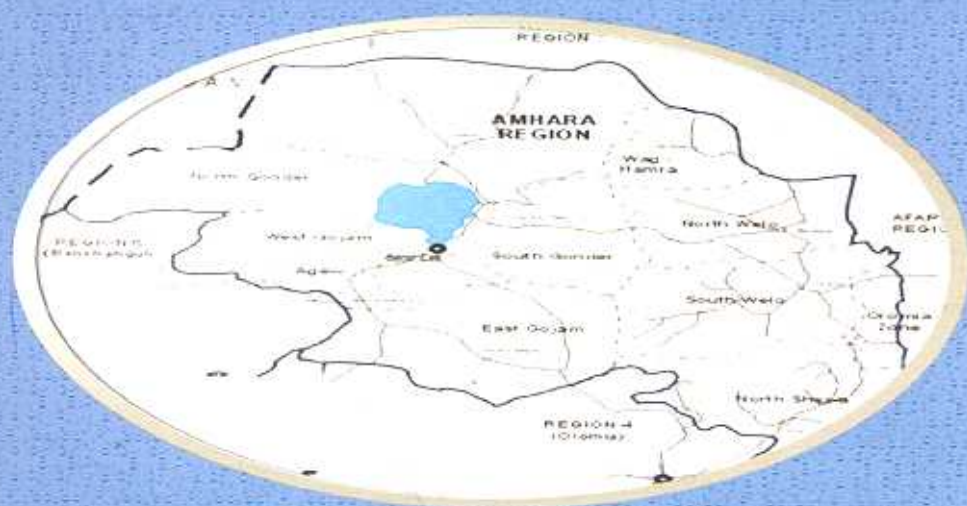
Ethiopian Economics Association (EEA)

EEA Bahir Dar Chapter



PROCEEDINGS OF THE THIRD REGIONAL CONFERENCE OF THE AMHARA REGIONAL STATE ECONOMIC DEVELOPMENT

Edited by:
Worku Gebeyehu
Demirew Getachew



June 2012

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Getnet Alemu

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FOREWORD

The Ethiopian Economics Association (EEA) and its Bahir Dar Chapter are happy to issue the proceeding of the Third Annual Conference on the Amhara Regional State Economic Development which was organized on the 20th August, 2011 at Amhara Regional State Bureau of Finance and Economic Development Conference Hall. EEA has been organizing conferences, workshops and panel discussions on the Ethiopian Economy over the years as part of its overall objectives that include contributing to the economic policy formulation capability; promoting the professional development of its members; promoting the study of Economics in the country's educational institutions, promoting economic research and disseminating the findings of such researches in the country, providing fora for the discussion of economic issues and promoting professional contacts between the Ethiopian Economists and those of others. Since 2009, EEA has started organizing regional conferences so as to broaden its activities and coverage at regional level and to contribute to the economic advancement of regional state through dissemination of economic research findings and promotion of dialogue on socio-economic issues of regional states.

In quest of its mission, EEA has been actively engaged in economic research, training, organization of International, National and regional conferences and round table discussions and the dissemination of the results of these activities through its professional journals and various publications. It has also been engaged in providing professional opinion and reflections on many issues affecting the development of this country. As a result of these and other efforts of the Association, EEA has established itself as a truly independent source of socio-economic policy options and data base in Ethiopia for the Ethiopian Government, the Ethiopian people and the International Community at large.

The Third Annual conference presentations and discussions thereof covered diverse themes. These included: Poverty, Social Capital, Trade, Tax compliance, Crop, livestock, Health and Tourism etc. All papers which were presented at the Third Annual Conference were reviewed by external reviewers and Comments and suggestions including editorial comments were communicated to authors for improvement. Finally, those papers which passed all the review and editorial process published in the Proceeding of the Third Annual Conference on the Amhara Regional State Economic Development. The conference attracted about 130 participants that are drawn from

Amhara Regional State Government Offices, Universities, Civil Society Organizations, and EEA members.

I would like to take this opportunity to express my heartfelt gratitude, on my own behalf and on behalf of the Ethiopian Economic Association, to the many people and organizations that made the conference a resounding success. First and foremost, I thank the authors of the papers and the audience whose active participations made the Third Annual Conference meaningful and dynamic. The Amhara Regional State Bureau of Finance and Economic Development deserve huge thanks for granting us the free use of its conference hall. The many professionals who dedicated their time to the conference and served as chairpersons deserve due thanks for their special contributions.

The staffs of the Economics Department of the Bahir Dar University, which runs the EEA Bahir Dar Chapter, deserve a special recognition for their enthusiasm and perseverance in managing the conference from inception to completion. I would like also to thank Bahir Dar University for the continuous support given to the EEA Bahir Dar Chapter and the martial, technical and finical support given for the successful conclusion of the Third Annual Conference.

I would like to seize this moment to express our gratitude to Friedrich Ebert Stiftung of Germany (FES) for financing the conference and the publication of the proceeding of the Third Annual Conference on Amhara Regional State Economic Development.

Finally, I would like to extend my sincere gratitude to H.E. Ato Degu Andargachew, V/President of the Amhara Regional State, for his an insightful opening remarks; and other senior regional government officials who spared their busy schedule and participated in the conference.

Alemayehu Seyoum Taffesse (DPhil)
President of the Ethiopian Economics Association

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THE IMPACT OF LOCATION ON CROP CHOICE AND RURAL INCOME: EVIDENCES FROM VILLAGES IN WOLLO, ETHIOPIA

Seid Nuru and Holger Seebens

Abstract

This paper attempts to demonstrate how location of an agricultural economic activity in relation to urban centers determines households' decision to allot their agricultural land to the production of either staple crop or a high value but risky cash crop. By applying fractional logit estimation technique on data collected from villages in Wollo of the Amhara Regional State in 2006, it has been found that proximity to urban centers, access to road, and education along with other factors determine the crop choice in favor of the production of high value crops. While the purely liquid wealth positively affects the allocation of land for the production of cash crops, the direction of the impact of livestock on crop choice is found to depend on the particular location of the activities in relation to urban (market) centers. The pattern of crop choice has been translated into a variation in the level of per capita income across villages where the farthest with no access to road are the poorest.

1. Introduction

Early thinking on the relation between location and crop choice dates back to the 19th century owing to von Thünen who first pointed out the importance of location in shaping the duality between the rural and urban economy. In his 'Isolated State,' Thünen portrays an economy that consists of an urban center surrounded by homogenous agricultural land which differs only in terms of distance from the urban center. Agricultural produces from the land are transported to town for trading. Crop choices depend on the cost effectiveness of each crop in terms of transportation. In the inner ring around the town, crops which are costly to transport (such as vegetables) are produced. At the outer annulus of the rings, crops involving lower transport costs (such as grain) are grown (Samuelson, 1983; Fujita and Thisse, 2002).

The decision of households located in the outer annulus to produce grains may not be entirely driven by price incentives but could also be an outcome of their desire to be self-sufficient in staple crops in order to smooth consumption. Inherent to different distances of villages from the urban centers is, thus, an unequal distribution of income, since vegetables are cash crops that yield high returns on the market while staple food grown at the outskirts can be sold only at low prices.

Despite Thünen's early approach, there has been put little attention to the role of location in recent crop choice models (Fujita and Thisse, 2002) which rather focus on uncertainties arising from weather conditions and price shocks. In an attempt to fill this gap, this paper analyzes the impact of location on crop choices and the associated disparity in income using data from villages in North Eastern Ethiopia.

It has been widely argued that various forms of uncertainties contribute to the subsistent nature of many rural areas in developing countries (Dillon and Scandizzo, 1978; Fafchamps, 1992; Dercon, 1996; Ayalew, 2003). In response to this, rural households have developed different strategies to cope with the risk associated with agricultural production. Diversification has been conceived as a feasible insurance strategy, which often implies lower returns, however. Price fluctuations can be compensated if households cultivate a wide portfolio of crops, among which staple crops—tending to be more stable in terms of prices—constitute an important safety measure. In particular, poor and risk-averse households tend to ensure self-sufficiency in staple crops leading to the limitation of diversification to only different kinds of staple crops.

Even given stable and high prices for cash crops, households' decision to engage in the production of cash crops depends on transportation costs, which in turn depend on the distance of the particular plot or village from the market. For instance, markets for logs and lumber of eucalyptus are well established in urban centers of Ethiopia. However, households living far from urban centers do not grow eucalyptus trees even on their marginal land because eucalyptus growers living closer to urban centers outbid in the market. One reason is higher transportation cost. Distance to markets has thus an important influence on the development prospects of remote villages. Decisions by households to allocate the bulk of land to the production of less valued staple crops results in low surplus and low incomes, implying that the incidence of poverty is likely to increase with distance away from urban centers.

This paper attempts to look into how the location of an agricultural activity in relation to markets in urban centers affects the production of high value cash crops. The remaining part of the paper is organized as follows. Section 2 highlights descriptive facts from surveyed villages. Section 3 presents a simple theoretical framework while Section 4 deals with the econometric analysis. Finally, section 5 concludes.

2. Location of Agricultural Land and Crop Choice in Selected Villages of Ethiopia

As of 2007, Ethiopia has about 77 million people growing at about 2.8% annually. About 85% of the population makes a living from land intensive subsistent agriculture accounting for 45% of GDP. The country exhibits one of the lowest rates of urbanization where only 15% dwells in urban centers. As a result, size of arable land per household decreases making the land issue critical in transforming the Ethiopian economy. Average land size in the country remains at about 1 hectare per household. This is equivalent to a mere 0.2 hectare per head with an average rural household size of 5, which is mostly used for staple crop production (CSA, 2005).

Due to a poorly developed transport network and low demand from the urban center, Ethiopian farmers focus on the production of staple crops except for coffee for which an already established international market exists. According to the national data from CSA, in 2005, 84.3% of rural households in Ethiopia, excluding nomadic areas, live on crop and livestock production. About 84% of the total production of major crops is accounted by

cereals. If we exclude teff¹ which is both staple and cash crop, the share of the purely staple crops in the major crop production is as high as 79%. Pulses which are predominantly cash crops have a share of less than 5% (CSA, 2005).

2.1 Location

The study covers six villages in four locations in Wollo, eastern part of the Amhara Regional State. The survey was conducted in the year 2006. The villages were systematically selected based on their location from urban centers. The survey also accounts for agro-ecological differences. About 252 households were randomly selected from the villages. The distance between the reference district town and the nearest villages to the town is about 4 kilometers. The farthest village is 20 kilometers away from the nearest district town. Proximity to major towns is also considered. The major towns that are taken as references¹ are Dessie and Woldiya. Dessie is the capital of South Wollo Zone (one of the eleven Zone administrations of the Amhara State) and has an estimated population of 169,000. Woldiya is the capital of North Wollo Zone with an estimated population of 43,000. The two towns are 120 kilometers apart along the main Addis Ababa – Mekele road. District towns include Kutaber and Mersa.

One of the villages covered by the study called Alasha is located in Kutaber district some 12 kilometers from Dessie. The nearest district town to Alasha is Kutaber with an estimated population of 5,000. Two major attributes of the village compared to other survey areas in terms of location are (i) it is the nearest village to major urban centers, and (ii) it is located in the highland plateau characterized by a relatively cool climate.

The other study site, Mersa Zuria area, includes three villages intercepting the district town Mersa on either side of the Dessie-Woldiya road. Mersa has an estimated population of 6,500. The villages have easy access to the market primarily due to their proximity to the major Addis Ababa-Mekele road via Mersa and Woldiya. Besides, the villages are nearer to the district town, Mersa, and the Zone town Woldiya. Among the three villages, Buhoro has significant access to irrigation partly due to availability of tributary rivers.

¹ Teff is an indigenous grass growing in Ethiopia which is used to make Ethiopian staple bread called 'Injera'.

The third study site is Girana. It is located about 7 kilometers east of the Addis Ababa-Mekele road. There is a gravel road linking the village to the major highway. The major attribute of the village is that it has some tributaries which allow for irrigating a significant part of land. Moreover, there is weekly open market in the village attracting people from the surrounding villages. The village has a potential of being upgraded to township.

Among the villages covered by the study, Habru-Ligo has the farthest distance from both urban centers and major roads, and even lacks feeder road. Individuals have to travel a minimum of three hours on foot on difficult terrains to work on their land. About 25 to 30% of the land possessed by the villagers is irrigable.

2.2 Land Size and Crop Choice

The average land size per household ranges from 0.61 hectare in Alasha area to about 1 hectare in Mersa Zuria area. Although Alasha and Kulie have similar distance from district towns, per capita land size in Alasha is lower than in Kullie and even less than that of Menentela which is closest to the next district town. The pattern is similar in term of per capita land size where Alasha has the lowest with 0.13 hectare and Mersa Zuria has the highest with 0.27 hectare. Girana and Habru-Ligo have a roughly equal size of per capita land which is about 0.14 hectare.

Location and Land Size by Village, 2006

	Distance from District Town (in km)	Distance from Major Towns (in km)		Land Size per Household (in hectare)	Proportion of Land Allotted for Cash Crop and Eucalyptus (%)
		<i>Dessie</i>	<i>Woldiya</i>		
Alasha	7	12	-	0.613	7.9
Mersa Zuria				1.020	18.2
Menentela	4	94	20	0.822	12.2
Kulie	7	97	25	1.000	9.4
Buhoro	8	98	20	1.160	28.3
Girana	15	75	50	0.666	19.9
Habru-Ligo	20	85	60	0.643	0.9

In terms of land allocation, Buhoro exhibits the highest share of land allotted for the production of cash crops (about 28%) while Habru-Ligo has the lowest share which is

less than 1%. Major cash crops produced are sugarcane, fruits (orange, papaya, guava), coffee, and vegetables. The staple crops include sorghum of various varieties, and teff in villages other than Alasha. Teff is used both as a cash crop and staple food due to its high value in urban markets as it is the major staple for the urban population. During periods of poor harvest, households usually sell their teff and buy other cheaper staple crops such as sorghum for household consumption. However, since teff has low productivity, households in the study areas allot only a small portion of their land for the production of this crop unlike other regions which are endowed with large land size and specialize in the production of the crop on a large scale. Households in Alasha area produce wheat, barley, oats, and pulses.

2.3 Patterns of Income

Among the villages under study, Mersa Zuria area is relatively affluent with a per capita income of 1830 Birr. This is well above the average per capita national income of about 1300 Birr recorded in 2005 (NBE, Annual Report 2006). Buhoro with a relatively better access to irrigation is specialized in cash crop production. Unlike other villages, 47.5% of its income comes from cash crops. The peasants' involvement in the production of high value cash crops in the area is reflected by the fact that about 48% of their income comes from 28% of their land. Kullie and Menentela, where irrigable land is lacking, the highest share of their income is derived from commercial livestock farming. About 24% of household income in Menentela area and 26% of the income in Kullie come from livestock farming.

Sources of Income of Households by Village, 2006

	<i>Per capita income (in Birr)</i>	<i>Source of Household Income and their Contribution to Total Income (%)</i>							
		<i>Staple crops</i>	<i>Cash crops</i>	<i>Eucalyptus</i>	<i>Wage</i>	<i>Remittance from Abroad</i>	<i>Remittance from Towns</i>	<i>Rural Enterprise</i>	<i>Sale of Animal</i>
Alasha	934	3.7	2.9	18.3	1.6	2.1	1.6	3.1	12.8
Mersa Zuria	1830	1.2	23.7	9.6	5.3	7.6	2.6	0.0	16.8
Menentela	1545	5.3	0.8	10.4	6.7	15.1	5.0	0.0	24.0
Kullie	1079	7.5	0.6	3.7	8.4	8.3	0.0	0.0	25.5
Buhoro	2298	2.5	47.5	11.2	3.1	2.3	2.0	0.0	8.7
Girana	1087	5.6	20.3	0.1	6.3	14.8	0.6	2.4	3.7
Habru-Ligo	520	6.3	3.8	0.1	1.8	2.2	0.0	0.7	3.2

Habru-Ligo has the lowest per capita income (about 520 Birr) among the villages covered by the survey. A typical rural farmer in Habru-Ligo earns just 23% of what a typical farmer in Buhoro earns. Though the village has irrigable land, cash crop production is not very common. Peasants in the area do not invest in commercial livestock even though the village is well endowed with suitable conditions for animal husbandry. Households raise cattle, goats and sheep mainly as a buffer stock.

Besides crop production, villagers operating nearer to urban centers allot some plots of land for fast growing trees in particular eucalyptus. This partly depends on the type of slope and soil fertility of the plot of land possessed by peasants. In Alasha, hilly and marginal land which is held by peasants privately is largely covered by eucalyptus forests which have demand from urban centers for purposes of construction and energy supply. About 18% of household income in Alasha comes from the sale of logs of eucalyptus. In Menentela and Buhoro, between 10 and 11% of household income is derived from selling eucalyptus.

3. Theoretical Framework on Location, Crop Choice and Rural Income

3.1 Background

We model a Thünen type of environment where rural households make a living from income that is generated from their farming activities. Households dwell and operate at different distance from urban centers. Each household consists of working household members who maximize a joint utility function. Labor time is optimally allocated between agricultural activities and off-farm income generating activities, most importantly employment in the urban centers. However, to make the analysis tractable, the household is assumed to consist of a single individual only.

Agricultural activities involve mainly crop production and animal husbandry. Crop production, which is the mainstay of rural households, involves various items of products, of which the production technologies may differ. We restrict our attention to two major activities, namely, production of staple crops and production of cash crops. In fact, about 74% of the income of households in the villages covered by the survey comes from crop cultivation.

The household produces crops by combining land and other inputs such as labor, animal draft power, fertilizer and pesticides. Part of the staple crop and a significant share of

the cash crop have to be sold to purchase manufactured goods for consumption. A household not producing sufficient staple crops thus falling short of home consumption has to purchase additional food from the market using the proceeds from the sale of cash crops.

The decision to produce a particular item depends on the relative distance of the activity from the town. Moreover, unlike the Thünen's rings, the land surrounding the town needs not to be uniform so that villages at the same distance from town specialize in different crops. In what follows, we attempt to analyze how location affects the decision of a household to allot a plot of land for either staple or cash crops.

3.2 Production Technologies and Costs

Land is a limited resource. As a result, households rationally decide to invest in high value crops that maximize income per unit of land. Cash crops are preferred not necessarily by virtue of high yields per unit of land but for their high market value, most importantly in urban centers. Some cash crops such as coffee are not consumed for their nutritional values while some others such as vegetables are highly perishable. Staple crops on the other hand give more security to the household against low prices for agricultural products as the household can survive on it.

The production of the two crops requires factors such as land and labor. We further assume that labor is not a binding constraint for agricultural production. The household is assumed to have a single unit of labor and a single plot of land that can be allotted to the production of cash crops and staple crops. Let f^c and f^s represent the shares of land for cash and staple crops, respectively, so that $f^c + f^s = 1$. Using f^c portion of land, the household produces q^c units of cash crops to be sold at price p^c in urban centers. The remaining land ($f^s = 1 - f^c$) is used to produce q^s units of staple crop. Part of this crop will be consumed at home and any surplus is sold at the market at a price of p^s .

The production function of the two types of crops that relate the output per labor q^j to a fraction of a unit of land f^j is, therefore, given by:²

² Practically, some cash crops such as coffee, orange, and pawpaw have maturity period of two to five years. There are also some crops such as vegetables and oilseeds with a maximum maturity period of one year. Ayalew (2003) noted this issue and has taken the opportunity cost of land in terms of yield of annual crops as a result of longer maturity period of coffee trees into account in his model. However, it is customary in the area under study that the land under permanent cash crops can at the same time

$$q^c = A^c f(l^c)$$

$$q^s = A^s g(l^s) \quad (3.1)$$

where q^i denotes output per unit of labor and A^c and A^s are the levels of technology required to produce cash and staple crops, respectively. The production functions are assumed to fulfill the standard conditions:

$$f'(l^c) > 0, \quad f''(l^c) < 0; \quad g'(l^s) > 0, \quad g''(l^s) < 0.$$

where $f'(\cdot)$, $g'(\cdot)$ and $f''(\cdot)$, $g''(\cdot)$ refer to the first and second order derivatives with respect to land, respectively. The technology required to produce staple crops, A^s , is considered a numéraire to which the technology A^c can be compared. Thus, A^s is set to unity so that $q^s = g(l^s)$.

It is assumed that the decision to produce cash crops also depends on the technical know-how about the production of the particular cash crop. An individual might be a quick innovator in terms of acquiring new technology if he has some formal education. The technological parameter in the production function of the cash crop is given by:³

$$A^c = A_0^c e^{\psi E} \quad (3.2)$$

where A_0^c is some indigenous knowledge of the technology, E is level of education (say in years of schooling), and ψ is a parameter.

Given prices of cash crop and staple crops, the total monetary value of these crops is given by:

be used for the production of annual crops until the cash crops grew to a full-fledged tree. Thus, it is not harmful to continue the analysis without considering the opportunity cost of land due to long gestation period of permanent crops.

³ The adoption of the technology once it is available is assumed to evolve exponentially according to

$A^c = A_0^c e^{gt}$ where g is the rate of innovation and t is time required to acquire the technique. The rate of growth of technology is assumed to be a function of education over time, $g = \psi E$.

$$y = A_0^c e^{yE} p^c f(l^c) + p^s g(l^s) \quad (3.3)$$

The household incurs production costs for each crop. Costs of production of each crop are proportional to land allotted to the production of the crops. Let w^c and w^s represent factor prices per unit of land. The associated cost of production of cash and staple crops are given by $w^c l^c$ and $w^s l^s$.

The household also incurs transportation costs for both crops. We further assume that direct cost of transportation is the same for each crop. However, the cost of transportation varies depending on the amount of crop the household wants to sell. Household sell small shares of the staple crop because most of it is produced for home consumption. We assume that all cash crops are sold and let n denote the share of staple crop that is marketable. Then, the total transportation cost with k unit price of transportation is given by $kq^c r$ and $knq^s r$, where r is the distance between the village and the urban center.

The household also faces cost due to the perishable nature of each crop. We define an index that measures the degree of the perishable nature of each crop in connection to transporting the surplus to the market. Let r be the distance of the plot from the market place and r_{\max}^i denote the maximum distance of the i^{th} crop beyond which the crop cannot be sold at the market due to its perishable nature. Then, the index for the i^{th} crop is given by:

$$r^{*i} = \frac{r}{r_{\max}^i} \quad (3.4)$$

where:

$$r^{*i} = \begin{cases} 0 & \text{if } r = 0 \\ 1 & \text{if } r \geq r_{\max}^i \end{cases} \quad \text{so that } r_i^* \in [0,1].$$

If the crop produced at distance r is perishable, then it loses a value of r^{*i} monetary units per unit of crop. If almost all cash crops produced and n fraction of the staple crop are intended to be sold at their respective prices, and if all staple crops are not perishable, then the associated total cost incurred can be summarized by:

$$C = (q^c + nq^s)kr + r^{*c} p^c q^c + w^c l^c + w^s l^s \quad (3.5)$$

Given the revenue function in Equation (3.3) and the cost function in Equation (3.5), the profit π of the household is, therefore, given by:

$$\pi_t = A_0^c e^{w^E} f(l^c) (p^c - kr - r^{*c} p^c) + g(l^s) (p^s - nkr) - w^c l^c - w^s l^s \quad (3.6)$$

3.3 The Problem of the Household

The household maximizes profit according to:

$$\max_{l^c} \pi = A_0^c e^{w^E} f(l^c) (p^c - kr - r^{*c} p^c) + g(l^s) (p^s - nkr) - w^c l^c - w^s l^s \quad (3.7)$$

Taking the first order derivatives with respect to proportion of land under cash crop, the first order condition is:

$$\frac{d\pi}{dl^c} = A_0^c e^{w^E} f'(l^c) (p^c - kr - r^{*c} p^c) - g'(l^s) (p^s - nkr) - w^c + w^s = 0$$

This can be rearranged to give:

$$p^c A_0^c e^{w^E} f'(l^c) = \left[A_0^c e^{w^E} f'(l^c) (kr + r^{*c} p^c) + w^c \right] + \left[g'(l^s) (p^s - nkr) - w^s \right] \quad (3.8)$$

The right hand side of Equation (3.8) is the value marginal product of land in the production of cash crops. The first term of the right hand side in square brackets is the marginal cost of producing and selling cash crops. The term in the second square bracket denotes the opportunity cost of production of cash crops at the net margin. In general, this condition says that an optimum allocation of the available plot of land between cash and staple crops ensures that the marginal product of land in the production of cash crops equals the foregone value of the marginal product of staple crops net of marginal costs of production in the alternative use plus direct marginal costs.

Given our assumptions, it can be shown that the second order derivative of the profit function with respect to plot of land allotted for the production of cash crops is negative.

$$\frac{d^2\pi}{d(l^c)^2} = A_0^c e^{\psi E} f''(l^c)(p^c - kr - r^{*c} p^c) + g''(l^s)(p^s - nkr) < 0$$

By the assumption of diminishing returns to scale, $f''(l^c)$ and $g''(l^s)$ are negative. The household produces cash crop if his optimization condition insures that unit profits are greater than unit costs so that $p^c > (kr + r^{*c} p^c)$ and sells his staple crop if $p^s > nkr$. This implies that the second derivative is negative. Thus, the sufficient condition for maximization of profit is met. Note that the second order derivative becomes positive if r^{*c} is unity, that is if $r \geq r_{max}^c$. Nonetheless, at $r^{*c} = 1$, the household has no incentive to produce any cash crop as it would intuitively mean that all cash crops that have to be transported will be spoiled before they reach the market.

3.4 Comparative Static Analysis

In this section we examine the impact of varying the distance of producers to the urban centers and the level of education on land allocation decision. The first order condition can be re-written in the form of an implicit function $F(\cdot)$:

$$\begin{aligned} F(l^c; r, r^*, E, p^c, p^s, w^c, w^s, k, n) \\ = A_0^c e^{\psi E} f'(l^c)(p^c - kr - r^{*c} p^c) - g'(l^s)(p^s - nkr) - w^c + w^s = 0 \end{aligned} \quad (3.9)$$

By totally differentiating the implicit function, we have:

$$dF = \left\{ A_0^c e^{\psi E} f''(l^c) \left(p^c - kr - r^{*c} p^c \right) + g''(l^s) \left(p^s - nkr \right) \right\} dl^c \\ + \left\{ k \left[A_0^c e^{\psi E} f'(l^c) - ng'(l^s) \right] \right\} dr \\ + \left\{ A_0^c \psi e^{\psi E} f''(l^c) \left[p^c - kr - r^{*c} p^c \right] \right\} dE + \dots = 0$$

Holding other exogenous variables constant, the change in l^c in response to a change in distance from the market is given by:

$$\frac{dl^c}{dr} = \frac{k \left[A_0^c e^{\psi E} f'(l^c) - ng'(l^s) \right]}{J}$$

where:

$$J = \left\{ A_0^c e^{\psi E} f''(l^c) \left(p^c - kr - r^{*c} p^c \right) + g''(l^s) \left(p^s - nkr \right) \right\}.$$

Basically, J is the second order derivative of the profit function with respect to l^c which is negative. In the numerator, $f'(l^c)$ and $g'(l^s)$, are positive by assumption. We assume that the marginal product under cash crop production $\left(A_0^c e^{\psi E} f'(l^c) \right)$ is greater than the n fraction of the marginal productivity of land for the production of staple crop, $\left(ng'(l^s) \right)$. This implies that the term in the numerator is greater than zero. Hence, we have:

$$\frac{dl^c}{dr} = \frac{k \left[A_0^c e^{\psi E} f'(l^c) - ng'(l^s) \right]}{J} < 0$$

That is, a unit variation in location across plots in relation to markets in the direction away from such markets leads to a decline in the share of land under cash crop production. Similarly, the direction of the impact of the index for the perishable nature of a cash crop can be shown to be negative. The higher the index (i.e. the more

perishable the crop is), the less proportional land to be allotted for the production of the particular cash crop.

$$\frac{dl^c}{dr^*} = \frac{p^c A_0^c e^{\psi E} f'(l^c)}{J} < 0.$$

The direction of the impact of other exogenous variables can be determined as well. For instance, the effect of education on crop choices can be shown to favor the allocation of more land for the production of cash crop. After totally differentiating (3.9) and rearranging we get:

$$\frac{dl^c}{dE} = \frac{-A_0^c \psi e^{\psi E} \{ f'(l^c) [p^c - kr - r^* p^c] \}}{J} > 0.$$

which is positive. As it has been shown already, J is less than zero, while in the numerator, the term in the square bracket is positive. That is, for the household to engage in the production of cash crops, the unit price p^c must be greater than the unit costs associated with transport. This holds even without considering other costs of production. The negative sign multiplying the whole numerator turns it to negative giving rise to the overall expression to be greater than zero. The result can be interpreted such that an increase in the level of education, say by a year of schooling, increases the proportion of land under cash crop cultivation.

4. Empirical Evidence: Econometric Analysis

The theoretical framework suggests that a household's decision to allot a plot of land to cash crop production in an attempt to maximize household income is by and large a function of, among others, distance from the market (usually urban centers), and level of education. There are, however, other factors which are deemed to be important in affecting crop choice. These include access to irrigation scheme, climatic conditions, and wealth of the household. Some cash crops such as sugarcane are water intensive and its production presupposes availability of irrigation scheme. Areas with irregular rainfall may not specialize in cash crop production. Moreover, wealthier households are highly likely to afford relatively higher initial investments in cash crops.

For given prices p^c and p^s , and costs, the model is given by:

$$l^c = f(r_i, AR_i, E_i, DI, DC, W, DR) \quad (4.1)$$

where r_i = distance of the plot from market centers, AR_i = access to road, E_i = level of education of the agent, DI = dummy for access to irrigation, DC = dummy for climate, W_i = wealth of the household, and DR_i = dependency ratio. It is expected that r , and DR would affect l^c negatively while other variables except DC affect it positively. The impact of climate on allocation of land for cash crops depends on the particular cash crop, whereas in the Ethiopian context, areas with cold climate tend to specialize less on cash crops.

In this section, we test the hypothesis that proximity to urban centers influences crop choice by applying a fractional logit model. In a second step, we estimate an income function using land under cash crops and staple crops as explanatory variables.

4.1 Estimation Technique

In the crop choice model, the dependent variable is land under cash crop in proportion to total land size. The explanatory variables include distance from urban centers, access to roads linking to urban centers, total land endowment, level of education of the head of the household, a dummy for climate, and a dummy for whether a household possesses irrigable land. Size of own plot, and size of land used under share cropping arrangements are also considered.

Obviously, OLS procedures are not appropriate when the dependent variable is a ratio bounded between 0 and 1. Running OLS on a fractional dependent variable would entail similar problems as it does in the linear probability model for strict binary cases (Wooldridge, 2002). One of the drawbacks of this approach is that predicted values of OLS estimates would not necessarily lie in the $[0,1]$ interval. The other important advantage of using fractional logit model over OLS is that the first accounts for possible non-linear relationship in the model.

A common approach to model dependent variables which are bounded between 0 and 1 is a logistic transformation where the log-odds ratio is modelled as a linear function of a set of independent variables. Unfortunately such procedure does not account for data

that includes the limits 0 and 1. Moreover, it is not possible to recover the predictions for the dependent variable without some simplifying assumptions. In our case, though a value of 1 is rare, there are a number of households who do not allot their plots for cash crop at all. One way out could be to proceed with such transformation by giving an extremely small number for values equal to zero and a near unity number for values of 1. This is, however, arbitrary which may lead to undesirable results (Wooldridge, 2002).

Papke and Wooldridge (1996) based on the results of Gourieroux, Monfort, and Trongen (1984) and McCullagh and Nelder (1989) suggested as an alternative the Generalized Linear Model (GLM) that makes use of quasi-maximum likelihood estimation procedures.

The notion of the GLM is that a regression model can be decomposed into a random component with expected value and variance of the dependent variable, a systematic component that is predicted by covariates, and a link function that relates the systematic component to the random component. For classical regression models, the random component is assumed to be distributed normal and the link function is an identity in the sense that the random and systematic components are identical (McCullagh and Nelder, 1989).

What makes GLM more relevant is that the normality assumption on the distribution of the random component could come from any function of the exponential family, and the link function could be any monotonic differentiable function (McCullagh and Nelder, 1989).

Given the dependent variable l_i^c and the vector of the various explanatory variables x , where $0 \leq l_i^c \leq 1$. Then, for all i :

$$E(l_i^c) = x_i \beta \tag{4.2}$$

In this case, the random component, $E(l_i^c)$, is expected to have a value of μ so that $0 \leq \mu \leq 1$, and, unlike the linear regression model, the random component could have a distribution different from normal. It might rather have a binomial distribution which is from the exponential family.

More importantly, the link function cannot be assumed to be identity because the systematic component $(x_i\beta)$ does not ensure the condition that the random component, $E(l_i^c)$, lies between 0 and 1. Hence, the link function that relates $E(l_i^c)$ and $(x_i\beta)$ could be given by:

$$E(l_i^c | x_i) = G(x_i\beta) \quad (4.3)$$

where $G(\cdot)$ is a link function satisfying the condition that $0 \leq G(\cdot) \leq 1$.

Gourieroux, Monfort, and Trongen (1984) showed that quasi-maximum likelihood estimators (QLME)⁴ are consistent as long as the likelihood function is in the linear exponential family and given that the link function under (4.3) holds. Papke and Wooldridge (1996) suggested the random component to be Bernoulli for it being easy to maximize. For the link function, we use the logistic distribution as suggested by McCullagh and Nelder (1999).

Thus, for $l_i^c \sim \text{Bernoulli}$ with a logistic link function, we have:

$$G(x_i\beta) \equiv \Lambda(x_i\beta) = \frac{e^{x_i\beta}}{1 + e^{x_i\beta}} \quad (4.4)$$

The Bernoulli likelihood function is given by:

$$f(l_i^c / x_i; \beta) = [\Lambda(x_i\beta)]^{l_i^c} [1 - \Lambda(x_i\beta)]^{1-l_i^c}, \text{ where } l_i^c \in [0,1].$$

This can be transformed to give:

$$L(\beta) = l_i^c \log[\Lambda(x_i\beta)] + (1 - l_i^c) \log[1 - \Lambda(x_i\beta)], \quad (4.5)$$

The QMLE procedure yields a consistent estimator with a conditional assumption on the variance. The assumption is that:

⁴ Quasi-maximum likelihood estimators, also known as pseudo-maximum likelihood estimators, are methods which maximize probability distributions which do not necessarily contain the true distribution.

$$\text{var}(l_i^c | x) = \sigma^2 G(x_i \beta) [1 - G(x_i \beta)] \text{ for some } \sigma^2 > 0 \quad (4.6)$$

The other model considered in this section is the income function of rural households. The estimable model is given by:

$$y_r = f(L_i^c, L_i^s, N, O, DI, E_h, DR) \quad (4.7)$$

where y_r = household per capita income from crop production, L_i^c = land under cash crop, L_i^s = land under staple crop, N = labor, O = number of oxen, DI = dummy for availability of irrigable land, E_h = education level of the head of the household, and DR = dependency ratio. The function is estimated by OLS.

4.2 The Data and Estimation Results

As it has been introduced above, the data used for this study is the household survey data collected from six villages in Wollo, the Amhara Regional State. The survey was conducted in the year 2006. The villages were systematically selected based on their distance from major towns. About 252 households were randomly selected from the villages.

In the crop choice model, distance from town is approximated by the distance in kilometer between what is thought to be 'centroid' of the village to the nearest district town. Distance from road is the distance in kilometer of the village from the nearest road accessible by vehicles. We defined access to road as the inverse of the distance from the road.

The dummy variable for availability of irrigation scheme takes a value of 1 if the village has access to irrigation facilities (modern or traditional) at a significant scale and 0 otherwise. The dummy for climate assumes a value of 1 if the village has cold (dega) climate (which is associated with high land areas) and 0 if it has moderate (woina-dega) climate.

Per capita cash income and per capita value of livestock⁵ are included to capture the impact of wealth on crop choice. To account for liquidity constraints, we include per capita value of permanent cash income which includes pensions, permanent remittances, and salaries from long-term off-farm employments. Value of livestock is the sum of the average market price of cattle, goats, sheep, and camels.

Livestock ownership may have two opposing impacts on crop choice. On one hand, livestock serve as buffer stock against risk in which case it favors the allocation of more land for cash crop production. On the other hand, livestock farming might be a competing activity to cash crop production. The relative importance of the two effects depends on village specific factors such as distance from urban centers. To disentangle the two effects, we used an interaction variable of distance from urban centers and value of livestock.

For the educational attainment of the head of the household, years of schooling by level (primary, junior secondary and senior secondary levels in which the head has attended some classes) were considered. The maximum years of schooling is 11 years. A dummy is used for each level where a value of 1 denotes some education at the respective level and 0 otherwise. The omitted category is 'never attended any of these levels'. Own land is the size of plot in hectares that belongs to the household. Size of land under sharecropping arrangements is also included as well as a dummy for whether a household has some plots of land that is adapted to irrigation irrespective of whether the plot is irrigated during the survey period. Many households implanted irrigation schemes but do not necessarily irrigate their plots depending on the season and the type of crop.

A potential source of endogeneity bias arises from liquid assets. Non-agricultural cash income is exogenous because pensions, remittances, and compensations for long term off-farm activities may not be expected to be affected by crop choice decisions. However, the simultaneity problem may arise in the case of value of livestock. Dercon (1996) reports simultaneity between crop choice and value of livestock. On the other hand, Kurosaki and Fafchamps (2002) find that liquid assets and livestock are predetermined and conclude that these variables are exogenous.

⁵ Similarly, Dercon (1996), and Kurosaki and Fafchamps (2002) used the value of livestock as a proxy for liquid wealth in their crop choice model.

In our case we applied a Hausman test to check whether value of livestock is exogenous⁶. The instruments used were total land size, number of oxen, and labor. The test does not support the null that value of livestock is endogenous. A total of 252 households are used for the estimation of both crop choice model and household income function. Estimates along with their marginal effects are reported in Appendix B.

4.3 Results for Crop Choice Model

The results for the land allocation model are shown in Appendix B. In most cases, slopes of the GLM estimates and OLS parameter estimates are not very different both in terms of magnitude and their statistical significance. The results show that proximity to town, access to road, education of the head, liquid wealth, and access to irrigation scheme are significant for predicting household crop choices. Rural households under study who operate nearer to urban centers tend to allot more land for the production of cash crops while those households who operate far from urban centers tend to allocate much of their land for the production of staple crops (grains). This might be due to the fact that rural peasants nearer to urban centers have a greater advantage in terms of transportation cost and information about the market. The results lend support for the argument that for crop choices the location of the village relative to the next market matters.

The irrigation dummy is significant and positive. Irrigation may have two impacts. First, most cash crops which have high demand in the urban market require a sustainable supply of water. As it has been indicated in Section 2.3, major cash crops that are produced include sugarcane, and fruits whose production is water intensive. Secondly, availability of irrigation scheme gives households the opportunity to produce more than once within a year. This in turn secures them to shift into the production of staple crops with low gestation period during a risk of falling prices of cash crops such as vegetable.

⁶ We estimated an auxiliary regression where per capita value of livestock was regressed on total land, labor, and oxen.

$$PCVL = 848.03 + 719.36Land + 349.80Oxen - 304.89Labor$$

(3.68) (3.50) (5.46) (-4.07)

We estimated the crop choice model by including the residual of the auxiliary regression along with the per capita value of livestock (Wooldridge 2002). We found that the coefficient of the residual term was not statistically significant indicating that the case of simultaneity is not supported.

In the case of liquid asset, estimation results without the interaction variable (VLS×r), value of livestock was found to be insignificant while permanent cash income reveals a positive and significant coefficient. Upon the introduction of the interaction variable, both permanent cash income and value of livestock were significant the latter having a negative coefficient. The interaction variable itself has a positive and significant coefficient.

It can be shown from the coefficients of value of livestock and interaction variables that within about 18 kilometers radius from market centers, the rivalry effect of cash crop production and livestock farming dominates⁷. Beyond 18 kilometers radius, the role of livestock as a buffer stock against risk dominates in that households with more livestock tend to allot land for cash crop. One explanation for positive association between cash crop production and value of livestock might be that remote villages have significant land that is not arable but which can be used for livestock farming. Hence, livestock farming does not necessarily compete with crop production in terms of land use.

In general, education of the head is positively associated with a higher probability of allocating more land to cash crops. Education on primary and junior secondary levels has positive impact. However, additional schooling to senior secondary schooling does not have much influence on the household's decision to allot more land to cash crops. The negative sign of the dummy for climate shows that highlanders of the villages under survey do not allot much land to cash crop compared to lowlanders. The coefficients and slopes for total own land, and land under sharecropping arrangements are not statistically significant. Land leased out in the form of share cropping arrangements is significant only at 10% level of significance.

Lastly, the dependency ratio (proportion of members of a household below the age of 10 and above the age of 65 to the active labor force) is found to be significant only at 10% level in the case of GLM estimation but significant at 5% in the case of OLS estimates. Households with a higher share of dependants might be more risk averse and hence do not tend to allot more land for cash crop as they prefer food security.

⁷ We calculated the threshold distance (= 18 km) by differentiating the land allocation equation with respect to value of livestock and set to zero. We used the slope coefficients of the GLM estimates for this purpose.

4.4 Results for Incomes Function

To investigate whether distance predicts income we use annual per capita income in Birr from agricultural activities, in particular cash and staple crop production as the dependent variable. On the right hand side we include the distance variables along with size of land under cash crop and staple crops as separate variables as well as a number of further controls. Head counts are used for oxen. In the case of labor, a sort of adult equivalent labor is used. Household members aged 16 and above are given a weight of 1 while those in the age of 10 to 15 are given a weight of 0.5. Some variables which were used as determinants of land allocation decision are also used in estimating the income function. The rationale of including the variables which were used as determinants of land allocation decision (dummy for irrigation scheme, and education) is to see their direct effect on income apart from their impact on it through land allocation decision.

Results are summarized in Appendix C. The null for constant variance under the Breusch-Pagan test for heteroscedasticity was rejected at 5% level. However, there was little change in the standard errors between the OLS and robust estimates causing no change in significance of coefficients at 5% level. The estimates revealed that coefficient for land under cash crop was significantly greater than that of the land under staple crop reflecting that the marginal product of land under cash crop is greater compared to its alternative use of staple crop production. More importantly, distance from the nearest urban center is found to significantly predict the level of per capita income of households. It shows that, other things being equal, households operating far from urban centers tend to have lower per capita income compared to those households nearer to towns.

5. Conclusions

In this paper, we investigate the interaction between distance to markets and crop choice in Ethiopia. We find that proximity to urban centers and access to roads increases the share of land allotted to cash crop production. Shorter ways of bringing the produce to the market imply lower transaction costs and consequently higher prices. Another channel through which market proximity may affect crop choices is better access to information about prices or new technologies. Furthermore, households located closer to urban centers with access to road but who do not have irrigable land tend to invest in commercial livestock farming and fast growing trees such as eucalyptus to be sold in

urban centers. This translates into uneven levels of per capita income among villages: a typical household in the richest village nearer to urban center has a per capita income more than 4 times that of a typical household who lives in the village far from urban centers.

Estimation results of the income function of rural household show that size of plots under cash crops and staple crops are significantly related to higher incomes. The coefficient of land under cash crop is by far greater than that of land under staple crop. Distance from the nearest urban center is found to be significant and negative in the incomes function implying that level of per capita income varies over such distances where the households with relative proximity to urban centers are better off.

In conclusion, strong linkages to the urban sector matter for the development prospects of rural areas. Policies that target on supply bottlenecks in the agricultural sector might not be successful without vibrant urban centers which constitute sustainable demand for marketable surplus. In a rural economy such as that of Ethiopia which is characterized by fragmented and static urban enclaves, encouraging township could be considered as a priority. Moreover, enabling rural households to have access to road and better information networking, expanding purposeful education, developing irrigation schemes, introducing new varieties of high yield cash crops including for cold climate zones might help rural households better cope up with shocks and enable them to create surplus that would serve as a basis for agrarian transformation.

References

- Ayalew, Daniel (2003): Essays on Household Consumption and Production Decisions under Uncertainty in Rural Ethiopia, Ph.D. Dissertation, Katholieke Universiteit Leuven.
- Becker, S. Gary (1993): Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, The University of Chicago Press.
- CSA. Central Statistical Agency of the Federal Democratic Republic of Ethiopia, Annual Statistical Abstract, Various Issues.
- Dercon, Stefan (1996): "Risk, Crop Choice and Savings: Evidence from Tanzania," *Economic Development and Cultural Change*, Vol. 44, No. 3, pp. 485-514.
- Dillon, John L. and Pasquale L. Scandizzo (1978): "Risk Attitudes of Subsistence Farmers in Northern Brazil: A Sampling Approach," *American Journal of Agricultural Economics*, Vol. 60, No. 3, pp. 425-435.
- Fafchamps, Marcel (1992): "Cash Crop Production, Food Price Volatility, and Rural Market Integration in the Third World," *American Journal of Agricultural Economics*, pp. 90-99.
- Fafchamps, Marcel and Agnes R. Quisumbing (1999): "Human Capital, Productivity, and Labor Allocation in Rural Pakistan," *The Journal of Human Resources*, Vol. 34, No. 2, pp. 369-406.
- Fujita, Masahisa and Jacques-Francois Thisse (2002): *Economics of Agglomeration: Cities, Industrial Location, and Regional Growth*, Cambridge University Press.
- Fujita, Masahisa and Jacques-Francois Thisse (1986): "Spatial Competition with a Land Market: Hotelling and Von Thunen Unified." *The Review of Economic Studies*, Vol. 53, No. 5, pp. 819-841.
- Gourieroux, C. A. Monfort and A. Trognon (1984): "Pseudo Maximum Likelihood Methods: Theory," *Econometrics*, Vol. 52, No. 3, pp. 681-700.
- Haddad, Lawrence, John Hoddinott, and Harold Alderman (1997): *Intra-household Resource Allocation in Developing Countries*. The Johns Hopkins University Press.
- Jones, Charles I. (2004): Growth and Ideas, NBER Working Paper No. 10767.
- _____.(2003): *Introduction to Economic Growth*, New York, W.W. Norton and Co. Second Edition.
- Kurosaki, Takashi and Marcel Fafchamps (2002): "Insurance Market Efficiently and Crop Choices in Pakistan," *Journal of Development Economics*, Vol. 67, No. 2, pp. 419-453.
- McCullagh, P. and J. A. Nelder (1999): *Generalized Linear Models; Monographs on Statistics and Applied Probability 37*, Second Edition, Chapman & Hall/CRC
- Nerlove, Mark L. and Efraim Sadka (1991): "Von Thunen's Model of the Dual Economy." *Journal of Economics*, Vol. 54, NO. 2, pp. 97-123.

- Papke, Leslie E. and Jeffery M. Wooldridge (1996): "Econometric Methods for Fractional Response Variables with an Application to 401 (K) Plan Participation Rates." *Journal of Applied Econometrics*, Vol. 11, No. 6, pp. 619-632.
- Pindyck, Robert S. and Daniel L. Rubinfeld (1998): *Econometric Models and Econometric Forecasts*; Forth Edition, Irwin Mc Graw-Hill
- Ray, Debraj (1998): *Development Economics*, Princeton University Press.
- Samuelson, Paul A. (1983): "Thunen at Two Hundred." *Journal of Economic Literature*, Vol. 21, No. 4, pp. 1468-1488.
- Wooldridge, Jeffery M. (2002): *Econometric Analysis of Cross Section and Panel Data*; The MIT Press, Cambridge, Massachusetts.

Appendices

Appendix A: List of Variables Used in the Estimation

Variable	Mean	Standard Deviation	Min	Max
Land under cash crop (ratio to the total)	0.12	0.15	0	1
Town-Distance	11.86	5.51	4	20
Distance from Road	3.39	3.80	1	10
Access to Road (inverse of distance)	0.69	0.39	0.1	1
Dummy Irrigation	0.42	0.50	0	1
Dummy Climate (=1 if Dega)	0.29	0.46	0	1
Education - Head				
Years of Schooling	2.06	2.99	0	11
Primary (1-6)	0.43	0.50	0	1
Junior Secondary (7-8)	0.06	0.23	0	1
Senior Secondary (9-12)	0.03	0.17	0	1
Total Own Land in hectare	0.72	0.39	0	2.5
Land Leased in for share cropping (LSC1)	0.21	0.38	0	3
Land Leased out for share cropping (LSC2)	0.02	0.10	0	0.75
Dependency Ratio	0.77	0.80	0	4
Permanent Cash Income (per capita)	30.92	157.57	0	1600
Value of Livestock (per capita)	1220.42	1349.76	0	9250
Per Capita Income (logs)	6.68	0.85	0.37	8.77
Land under cash crop	0.11	0.14	0.00	0.50
Land under staple crop	0.72	0.41	0.09	2.25
Labor	2.33	1.02	1	7
Oxen	1.61	1.25	0	9
Cattle (other than oxen)	2.47	2.47	0	12
Dummy Rural Enterprise	0.19	0.40	0	1

Appendix B: GLM Estimation of Land Allocation Decisions

Dependent Variable: Share of Land Allotted to Cash Crop

	GLM Estimates		OLS Estimates				
	Coefficient		Slope				
Distance-Town	-0.180	[-5.92]***	-0.013	(-6.22)	0.011	(-4.12)	[-4.50]
Access to Road	1.689	[5.64]***	0.125	(5.42)	0.091	(3.20)	[3.21]
Dummy Irrigation	0.787	[2.51]**	0.062	(2.56)	0.067	(3.02)	[2.66]
Dummy Climate	-1.585	[-3.78]***	-0.094	(-3.97)	-0.140	(-4.47)	[-3.41]
Cash Income	0.0009	[3.21]***	7×10^{-5}	(2.89)	0.0002	(3.07)	[2.33]
Livestock (Value)	-0.0005	[-3.08]**	-4×10^{-5}	(-3.08)	-4×10^{-5}	(-2.82)	[-3.56]
VLS×r	5×10^{-5}	[3.21]***	3.4×10^{-6}	(3.26)	3.5×10^{-6}	(2.33)	[3.11]
Education-Head							
Primary (1-6)	0.391	[2.43]***	0.030	(2.31)	0.032	(1.86)	[1.95]
Junior Sec. (7-8)	0.904	[2.65]**	0.094	(1.94)	0.103	(2.94)	[2.43]
Senior Sec.(9-12)	0.398	[0.97]	0.035	(0.83)	0.048	(0.98)	[1.15]
Total Own Land	0.185	[0.89]	0.014	(0.91)	0.013	(0.59)	[0.58]
LSC1	-0.206	[-1.07]	-0.015	(-1.05)	-0.038	(-1.62)	[-2.01]
LSC2	0.817	[1.80]*	0.061	(1.79)	0.144	(1.69)	[1.59]
Dependency Ratio	-0.243	[-1.89]*	-0.018	(-1.85)	-0.022	(-2.14)	[-2.09]
Intercept	-1.375	[-2.48]**	-		0.201	(3.55)	[3.44]
N	252						
R ²						0.39	
\bar{R}^2						0.35	
Joint Stability					F(14,237):	10.59	21.48
Heteroscedasticity					$\chi^2(1) =$	26.50	

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Figures in brackets are t-ratios and those in square brackets are robust t-ratios.

Appendix C: OLS Results of Rural Per Capita Income: Land being instrumented**Dependent Variable: Per capita Household Income (in logs)**

Covariates	Coefficients	t-ratios	
Land under cash crop(Estimated)	1.13	(2.13)	[3.11]
Land under staple crop (Estimated)	0.46	(3.42)	[3.22]
Labor	-0.10	(-2.35)	[-2.47]
Oxen	0.16	(4.12)	[4.21]
Dummy for Irrigation	0.36	(3.20)	[3.67]
Distance from Town	-0.03	(-3.15)	[-3.31]
Access to Road	0.32	(2.20)	[2.56]
Education - Head			
Primary (1-6)	0.02	(0.27)	[0.28]
Junior (7-8)	0.17	(0.86)	[0.79]
Secondary (9-12)	-0.06	(-0.23)	[-0.43]
Dummy for Rural Enterprise	0.31	(0.89)	[3.30]
Dummy food for Work	0.09	(3.04)	[1.01]
Intercept	6.11	(24.00)	[23.72]
N		252	
R ²		0.49	
\bar{R}^2		0.47	
F(12, 239)		19.28	29.43
RESET: F(3, 236)		1.28	
Heteroscedasticity: $\chi^2(1)$		4.28	

Figures in brackets are t-ratios and those in square brackets are robust t-ratios.

THE EFFECT OF POVERTY ON HOUSEHOLDS' VULNERABILITY TO HIV/AIDS INFECTION: THE CASE OF BAHIR DAR CITY IN ETHIOPIA¹

Getachew Yirga^{2 3} and Surafel Melak²

Abstract

Though the impact of HIV/AIDS infection on the livelihood of people is well defined, there is no sufficient empirical evidence for the reverse causation. This research aims at investigating the impact of poverty on risk of HIV infection in Bahir Dar City, Ethiopia. Primary data were collected mainly using structured questionnaire. Descriptive statistics and econometric models were employed in analysis. The former shows that poverty in the city is so widespread in terms of both quantitative and qualitative measures. The econometric findings reveal that the non-poor have higher probability of overall risk of contracting the virus. Our data falls short of supporting the widely held view and our hypothesis that poverty directly contributes to risk of HIV infection. The findings imply that proper implementation of the national poverty reduction strategy with local government and community participation is important to tackle poverty. Very importantly also, the sexual behaviour of people making them vulnerable to HIV needs to be targeted.

Keywords: HIV/AIDS, logistic regression, sexual behaviour, socio-economic status, vulnerability

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1. Introduction

The world is rapidly heading to be more urban. The recent urbanization process is much faster in developing than in the developed world. By 2050, two-thirds of the population of the developing world is likely to live in urban settings (UNFPA, 2007). The average rate of urbanization in Africa is the highest in the world at 3.97 percent annually (van-Renterghem and Jackson, 2009). The positive effects on social and economic development of urbanization have been largely documented. However, rapid and unplanned urbanization in sub-Saharan Africa (SSA) has left many with little access to public goods and prone to various communicable diseases such as HIV/AIDS. Poverty acquires both economic and non-economic connotations. It has been associated, for example, with poor health, low levels of education and inability or unwillingness to work. Poverty is becoming increasingly urban. Urban poverty may be understood as the lack of access to basic needs particularly food, shelter, health, security, basic hygiene, sanitation and water, in addition to economic security (Rae, 2001). One-third of the world's urban residents receive \$2 a day (Baker, 2009). This figure almost doubles when it comes to SSA and over 75 percent for Ethiopian urban dwellers.

The most threatening and dangerous health (of course economic and social) problem which is controversially related to poverty is the HIV/AIDS infection. The primary manifestation of Hiv/Aids is increased morbidity (ill health) and mortality, with the immediate impact felt at household level, where medical and funeral costs increase expenditure and eventually reduce the household income (van-Donk, 2002). Hiv infection undermines development, results in falling life expectancy, increasing number of orphans and the destruction of family and community structures (Wojcicki, 2005). Generally, the epidemic deepens poverty and increases inequalities at every level, undermines efforts of poverty reduction, income and asset distribution, productivity and economic growth (Barnett and Whiteside, 2002).

Out of the 33.4 million HIV positive people worldwide, 1.5 million are Ethiopians (UNAIDS, 2010). In 2008, over 0.88 million Ethiopian children below the age of 17 lost one or both of their parents to HIV/AIDS (Habte, 2008). A number of underlying factors contribute to the spread of HIV in Ethiopia, including poverty, illiteracy, widespread transactional sex, gender disparity, population movement (including rural to urban migration) and harmful cultural and traditional practices. The epidemic's adverse consequences (death, illness, the burden of caring for those infected, and loss of

productivity) in turn exacerbate poverty, increase the numbers of orphans and are disrupting the social fabric of the community and the nation at large (FHAPCO, 2008). The virus has ruined the country's active labour force as over 90 percent of the infections strike people between ages 15 and 49 (Habte, 2008).

Evidently, the link between poverty and susceptibility to communicable diseases is well established and documented. Nonetheless, the microeconomic aspect of "who is most likely to die of AIDS" (Ainsworth and Semali, 2002) - the rich or the poor - is a relatively recent and debatable issue. Findings on the relationship between poverty and degree of vulnerability to hiv/aids are not universal.

Many studies argue that the poor are the most susceptible. Poor and uneducated people are more likely to contract sexually transmitted diseases since they are deprived of the right to information on risk behaviour, are too illiterate to understand prevention messages, have less access to quality services (Bhargava and Satihal, 2005) and lack the power with respect to negotiation of safer sex including condom use (Brook et al., 2006). Even when those information, education, and counselling activities reach the poor, they are often irrelevant and inoperable given the reality of their lives (Mbirimtengerenji, 2007). Booyesen and Summerton empirically found that poor women are less likely to be knowledgeable about HIV/AIDS and more likely to engage in risky sexual behaviour (Booyesen and Summerton, 2002). Residential arrangements of the poor do not often afford privacy for sexual intercourse within households (Zulu et al., 2002) leading to early sex debut by children. When the poor consider migration as a 'flight from poverty' (Mbirimtengerenji, 2007), they often finish in commercial sex work (van-Donk, 2002). In general, poverty makes people hopeless so that they may sacrifice the future to ensure a better today (Tladi, 2006).

Ramirez-Valles and colleagues indicated that neighbourhood poverty directly increased the probability of engaging in sexual risk behaviour (Ramirez-Valles et al., 1998). An interesting finding was that higher family class (education and occupation levels and related) indirectly reduced the likelihood of practicing risky sexual behaviour by influencing neighbourhood poverty and by increasing youth's involvement in pro-social activities. A gender-wise analysis showed that men of higher wealth index reported more casual sex partners, but were also more likely to use condoms (Lopman et al., 2007). They also found that women of higher wealth index were less likely to begin sex (under 25 years old), to have casual partners, to have more than one partner in three

years of follow-up, or to engage in transactional sex and these differentials were most pronounced in towns.

However, there are studies which argue otherwise – the non-poor are more likely to contract the virus. The rich, usually men, may ‘purchase’ the HIV in a different manner. They may be at higher risk of infection due to multiple and concurrent sexual partnerships (Madise et al., 2007; Tladi, 2006). The well-off, who can afford to lead mobile lifestyles, may interact sexually with others thereby being vulnerable to the virus. Another reason why wealthier people may have higher HIV prevalence is because they may live longer due to better nutrition and access to antiretroviral therapies (Madise et al., 2007). Similar proposition holds true for women as non-poor women are believed to have an exposure to risky sexual behaviour (Ainsworth and Semali, 2002; Filmer, 2002). After assessing the behavioral risk factors for HIV/AIDS in and around Addis Ababa and Nazareth cities, Nedi and colleagues found that the majority of the sample had non-regular sexual partners, which was higher among students (Nedi et al., 2002). Their study revealed that the educated, who usually are non-poor, are at a higher risk of contracting the virus.

Previous studies do not provide sufficient evidence on the precise link between poverty and vulnerability to HIV infection. Further, out of 36 studies reviewed by Wojcicki, fifteen found no association between socioeconomic status and HIV infection; twelve found a negative link between poverty and HIV infection; eight found a positive link between poverty and infection; and one was mixed (Wojcicki, 2005). Another review also noted that the associations are complex and called for consideration of context-specificity and the critical influence of certain contextual factors such as location, gender and age asymmetries, the mobility of individuals, definitions of poverty or socioeconomic status and the social ecology of HIV transmission (Gillespie et al., 2007).

In addition, the majority of those studies used single measure of sexual behaviour of heads of households like condom use, number of sexual partners, age at first sex, etc. However, it is important to see whether the amalgamation of these and other measures are influenced by the socio-economic status of the household. The technique of generating the composite variable is taken from Tladi (2006); he generated ‘HIV knowledge’ variable from some nine variables. We have developed ‘overall HIV vulnerability’ variable and used it as a dependent variable while at the same time retaining the traditional proxies of vulnerability thereby relating them to poverty status.

The study focuses on Bahir Dar, one of the fastest growing cities of Ethiopia. With a population of over 210,000 in 2007, the city is serving as the political capital of the Amhara National Regional State, the second most populous region in the country. Following the decision of being capital, the city's population has grown tremendously stimulated primarily by migration. That has been translated into expansion of the two evils—HIV/AIDS and poverty. The HIV/AIDS prevalence rate in Bahir Dar was once reported as the highest in the country. A point estimate in 2009 showed that the prevalence rate in the city was 13.5% (11.8% for males and 15.4% for females), far higher than the regional average of 3.6% (BoFED, 2009). Although no dependable figures are obtained, the poverty situation in the city has also worsened as can be seen from the expansion of slums. The study thus tries to find any significant impact on the susceptibility of residents to HIV/AIDS of their socio-economic status. We proxy socio-economic status by a binary variable – whether or not a household is in absolute poverty. We hypothesize that the urban poor are more HIV vulnerable than the non-poor as poverty forces them to engage in perilous sexual behaviour.

2. Data and Methods

The study is based on household-specific primary data. Structured questionnaires were prepared in the local language, Amharic, and filled out by well trained members of associations of people living with HIV/AIDS and socially and academically active undergraduate students of economics. The questionnaire asked about, among other things, general household characteristics, socio-demographic and economic issues, and household reproductive health knowledge and sexual behaviour.

The nature of the problem demanded the employment of a mix of stratified, purposive and simple random sampling techniques. According to the current administrative structure, the city of Bahir Dar has nine kebeles. (Kebele is the smallest administrative unit in Ethiopia.) We initially stratified them as residential, slum-residential, slum-business and mixed-slum based on our observation. Then, out of five mainly residential kebeles a random sample of two and from two residential-slum kebeles one were selected. One business-slum and one slum-mixed kebeles were also incorporated making the total number of sample kebeles to be five. Sample households in the sample kebeles were next selected randomly. The sample size allocated to each sample kebele ranges between 20 and 25 depending on its population size. A total of 120 households

were interviewed and with a response rate of 97.5 percent, 3 of them provided worthless information.

Both descriptive and econometric methods of analyses were then employed. In order to assess the extent of household poverty, their vulnerability to HIV/AIDS and the characteristics of sample households, we used various tools in descriptive statistics. The econometric analysis, which used logit regression, was applied primarily to find out a significant effect, if any, of poverty status on HIV/AIDS susceptibility.

The general econometric model of the study has the form:

$$Y = \alpha + \gamma(Poverty) + X\beta + \varepsilon$$

Where

Y represents dependent variable, taking three different sexual behaviour-measuring variables: age at first sex, non-regular use of condoms, and general HIV vulnerability; all are used in their binary form;

$Poverty$ represents the poverty status (poor or non-poor) of a household;

X represents a vector of other household characteristics, including age, sex, educational background, marital status, employment status, migration dummy, media exposure, area of residence (slum or non-slum), etc;

α and γ are parameters, and β is a vector of parameters to be estimated; and ε is an error term.

We have estimated logit model. It is also possible to employ probit model. However, since we are interested in the marginal effects, in which logit and probit regressions provide almost similar results, we have chosen the simplest and the widely used logit regression. Ultimately, three binary logistic regressions were run, one for each of the following dependent variables, namely, age at first sex, non-regular condom use and overall HIV vulnerability.

Age at first sex dummy: The initially collected data on the age of the household head at sexual commencement were converted to a dummy variable by considering sexual commencement at 18 years or above as normal (less risky).

Non-regular condom use: This is again generated as a dummy variable in favour of non-regular users. Those ever having sex reported the frequency of condom use with their partners as never, sometimes or always. If a household head is married and had no more than one sexual partner, despite they reported non-regular use of condom, the household is perceived as less risky and hence was given a value of 0.

Overall HIV vulnerability: This is the major dependent variable, which is once again a dummy, and constructed from the above three and other variables. Firstly, we generated an HIV vulnerability score from the following variables: non-regular use of condom while being not married; age at first sex was less than 18 years; had sex with more than one partner; common use of razor blades; and had sexual intercourse in the 12 months before the survey while being not married. For each of these variables where 'yes' responses were found, we added 1 to the score (indicating more risky behaviour), but subtracted 1 otherwise (indicating less risky behaviour). Next, a frequency distribution and a histogram with a normal curve were fit for the score. Almost half (49 percent) of the respondents had a score of -5, while the remaining had a score ranging between -3 and 1. This distribution information was finally used to categorize the vulnerability score into two groups: highly vulnerable (risky) (referring to those with score between 1 and -3) and less vulnerable (less risky) (referring to those with score of -5). This grouping produced a dummy variable, overall (HIV) vulnerability, taking 1 for the highly vulnerable (risky) households and 0 for the less vulnerable (less risky) ones.

The major independent variable, poverty status, is generated as follows. First, expenditure data on various major items were summed up to give household total monthly expenditure. This was then converted to the daily per capita basis. Considering the previously standard World Bank's line of poverty (1 USD per day) and the then average exchange rate of the dollar with the birr (1 USD=15 Ethiopian birr), we finally computed the poverty status dummy variable.

The coefficient estimate as well as the marginal effect of the poverty status variable is expected to be positive. We are, in other words, anticipating that being poor reduces the timing of sexual debut, makes people not to regularly use condoms and generally forces them to act in such a way that they will be highly prone to HIV infection.

3. Results

Characteristics of the Sample

The background characteristics of the survey respondents are shown in Table 1. More than half (56%) of the total 117 respondents are men. The age distribution of the respondents shows that over 60% of the sample is less than 50 years of which the adult population (30-49) constitutes the lion's share. As the data reveals, under the age of 30, the proportion of females is significantly higher than their male counterparts. As close as half of the respondents (48%) have 4-6 family members.

Table 1: Certain socio-economic and demographic characteristics

Characteristics	Category	Percent		
		Male	Female	Total
Sex		56.41	43.59	
Age	15–29	6.06	27.45	15.38
	30–49	46.97	45.10	46.15
	50–65	28.79	23.53	26.50
	65+	18.18	3.92	11.97
Household Size	1–3	21.21	54.90	35.90
	4–6	56.06	37.25	47.86
	6+	22.73	7.84	16.24
Marital Status	Married	81.82	29.41	58.97
	Divorced	3.03	27.45	13.68
	Widowed	4.55	31.37	16.24
	Single	10.61	11.76	11.11
Educational Level	Illiterate	15.15	43.14	27.35
	Elementary	28.79	25.49	27.35
	Secondary	18.18	23.53	20.51
	> Secondary	37.88	7.84	24.79
Employment Status	Working	69.70	58.82	64.96
	Not Working	30.30	41.18	35.04
Poverty Status*	Non-poor	24.24	19.61	22.22
	Poor	75.76	80.39	77.78

Source: *Computed from Authors' Survey, August 2010*

Marriage is believed to have an instrumental role to skirmish the HIV/AIDS pandemic. Our data shows that the great majority (59%) of the respondents are married. However, the proportion of households who are either widowed or divorced need not be undersized as they comprise as high as 30% of the responding households. This implies that approximately in one of three households living together is beaten by social and natural circumstances. The rate of divorce or widowing significantly varies by gender. By and large, 59% of women but only 8% of men are more likely to miss their spouse by death or divorce. Such undesirable consequences may lead female-headed household of the city to engage in businesses which are risky to the infection of the deadly disease. Or they may be forced to have multiple sexual partnerships. This may be attributed to the fact that participation of women in the labour market or other income generating schemes (58.82%) is still lower relative to men. Thus, women remain economically dependent on males and the economic crises of family separation (especially due to death of husband or divorce) and its acceleration to HIV infection are likely to be higher.

Education is a powerful tool to capacitate and broaden society's cognitive and analytical skill for better and meaningful way of life generally and for battling against the HIV/AIDS epidemic specifically. Nonetheless, the educational attainment of the sample households is sufficiently low as over half of them have below secondary education (illiterate and primary education). Only one in every five and one in every four households does have secondary and tertiary education respectively. The disadvantageous position of women is also exacerbated by their poor educational achievements. The proportion of female illiterates (43%) is much larger than that of males (15%) while almost similar distance exists in the reverse direction when compared with achievement above secondary education. Only less than 8% of women have the access to extend their formal education above secondary level compared to 39% of men. Because of the difficulty of estimating households' income directly, segregated expenditure data has been collected and pooled to proxy income. The poverty incidence figure then computed is shocking. More than three-quarters of the sample households consume below the one-dollar-per-day line. Evidently, larger segments of female-headed (over 80%) than male-headed (over 75%) households live in absolute poverty.

Housing Condition and Possession of Utilities

Housing is a big social and economic challenge in many urban areas of the country. Although more than half of the respondents have their own house at latter ages, as high as 44% of the respondents are still unlucky to enjoy the utility of house ownership.

Lower level of income and dis-saving behaviour may contribute a lot for such disappointing way of urban life in Bahir Dar. A significant proportion of the respondents are therefore forced to reside/rent-in/in slum areas of the city. Given a mean family size of 4.47, one third of the households are living in a house with no bed room and a single room is a bed room for at least two people.

Table 2: Conditions of housing and other utilities

Housing		
Characteristics	Category	Percent
Have own house	Yes	56.41
	No	43.59
Location	Slum area	43.59
	Non-slum area	56.41
Number of rooms	1-2	31.82
	3	31.82
	Over 3	36.37
Wall type	Wood and mud	75.16
	Wood and cement	10.61
	Cement bricks	13.64
Utilities and other asset possessions		
Characteristics	Category	Percent
Have electric service(own)	Yes	59.83
	No	40.17
Have pure water supply service	Yes	64.96
	No	35.04
Have private toilet	Yes	57.26
	No	42.74
Have refrigerator	Yes	41.88
	No	58.12
Have TV	Yes	73.5
	No	26.5

Source: *Computed based on Authors' Survey, August 2010*

Data were collected on the availability and possessions of electricity, water service, toilet facility and durable goods such as refrigerator and television. The proportion of households with own electricity is 60% and the rest of the respondents do not have a

contract with the power supplier and get electric service from indirect sources. Consumption of pure water from own source (65%) is slightly better than power supply though sizable proportion (35%) of the sample households are still dependent on other households.

Availability of own toilet at household level is a proxy variable used to look at the sanitation facility of respondents. In this regard, 43% of the households do have shared toilet. Possession of these essential facilities by and large influences the privacy and quality of life of the residents. Three of the four households do have a TV and this accession could be the reason why many households generate public information through TV and radio. Refrigerator is relatively a luxury good though it would have been a necessity in Bahir Dar. However, less than half (42%) of households have their own refrigerator. In general, considerable proportion of the sample households are deprived from the utility they could generate from the city. Thus, the nature of poverty is deep-rooted.

Table 3: Sexual behaviour and HIV/AIDS knowledge by poverty status

Characteristics	Category	Percent		
		Non-poor	Poor	Total
Ever had a sexual partner	Yes	100.00	100.00	100.00
	No	0.00	0.00	0.00
Age at first sex	18 or above	80.77	64.84	68.38
	Below 18	19.23	35.16	31.62
Had sex in the past twelve months	Yes	73.08	70.33	70.94
	No	26.92	29.67	29.06
Had sex with more than one partner	Yes	11.54	8.79	9.40
	No	88.46	91.21	90.60
Condom Use	Never	63.16	68.25	67.07
	Sometimes	15.79	9.52	10.98
	Always	21.05	22.22	21.95
Don't use razor in common	Yes	84.62	92.31	90.60
	No	15.38	7.69	9.40
Don't eat with HIV positive people	Yes	0.00	7.69	5.98
	No	100.00	92.31	94.02

Source: Computed based on Authors' Survey, August 2010

Sexual behaviour, HIV/AIDS Knowledge and Poverty

All of the approached respondents do experience sexual intercourse. As shown in Table 3, about one third of them had sex before they celebrated their 18th birth day. Earlier sexual initiation is believed to be more risky in terms at least of HIV/AIDS infection. The proportion of the poor who initiate sex before 18 is almost twice of that of the non-poor. About 91% of the respondents are loyal to their sexual partner. Only 22% the respondents use condom consistently. But, the remaining either totally abandon it (67%) primarily because they are married or use it occasionally (11%). Differences seem to exist between the poor and the non-poor regarding use of condom. While more of the non-poor occasionally use it, more of the poor totally abandon it.

To examine the knowledge of respondents about HIV/AIDS, some simple but imperative questions were raised; for instance, when they were asked whether they share razor blades, 90.6% of the respondents abandoned it. Households' awareness in this regard is promising and the poor have shown more progress than the non-poor. Culturally, Ethiopians enjoy eating food together. Nevertheless, after the incidence of the HIV/AIDS catastrophe, observable discrimination against HIV positives has become rampant. But, as our finding reveals, most of the respondents (94%) reported that eating together with HIV victims has nothing to do with the unaffected person. Thus, there is an essential development in the knowledge and behaviour of households. All of the non-poor, except very few poor, have enjoyed that improvement.

Determinants of the Risk of HIV Infection

We run three logit regressions based on one basic model. Three sexual behaviour-measuring variables – age at first sex, non-regular use of condoms and general vulnerability to HIV– were our dependent variables in each of the estimations. In addition to poverty status, various household characteristics such as age, educational background, marital status, HIV knowledge, household size and area of residence (slum or non-slum) were entered as explanatory variables. The coefficients and marginal effects of the estimations (after logit) of the models are reported in Table 4.

Table 4: Logit coefficients and marginal effects on various indicators of vulnerability to HIV/AIDS

Independent variable ⁴	Dependent variable					
	Age at first sex		Non-regular condom use		Overall vulnerability	
	Coeff.	Marginal Effect	Coeff.	Marginal Effect	Coeff.t	Marginal Effect
Poverty status (poor=1)	-0.471	-0.018 (0.1369)	-1.513	-0.043 (0.0786)	-1.324	-0.234* (0.1328)
Marital status (not married=1)	1.367	0.267** (0.1060)	2.558	0.223*** (0.0846)	2.157	0.452*** (0.0989)
Educational level	0.151	-0.028*** (0.0093)	0.018	0.003 (0.0048)	-0.052	-0.010 (0.0111)
Age	-0.042	-0.008* (0.0043)	-0.083	-0.006** (0.0026)	-0.056	-0.013** (0.0053)
HIV knowledge (high=1)	-0.881	-0.155 (0.1258)	-0.581	-0.022 (0.0683)	-1.581	-0.308** (0.1298)
Household size	0.252	0.056* (0.0305)	0.175	0.025 (0.0156)	0.185	0.089** (0.0389)
Slum residence (slum=1)	-0.039	-0.017 (0.1037)	2.322	0.197** (0.0788)	0.506	0.099 (0.1256)
Log Likelihood	-57.843		-36.353		-61.998	
Pseudo R2	0.2077		0.3572		0.2352	
LR chi2	30.33		40.40		38.12	
Prob>chi2	0.0001		0.0000		0.0000	

*, ** and *** show significance at 10%, 5% and 1% levels respectively. Standard errors in parentheses.

⁴ These are only the independent variables of the parsimonious models. Some variables, such as gender, migration dummy, etc. were rejected due to multicollinearity and other problems. Multicollinearity is not a danger in the remaining variables as test results were in favour of the absence of the problem.

Age at first sex

Four of the seven explanatory variables included in the model are found statistically determining the age at which sexual relations initiate. According to the estimates, being unmarried positively affects the age at first sex. It means that those household heads that are currently unmarried had a higher probability of early sexual initiation compared to those that are married. It has widely been recognized that education has the importance of delaying early commencement of sexual activity. As can be observed from the negative sign attached to the marginal effect of educational level, the higher the educational achievement the lower will be the likelihood of early sexual start-up. Accordingly, each extra year of schooling reduces the probability of sexual initiation under the age of 18 years by 3 percent. We also estimated that the marginal effect of age of the household head on the probability of sexual commencement under 18 is negative. This indicates that younger residents begin sexual activity at earlier years than the older ones. It is also found, other things kept constant, that the likelihood of earlier sexual initiation changes positively with larger family size.

Non-regular condom use

Only three of the explanatory variables included in the model - marital status, age and slum residence – significantly determine the probability of non-regular condom use. Poverty status, educational level, HIV knowledge and household size are found not to have any statistically noteworthy impact on condom use behaviour.

Slum residence and being not married directly influence the likelihood of irregular use of condoms. We have found that people who reside in slum areas exhibit higher irregularity in their condom usage when compared with those who reside in non-slum areas. More specifically, the change in the likelihood that people do not use condoms is higher for slum residents by about 2 percent compared to the non-slum residents. Other things remaining unchanged, the sign attached to the marginal effect of the age variable shows that younger people are slightly likely to be non-regular condom users. However, households headed by those unmarried are more probable in not using condoms regularly. In short, according to the non-regular condom use model estimates, those at the risk of contracting HIV due to irregular usage of condoms are residents of slum areas in the sample kebeles of Bahir Dar city. Younger residents of the city and those that are single, divorced or widowed are also among the at-risk populations.

Overall vulnerability to HIV/AIDS

The overall HIV vulnerability variable is more comprehensive than the previous measures of risky sexual behaviour. It has been estimated that the poor are less vulnerable than the non-poor. This is shown by a significant and negative marginal effect of the poverty status variable. Similar to the previous results, those that are either single, divorced or widowed show behaviours that put them at a higher risk of contracting the virus. Other important determinants of the probability of vulnerability to HIV are age of the head and HIV knowledge. Younger residents are once again more exposed than older ones. Not surprisingly, being knowledgeable about HIV safeguards vulnerability. These two last findings reveal that the youth are aware of HIV/AIDS but are susceptible, implying the importance of investing on other things than mere awareness-creating activities.

4. Discussion and Implications

We have already found descriptively that a significant portion of respondents have debuted sexual intercourse too early. That is also supported by the econometric finding that the youth have a faster debut. When people initiate sex early, they may be vulnerable to HIV/AIDS due to various reasons. Firstly, they may not have sufficient knowledge about transmission ways as well as protection techniques. In this sense, the role of formal education is vital. We estimated that each extra year of schooling reduces the probability of early sexual initiation by about 3 percent. Similar evidence was found in Kenya as school attendance reduced the likelihood of early initiation of sexual activity and occurrence of premarital intercourse among adolescents (Mensch et al., 2001). Not only formal education but also audience targeted reproductive health information and training is imperative especially for younger women to mitigate the risk of HIV infection. The role of development partners in this regard is huge. Secondly, they may not have the economic and mental freedom to purchase and use protection tools though they are aware of them.

The poor and the non-poor seem to be different in their use of condoms. Although the econometric evidence was not found as expected, it was descriptively found that the poor are less consistent in their condom use. This may be attributed to the fact that the poor are unable to access condoms which requires state intervention, including cheap/free provision of condoms. However, people who reside in slum areas exhibit higher irregularity in their condom usage when compared with those who reside in non-

slum areas. Since slum residential arrangements do not afford privacy in sexual relationships, 'unplanned' intercourses without condoms may become common. This has the implication that modernizing the housing situation of urban residents is important which could be achieved by strong collaboration with the residents and stakeholders.

We find that the probabilities of irregularity in condom use and initiating sexual intercourse at an age level lower than 18 years do not significantly change with a change in the person's wealth status. Other factors than being poor determine them. This does not however mean that socio-economic status does not influence the risk of contracting HIV; it does so via a combination of these and other channels. We have used the overall vulnerability variable to capture that amalgamation. Our estimation results confirm thus that the non-poor are predisposed to the virus. The youth must be held busy in productive activities. Their knowledge about HIV/AIDS must be augmented in various ways including formal and informal ways of obtaining information.

References

- Ainsworth, M. and Semali, I., 2002. Who is Most Likely to Die of AIDS? Socioeconomic Correlates of Adult Deaths in Kagera Region, Tanzania.
- Baker, J., 2009. Meeting the Challenges of Urban Poverty and Slums. The World Bank.
- Barnett, T. and Whiteside, A., 2002. Poverty and HIV/AIDS: Impact, Coping and Mitigation Policy. In: G.A. Cornia (Editor), AIDS, Public Policy and Child Well-being. UNICEF-IRC, Florence.
- Bhargava, P.K. and Satihal, D.G., 2005. Poverty Linked HIV/AIDS as Determinants of Mortality: Evidence from a Community Based Study in Karnataka, India, CICRED Seminar on Mortality as Both a Determinant and a Consequence of Poverty and Hunger, Thiruvananthapuram, India.
- BoFED, 2009. Development Indicators of Amhara Region 2008/09, Amhara Region Bureau of Finance and Economic Development, Bahir Dar.
- Booyesen, F.I.R. and Summerton, J., 2002. Poverty, Risky Sexual Behavior, and Vulnerability to HIV Infection: Evidence from South Africa. *Journal of Health, Population and Nutrition*, 20(4): 285-288.
- Brook, D., Morojele, N., Zhang, C. and Brook, J., 2006. South African adolescents: Pathways to Risky Sexual behavior. *AIDS Education and Prevention*, 18(3): 259-272.
- FHAPCO, 2008. Annual HIV/AIDS Monitoring And Evaluation Report, July 2007 – June 2008 (2000 EFY), Addis Ababa.
- Filmer, D., 2002. Socio-economic Correlates of Sexual Behavior: A Summary of Results from an Analysis of DHS data Background Paper to Confronting AIDS.
- Gillespie, S., Greener, R., Whiteside, A. and Whitworth, J., 2007. Investigating the Empirical Evidence for Understanding Vulnerability and the Associations between Poverty, HIV Infection and AIDS Impact. *AIDS*, 21(suppl 7): S1-S4.
- Habte, D., 2008. Assessment of the Distribution of At-risk Populations and HIV/AIDS Referral Services in Ethiopia: Baseline Assessment for Mobile HIV Counseling and Testing Program in Amhara Region.
- Lopman, B. et al., 2007. HIV Incidence and Poverty in Manicaland, Zimbabwe: Is HIV Becoming a Disease of the Poor? *AIDS*, 21(suppl 7): S57-S66.
- Madise, N., Zulu, E. and Ciera, J., 2007. Is Poverty a Driver for Risky Sexual Behaviour? Evidence from National Surveys of Adolescents in four African Countries. *African Journal of Reproductive Health*, 11(3): 83-98.
- Mbirimtengerenji, N.Z., 2007. Is HIV/AIDS Epidemic Outcome of Poverty in Sub-Saharan Africa? *Croat Med J*, 48: 605-617.

- Mensch, B.S., Clark, W.H., Lloyd, C.B. and Erulkar, A.S., 2001. Premarital Sex, schoolgirl Pregnancy and School Quality in Rural Kenya. *Studies in Family Planning*, 32(4): 285-301.
- Nedi, T., Yerdaw, M. and Enquoselassie, F., 2002. Assessment of Behavioral Risk Factors for HIV/AIDS in Selected Target Groups in and around Addis Ababa and Nazareth Cities, Ethiopia. *African Journal of AIDS Research*, 1(2): 97-101.
- Rae, G.O., 2001. Health and Urban Poverty. *East African Medical Journal*(December): 621-623.
- Ramirez-Valles, J., Zimmerman, M.A. and Newcomb, M.D., 1998. Sexual Risk Behavior among Youth: Modeling the Influence of Prosocial Activities and Socioeconomic Factors. *Journal of Health and Social Behavior*, 39(3): 237-253.
- Tladi, L.S., 2006. Poverty and HIV/AIDS in South Africa: An Empirical Contribution. *Journal of Social Aspects of HIV/AIDS*, 3(1): 369-381.
- UNAIDS, 2010. UNAIDS Annual Report 2009.
- UNFPA, 2007. *State of World Population 2007: Unleashing the Potential of Urban Growth*.
- van-Donk, M., 2002. HIV/AIDS and Urban Poverty in South Africa.
- van-Renterghem, H. and Jackson, H., 2009. AIDS and the City: Intensifying the Response to HIV and AIDS in Urban Areas in sub-Saharan Africa, A Street, a City, an Epidemic and the Hidden Power of Urban Networks, Durban.
- Wojcicki, J.M., 2005. Socioeconomic Status as a Risk Factor for HIV Infection in Women in East, Central and Southern Africa: a Systematic Review. *Journal of Biosocial Science*, 37: 1-36.
- Zulu, E., Dodoo, F. and Chika-Ezeh, A., 2002. Sexual Risk-Taking in the Slums of Nairobi, Kenya, 1993-98. *Population Studies*, 56(3): 311-323.

VALUING THE ECONOMIC BENEFIT OF ECOTOURISM AREAS WITH TRAVEL COST METHOD: A Case Study of Semen Mountain National Park, Ethiopia¹

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Abstract

Semen Mountain National Park is one of the best-known nature-based recreational sites in Ethiopia, due to its impressive landscape and endemic wild animals despite its being placed in the list of World Heritage in danger since 1996 due to heavy settlement by farmers, the increase in the number of endangered wildlife, widespread deforestation and continuous deterioration in recreational qualities of the site. Thus, there is a need for valuation of the park to know how much value the people attach to the park so as to demonstrate how the site managers can extract a positive net benefit after incurring a cost on maintaining the park and ensuring sustainable and efficient level of operations. Thus, the objective of this study was to determine the recreational economic benefit of the park using Travel Cost Method (TCM). A total of 200 respondents, 140 foreign and 60 local visitors were interviewed face-to-face to collect the data. And then a consumer surplus was estimated. Accordingly, the expected aggregate annual recreational economic benefit gained by on-site visitors during the year 2010/11 was estimated at Birr 48,562,086.4 (approximately US\$ 2,943,156.7) but the park authorities collect only 14 percent of this sum. The results indicate that the recreational economic benefits of the park are much larger than what is currently collected by park authorities and thus the park authorities can change the current prices of the services so as to generate extra revenue that would be spent on maintaining the park for its sustainable use.

Key Words: Semen Mountain National Park, Travel Cost Method, Recreational Economic Benefit

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1. Introduction

National parks like other environmental resources and public goods have a number of benefits in many different ways for human beings. They have importance relating to the ecological functions and are used for recreational purpose. National parks which are used as ecotourism sites can enhance national income, and have economic impacts to society around the area of the parks and this in turn can contribute to national economic growth (Nuva et al., 2009).

Even if nowadays, the use of national parks for recreational purposes is increasing in many countries, many people equate national parks as recreational services with “fun”. They do not consider it as a subject for serious study. It could be because of this that research in recreational areas has been very limited if not almost non-existent in many countries. In other words, even if recreational resources are presumed to provide positive utility for human beings, there is limited effort to compute the true value of the services of scarce natural resources.

These resources include land, water, beaches, buildings, parks, forests, personnel, and other natural, human and financial resources (Clawson et al., 1996). Hence, we need to impute values that reflect the true social costs and benefits of activities using some indirect methods. Failure to take into account the true social costs and benefits may underestimate net conservation benefits and overestimate net development benefits which in turn might impose an irreversible damage to recreational resources in favor of other development activities. This is due to the discrepancy between the willingness of people to pay for the amount of utility that are generated from the services of the national parks and the low value/attention which is actually granted to it. This is resulted from the fact that ecotourism services are not traded in the market and their economic values are not actually known.

Likewise, even if national parks as ecotourism play an important role towards poverty alleviation, biodiversity conservation and employment creation in Ethiopia, the challenge remains in finding ways to jointly address these issues. The current price for different services is assigned arbitrarily rather than through valuation techniques which in turn results in the park authorities to be constrained by lack of money. Specifically, despite the fact that Semen Park has many sources of attraction, the site has been unable to improve the qualities of ecotourism experience and expand the types and

variety of its recreational services for a long time. Instead, the center is deteriorating mainly because of wide-spread deforestation resulting from road construction, residence of people, grass burning, agriculture, firewood collecting, hunting and domestic livestock grazing. Accordingly 24% of the Park remained under cultivation (Hürni, 1980) and the population and its livestock within the Park are expanding by 2% per year (Beltran, 2000). And also several animals such as Walia ibex, leopard and Ethiopian (Semen) wolf, and larger ungulates of the lower Afro-mountain areas become locally extinct. Observations of the Semen wolf have become increasingly rare since much of the habitat of its chief prey, the mole rat, has come under cultivation. The Walia ibex population has also dispersed and its range and presence within the Park has decreased; large areas of former habitat have been abandoned, and sightings have been made only in the most remote and inaccessible areas (Hürni and Stiefel, 2003). Moreover, during the years of civil unrest the Park's buildings and equipment were destroyed (EWCO, 1991). All of these problems made the park to be inscribed on the list of world Heritage in danger since 1996 and continually to reduce recreational qualities of the site. Thus, visitors might be forced to spend their recreation time on other substitute sites and the site be used for some other alternative development activities, which in turn may result in irreversible damage to the different environmental resources on the site. This is due to the fact that, the current prices for different services are assigned arbitrarily rather than through valuation techniques which result in the park authority to be constrained by lack of money. In addition, even if a number of studies have been conducted to estimate the benefit on the recreational areas in developing countries like Ethiopia, they have largely been restricted to measuring the recreational net benefit based on the number of trips as a dependent variable. Except Mladenov et al. (2007) who conducted a study on the value of wildlife-viewing tourism as an incentive for conservation of biodiversity in the Okavango Delta in 2001 and 2002 using contingent valuation (CV) and travel cost (TC), as far as the authors of this particular study are aware of, studies on exotic and isolated ecotourism areas like Semen Park based on only one trip, have not been done.

Thus, in this regard this study which is conducted to estimate the Semen Mountain National Park per day and one visit benefits importance in terms of contributing to policy actions by the Park's authority and also fills the gap in the literature in this area. More specifically, this paper is expected to demonstrate the management of Semen Park on how to extract revenue out of the excess benefit to be generated after improving the qualities of the national park and expanding the types and variety of the services.

2. Theoretical Framework and Empirical Model

This study basically employed Travel Cost Method to estimate site benefit for the Semen Mountain National Park.

Method for Travel Cost

The application of a TCM involves a number of assumptions about factors such as the specification of the dependent variable, the measurement of travel costs, the specification and measurement of other independent variables, the specification of the functional form, and the appropriate integration procedure to calculate the estimates of consumer surplus (CS) (Haab and McConnell, 2002).

The common practice in TCM is to derive the recreational demand equation and then estimate consumer surplus that enables to calculate recreational benefits associated with the site from using repeat visits to a site as a dependent variable. But this may not always be the case. As is the case for this study, there are situations where (almost) all visitors may not make repeat visit to site. It is not because they did not benefit from it but because it is an exotic, isolated place that they were unlikely to visit more than once. To solve such problem, we follow Mladenov et al., (2007) and determine the consumer surplus based on responses of the respondent to the question: 'What is the maximum amount of money you would have paid to take the trip?' The choices were from the present cost to three times the present cost in increments of 0.5.

Accordingly, the Consumer Surplus of the SMNP can be defined as the difference between individual maximum willingness to pay and actual recreational expenditure for the use of the park for visitation and recreation purposes. The advantage of this measure is that once the average CS of a representative visitor is estimated, it will be possible to obtain that total surplus value for the site per annum by multiplying the total number of visitors to the park in previous year with the average surplus value per person (Morey, 1994).

Consumer surplus computed from the travel cost portion of the data collected was calculated as:

$$CS_{it} = (CSMNP - TC) * MWTP - (CSMNP - TC) \dots \dots \dots (1)$$

Where CS_{it} is the consumer surplus per visitor i per trip t , $CSMNP$ is the amount spent only during the Semen Mountain National Park portion of the trip, TC^4 is the total travel cost associated with a round trip to and from the park, and travel time costs which is calculated by taking one third of net of tax wage rates, and $MWTP$ is the maximum willingness to pay beyond their present cost to take the trip (ranging from 1 to 3, in increments of 0.5), all for the i^{th} individual.

Visitors were also asked questions about trip characteristics, such as trip cost, transport costs, other sites visited, type of accommodation and services included in their package, number of days stayed, staying cost and mode of travel into the SMNP. Socio-economic data were also collected to determine the profile of the type of tourists drawn to the SMNP including income, age, marital status, occupation, gender, education, size of household and nationality.

3. Results and Discussion

3.1 Tourist’s socio-economic and trip characteristics

During the year 2010/11 the Semen Mountain National Park had 16838 visitors of which 15232 (90 percent) were foreign visitors. The study is conducted based on a sample of 140 foreign and 60 local visitors which comprise 70 and 30 percent respectively; this is due to the fact that most of the visitors were foreign. Most of the respondents were Europeans which accounts for 80 percent of foreign respondents followed by American respondents. All of the visitors have said that they visited the site only once. As it can be seen from Table 1(a) below, out of the total visitors, males are 62 and 43 for foreign and local respondents respectively. The average age of the respondents was 47.79 and 30.97 years, the mean family size of respondents was 3 and 4, and the mean years of education was 16 and 15 years respectively for foreign and local respondents. The

$^4 TC_i = \frac{Air\ Cost + CTRAN}{Sites} + OP_{ti}; OP_{ti} = 1/3 * PDI * \frac{Days}{Sites}$; Where OP_{ti} is the opportunity costs in birr of travel time per visitor per trip, PDI is the per day disposable income, $Days$ is the number of days spent in the round trip travel, **Air cost** and **CTRAN** represent the round trip transport cost from abroad and locally spent (either for package or public or/and air transport) respectively, **Sites** represents total number of sites visited in Ethiopia. Here the travel cost and days spent on travel is assumed to be equal across the visited sites. The cost for travel and on-site cost per day is assumed to be equal from a single price paid for package.

average income was calculated as 44,492 birr (2,696.5 US\$) and 2,927 birr (177.4 US\$) per month and most of the respondents were public sector employees which accounts for 64 and 68 percent for foreign and local respondents respectively. The socio-economic survey result also indicates that about 55 percent of foreign and 37 percent of local respondents have reported to be married. Most of the local respondents were single. This is due to the fact that they are students and young graduates.

Table 1(a): Socio-economic characteristics

Variable	Description of the variables	Foreign visitors	Local visitors
		Mean (Std.dev.)	Mean (Std.dev.)
Socio-economic Characteristics			
GENDER	Gender dummy variable (1 = male and 0 = female)	0.44 (0.49)	0.72 (0.45)
AGE	Age of respondents (years)	47.79 (14.14)	30.97 (8.27)
FAMSIZE	Total number of people in the visitor's household	3.06 (1.70)	3.7 (1.89)
EDU	Visitor's educational level in years of education	16.16 (2.98)	14.93 (2.76)
INCOME	Disposable monthly income of visitor (in Birr)	44492.64 (21891.37)	2927.12 (1632.19)
NATION	Nationality of the visitor (dummy as 1 = foreign and 0 = local visitors) ⁵	0.7 (0.46)	0.3 (0.45)
MARSTSTUS	Marital status of the visitors (dummy as 1 = married and 0 = otherwise)	0.55 (0.50)	0.37 (0.49)
EMP	Visitor's basis of employment (dummy as 1 = full time and 0 = otherwise)	0.643 (0.481)	0.68 (0.47)

Source: computed from the survey data

As it can be seen from Table 2 (b) below, average total planned trip costs were Birr 33,838.75 and 1,390.8 of which the cost of Semen Park portion of the trip representing almost one-fourth and more than half of all trip costs for foreign and local visitors

⁵ Unlike other variables, the values for this one are computed from the total (i.e., by combine foreign and local respondents).

respectively. This portion included both travel costs and on-site staying costs for Semen Park. The average number of days of stay on the park was found to be 3.05 and 2.17. Regarding the years of acquaintance of visitors with the site, the data show average years of 2.26 and 8.78 for foreign and local respondents respectively. The proportion of visitors travelling in group was almost the same (which was about 90%) for both foreign and local visitors.

Table 2 (b): Trip characteristics

Trip Characteristics of the Respondents			
TOTCOST	Planned total cost for all trip in Ethiopia (in Birr)	33838.75 (15786.28)	1390.833 (827.98)
TC	Total travel cost associated with a round trip to and from the park (in Birr).	3874.016 (1324.693)	365.233 (187.80)
STAYCOST	Amount of on-site cost on the park (in Birr)	1845 (1540.83)	313.2282 (161.02)
DAYSSTAY	Number (#) of days stay on the park	3.05 (1.88)	2.17 (0.98)
KNOW	Respondents have known the park (# of years)	2.26 (1.98)	8.78 (4.81)
MWTP	Maximum amount visitor would have spent on trip (# of times the present cost)	1.56 (0.39)	1.6 (0.39)
GRO	Respondent's travels in group (dummy as 1 = yes and 0 = no)	0.89 (0.32)	0.9 (0.30)
PACKAGE	Whether respondents use package (dummy as 1 = yes and 0 = no)	0.86 (0.34)	0.36 (0.48)
VISITOTH	Whether respondents visit other sites (dummy as 1 = yes and 0 = no)	0.96 (0.19)	0.38 (0.49)
	Number of Respondents	140	60

Source: computed from the survey data

Actual cost (which is the sum of travel cost per round trip and on-site staying cost on the park) and the maximum willingness to pay (MWTP) are the two most important variables that will be used to determine the consumer surplus. Thus, visitors were asked their travel cost, on-site staying cost and maximum willingness to pay for the park during last year. There is, however, a difficulty in computing the travel cost specifically spent for the Semen Park due to the fact that most of the visitors were multi-site visitors, (96 and 38 percent) and package users (86 and 36 percent) of foreign and local respondents respectively. Most of the respondents combined their Semen Park trip with trips to

other sites, such as Bahir Dar, Gondar, Axum, Lalibela, Addis Ababa, Hawssa etc and they were charged a single price for the entire package. Thus, the information on transportation costs and package cost obtained from the questionnaire covered the cost of a visitor's whole trip, and not just the trip to the Semen Park. In order to estimate the recreational economic benefit of the park, the travel cost for visiting the park had to be identified from within the total cost of the trip. We tried to address this problem using the equation given in the methodology part which gives an approximate value. Accordingly the mean travel cost per round trip to the park were reported as birr 3874 for foreign respondents, and birr 365 for local respondents. Travel costs consisted of both money spent for transport and opportunity cost of time while in travel.

3.2 Results of the Travel Cost Method

Table 2: Consumer Surplus and recreational economic value of SMNP (in birr)

Visitors	Actual Price Paid		Consumer Surplus		Recreational Economic Value	
	All visitors	Per visitor	All visitors	Per visitor	All visitors	Per visitor
Foreign visitors	87111808	5719	47935104	3147	135046912	8866
Local visitors	1089590.7	678.45	626982.4	390.4	1716573.1	1068.85
Total		88201398.7		48562086.4		136763485.1

Source: Calculated from survey data

The annual tourist spending on park, calculated by multiplying the average actual cost (actual price paid) by the number of visitors to the park for the study period of March 2010 up to February 2011 (15232 foreign and 1606 local visitors), was about Birr 87,111,808 (US\$ 5,279,503) and Birr 1,089,590.7 (US\$ 66,035) respectively for foreign and local respondents and Birr 88,201,398.7 (US\$ 5,345,539) for all visitors. The average maximum willingness to pay was given as 1.56 and 1.6 of the present cost for foreign and local respondents respectively (see Table 3). Accordingly the average annual consumer surplus was calculated from Equation 1 which is given by the difference between maximum price and actual price paid for 140 and 60 valid surveys reported as Birr 3147 and 390.4 per person per annum for foreign and local respondents respectively.

Accordingly, the annual total consumer surplus⁶ was estimated to be Birr 48,562,086.4 (US\$ 2,943,156.7) reflecting the annual recreational economic benefit (maximum revenue) of the park but the park authorities actually collected only 14 percent of this sum. This figure is the value of the benefit that visitors gained by visiting the park. It also reflects the amount that visitors are willing to pay to enjoy the park' natural resources. This figure, however, does not include the non-use value of Semen Park. With one visit, international tourists received more surplus than domestic tourists (i.e., Birr 47,935,104 in comparison with Birr 626,982.4). The surplus gained per head was also very much higher than that of domestic tourist's. In other words, international tourists valued the natural resources of the Semen Park more than domestic tourists and as a result they gleaned greater enjoyment from the Semen Park than their local counterparts.

The total recreational economic value equals the total consumer surplus plus the total price paid. The annual monetary recreational economic value of the SMNP is about Birr 136,763,485.1 (approximated to be US\$ 8.3 million). This is the value that is yielded every year for economy and beyond due to the presence of the park. However, this is not the revenue of park only. This value is distributed in the form of the consumer surplus of visitors who have gained recreational benefit from Semen Park and in terms of the prices paid to transportation companies and agents for providers of services such as hotels, restaurants, tourist agencies or package providers, etc. A very small part of the estimated recreational economic value of Semen goes to the park through expenditures on entrance fee and different services on the park.

3.3 General Perception and Observation about the Semen Park

Even if most of the respondents indicated that the recreational quality of the park is good, respondents were also asked to rank the major problems of the park. The responses were summarized in the following table.

⁶ This is the sum of the total surplus value for foreign and local visitors respectively given as about Birr 47,935,104 (US\$ 2,905,157.8) and Birr 626,982.4 (US\$ 37,999) for foreign and local visitors.

Table 3: Major problems at the site that reduce the park qualities

Degree	Foreign Respondents		Local Respondents	
	Frequency	Percent	Frequency	Percent
Forest and landscape degradation of the area	45	32.2	14	23.3
Severe cold	24	17.2	9	15
Lack of protected tourist zone	20	14.2	11	18.3
Lack of appropriate resting facility in the park	18	12.8	8	13.3
Difficulty to see the endemic wildlife animals due to insufficient number	33	23.6	18	30
Total	140	100	60	100

Source: Computed from the survey data

Forest and landscape degradation of the area, which comprises 32 percent, was ranked as the first major problem in reducing the recreational quality of the park by foreign respondents. This is due to the fact that the park quality is deteriorating mainly because of road construction, widespread deforestation and grass burning, agriculture, firewood collection, hunting and domestic livestock grazing. Difficulty to see the endemic wild animals due to insufficient number, severe cold, lack of protected tourist zone, and lack of appropriate resting facility in the park are the second, third, fourth and fifth problems respectively ranked by foreign respondents.

Difficulty of seeing the endemic wild animals due to insufficient number was ranked as the first major problem in reducing the recreational quality of the park by local respondents. The second, third, fourth and fifth major problems ranked by local respondents respectively were forest and landscape degradation of the area, lack of protected tourist zone, severe cold, and lack of appropriate resting facility in the park.

Visitors were also asked to choose park attributes that attracted and made them to visit the park. Since each of the attributes was not independent, respondents were allowed to choose more than one answer that can justify their choice. Accordingly, 95 and 97 percent of foreign and local respondents were attracted by endemic animals and bird watching. About 92 and 90 percent of foreign and local respondents were interested in the beauty of the naturally green landscape of the park. Mountain trekking and site seeing, and get away from cities and crowds attracted 85 and 45 percent of the foreign

and 55 and 18 percent of local respondents respectively. The proportion of visitors who gave research and/or course related as well as sharing experience with society as causes of attraction were 36 percent of local and 40 percent of foreign respondents respectively.

4. Conclusion and Recommendation

The SMNP has tremendous potential and represents one of the most wonderful natural areas due to its naturally endowed resources. However, the Park has been included in the List of World Heritage in Danger due to the evidence of recent forest and landscape degradation of the area, deterioration of the population of endemic wild animals and thus sightings have been made only in the most remote and inaccessible areas, lack of appropriate resting facility in the park, and lack of protected tourist zone which result from agricultural encroachment and human settlement, loss of biodiversity, grazing and the impacts of road construction. This is due to lack of sustainable income from internal sources to support improvement and expansion projects. Thus, understanding the recreational value of natural resources of the park is fundamental to effective conservation programs. Therefore, it is important to estimate how much value people attach to this park so as to demonstrate how the respective authorities can extract additional revenue to improve the qualities and expand the types and varieties of their services. In doing so a standard environmental valuations technique was applied namely travel cost method.

The travel cost method of valuation depends on information about the amount of money and time visitors spend to reach that site. Actual cost which is the sum of travel cost per round trip and on-site staying cost, and the maximum willingness to pay (MWTP) are the two most important variables that we used to determine consumer surplus. Accordingly, the average consumer surplus per person was estimated to be Birr 3147 and 390.4 for foreign and local respondents respectively. This translates into an expected aggregate annual recreational economic benefit of Birr 48,562,086.4 (approximately US\$ 2,943,156.7) which reflects the value of the benefit that visitors gained by visiting the park. Even if the Park had a much larger economic potential than was actually realized, records show that the park was getting only 14 percent of the potential recreational economic benefit of the site for the survey 12 months.

Thus, our recommendation is, the park authorities should increase the current price for different services that are provided in the park given the huge recreational economic benefit of the park as valued by visitors. This will enable the concerned authorities to have a higher income to support improvement and expansion of the types and quality of the recreational services. In doing so, the average consumer per person that is estimated in this study could be used as a guide on the fee structure.

References

- Beltran, J. (2000). "Indigenous and Traditional Peoples and Protected Areas," Principles, Guidelines and Case Studies. IUCN, Gland, Switzerland.
- Clawson, M., and Knetsch, J. (1966). "Economics of Outdoor Recreation," Washington, DC. Resource of the Future.
- EWCO. (1991). "Simen Mountains National Park." Situation Report to UNESCO, Ethiopia.
- Haab, T., and McConnell, K. (2002). "Valuing Environmental and Natural Resources: Econometrics of Non-Market Valuation". Cheltenham, UK: Edward Elgar.
- Hürni, H. (1980). "Simen Mountains National Park." Monthly report, WWF, Paris.
- Hürni, H. and Stiefel, S. (2003). "Report on a Mission to the Semen Mountains National Park World Heritage Site, Ethiopia." Report for NCCR North-South and the East & Southern Africa Partnership Programme of the Centre for Development and Environment, University of Berne, Switzerland.
- Mladenov, Natalie, Gardner, R John, Flores, E Nicholas, Mbaiwa, Joseph, Mmopelwa, Gagoitseope, and Strzepek, M Kenneth. (2007). "The value of wildlife-viewing tourism as an incentive for conservation of biodiversity in the Okavango Delta, Botswana," *Development Southern Africa*, 24: 3, 409 — 423.
- Morey E. R. (1994). "What is Consumer Surplus per Day of Use, When Is It a Constant Independent of the Number of Days of the Number of Days of Use, and What Does It Tell Us about Consumer Surplus?" *Journal of Environmental Economics and Management* 26(3): pp 215-303.
- Nuva, R. and Mad Nasir Shamsudin (2009). "Willingness to Pay towards the Conservation of Ecotourism Resources at Gunung Gede Pangrango National Park," West Java, Indonesia; *Journal of Sustainable Development*, vol. 2, No.2, pp. 1-2.

LIVELIHOODS OF URBAN HOUSEHOLDS IN DEBREMARKOS TOWN: THE ROLE OF SOCIAL CAPITAL

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Abstract

Peoples' everyday life experiences show that social ties and networks have important implications for their day to day activities and long-term livelihood decisions and outcomes. In cognizant of this fact, recent development theories take this social fabric not only as an asset, but as one of the crucial livelihood assets. This study is conducted in two selected kebeles of Debre Markos Town and mainly assesses the role social capital can play in the livelihoods of urban households. The study is also intended to identify the available dimensions of social capital to the sample urban households and determinant factors of social capital utilization. Mixed methodology is employed in order to achieve the objectives of the study. Household Survey, Life History and Key Informant Interview are the methods applied. Purposive and Simple Random sampling techniques are used to identify samples of the study. Social capital in the study area is manifested in terms of the concentration of memberships and the networks the households have. Apart from these "structural" social capital dimensions, the high level of trust existing among the households and reciprocity are manifestations of social capital in the study area. The study reveals that better access to resources; social capital as coping strategy; enhancement of other livelihood assets, emotional support and social security are the main roles of social capital in the livelihoods of the sample urban households. Socio-economic, personal, cultural and religious factors determine social capital in the study area. Maintaining the existing social capital should be pursued through encouraging and supporting the existing local institutions. This would help to preserve the existing social capital and tap its returns.

Key words: Social capital, urban households, livelihoods, Sustainable Livelihoods Framework

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1. Introduction

Differences in social and economic outcomes cannot be justified fully by the “traditional” economic resources like labor and land (Grootaert, 1999). There is a growing recognition that development thinking should incorporate human and social dimensions of economic failures and successes. Human capital is an important asset towards development since “a society's endowment of educated, trained, and healthy workers determine how productively the orthodox factors could be utilized”. However, later on, these human capital constituents are believed to be less productive “unless that person also has access to others to inform, correct, assist with, and disseminate their work” (Woolcock, 1998: 154).

Peoples' everyday life experiences show that social ties and networks have important implications for their day to day activities and long-term livelihood decisions and outcomes (Woolcock & Narayan, 2000). In cognizant of this fact, recent development theories take this social fabric not only as an asset, but also as one of the crucial livelihood assets. Besides, analysis of poverty based on livelihood assets views social capital as one of individuated assets that can be accumulated and destructed.

Moreover, in the livelihoods framework five assets are distinguished as central in development interventions: human, social, physical, natural and financial (Rigg, 2007). In this approach, social capital captures those asset dimensions which are concerned with social networks and associations (Rakodi & Lloyd-Jones, 2002). Accordingly, “communities endowed with a diverse stock of social networks and civic associations are in a stronger position to confront poverty and vulnerability, resolve disputes and take advantage of new opportunities”. On the contrary, “the absence of social ties can have an equally important impact” (Woolcock & Narayan, 2000: 226; Grootaert *et al.*, 2004).

The impact of social capital on income and welfare of households and in improving access to resources has been researched, and reflected its potential in reducing poverty (Grootaert & Bastelaer, 2002; Mikkelsen, 2005). Access and purposive mobilization of social capital lead to a better socioeconomic status (Sobel, 2001; Lin, 2001).

Studies in both urban and rural Ethiopia revealed that social capital is significant in attaining and sustaining economic benefits and activities. Eleni (2001) assessed the significance of social capital in the grain market of Ethiopia and argued that social

capital, measured by the network of trading contacts available to each trader, is important in enabling traders to find trading partners more readily and thereby decreasing transaction costs. Mulugeta (2006) studied the role of social capital in relation to group lending mechanisms of Dedebit Credit and Saving Institution. His study assessed the importance of social capital before, during and after the credit service of the institution and underlined the huge potential that social capital can contribute for various interventions.

Tewodaj (2005) examined the role of social capital in recovery and growth of households' endowments. The study investigated that both local social relationships as well as "bridging" social capital seem to have a positive effect on asset holdings directly, as well as indirectly by mitigating the impact of income shocks on livestock capital. Tsedey (2005) investigated how social capital serves as survival mechanism for street children and youth in Addis Ababa. Similarly Nega *et al.* (2009) showed that there is a significant contribution of social capital towards empowerment of individuals even if with gender difference. Samson (2010) assessed the potentials of social capital for local development in selected poor communities of Addis Ababa.

Most current inquires assume that social capital has a great value in the livelihoods of individuals, households or society as whole. Nevertheless, empirical investigations to demonstrate its contributions to the livelihoods of urban households are scanty. The values and benefits of the different theorized dimensions of social capital and their contribution in the livelihoods of urban households need further investigation. One ongoing debate has been whether the social diversity and fluidity of cities mean that the urban areas suffer from conditions of social disintegration and the erosions of community, or whether they rely on strong networks of solidarity between groups and individuals (Farrington et al., 2002). By this, some argue that urban diversity and fluidity make urban residents to suffer from social disintegration; and others hold a view that despite the diverse nature of cities and towns, people rely on strong social networks and structures (Farrington et al., 2002; Meikle, 2002). Acknowledging this debate, this study mainly assesses the role of social capital in the livelihoods of urban households in Debre Markos town. More specifically, the paper aims to examine the different dimensions of social capital urban households own in the study area; to assess the livelihood outcomes for which social capital is employed and to assess factors that determine social capital in the study area.

2. Conceptual Framework

2.1 Social Capital

Analyzing the role of social capital to households' livelihoods can be performed "in the context of a simple conceptual framework which views social capital as one class of assets available to households" (Grootaert *et al.*, 2004: 14). In this study social capital represents groups, networks, trust and reciprocity which help households to benefit from them and contribute to their livelihoods. Recognizing the multilevel measurement and analysis of social capital at micro, meso and macro levels, the study assesses the role of social capital at the micro level by measuring social capital at household level.

To capture social capital at household level, the two broad categories of social capital are used: structural and cognitive. The structural dimension takes the nature and extent of households' participation in different types of social organizations and informal networks. It is used to explore the different groups and networks where people may call upon or have access to them. It also considers group diversity and dynamics. The second dimension of social capital is the "cognitive" dimension where trust and reciprocity are included.

The following section briefly presents the different dimensions of social capital which are used to measure social capital in the study.

Groups

In this dimension number and types of groups, organizations or associations where the sample households are member of are included. Density of associations and the nature of the groups in terms of functioning and benefits are analyzed.

Networks

The other structural dimension of social capital taken is networks of the households. Here networks are taken as those lines or connections available to households; and households can rely on starting from making talks on private matters to accessing any livelihood assets to build and sustain livelihoods and decrease vulnerability.

Trust

Social capital literatures debate whether trust is dimension of social capital or its byproduct (Woolcock, 1998). Fukuyama wrote strongly on the link between trust and

social capital and took social capital as a dimension of social capital. He argued that there is “radius of trust, that is, the circle of people among whom co-operative norms are operative” (Fukuyama, 2001: 8). The radius of trust can be large or small depending on the benefits it provides. In this dimension, the perception of households towards trusting other members of households, relatives, neighbors and colleagues is assessed. Then, the contribution or influence of their trust towards their livelihoods is assessed.

Reciprocity

Reciprocity signifies the relationship of exchange where people usually exchange labor, capital and consumption with the anticipation of future return on specified or unspecified point of time (Das, 2004). Here the perception, expectation and the extent of the norm of reciprocity of households are assessed by designing appropriate survey questions. The role or contribution of this norm to their livelihoods is also examined.

2.2 Sustainable Livelihoods Framework

After identifying the nature of households’ social capital, the interplay between social capital and livelihoods of the households is investigated. In doing so, Sustainable Livelihoods Framework is used as analytical tool.

A livelihood comprises assets (natural, physical, human, financial, and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000: 10, quoted in Tegegne, 2011).

The livelihood perspective comes to the fore in the anticipation of the full understanding of livelihoods. The livelihood approach recognizes that “households construct their livelihoods both on the basis of the assets which are available to them and within a broader socio-economic and physical context” (Rakodi & Lloyd-Jones, 2002: 8).

Sustainable livelihood framework gives power to agencies and “emphasizes their dual dependence on multiple activities and multiple assets, especially social capital, for survival”. The approach underlines the role of the agency “to sustain and develop their livelihoods and particularly their ability to benefit from social capital” (Lyons & Snoxell, 2005a: 1303).

The livelihoods approach has different components which help us to fully analyze people's livelihoods. From these components, the study takes livelihood assets, vulnerability, livelihood strategies and livelihood outcomes and assesses the interplay between social capital and these livelihood components. These components are selected since they are significant to sketch the role of social capital in the livelihoods of urban households.

Vulnerability

Vulnerability means the probability of being exposed to risk (Rigg, 2007). In other words, it is the insecurity of the well-being of individuals, households or communities in the face of changing environment (ecological, social, economic, and political). The change could occur in the form of shocks, trend, and seasonality. Analyzing vulnerability includes both the threats to individuals and their assets. It also deals with people's ability to mobilize assets to discover "opportunities and resist or recover from the negative effects of the changing environment" (Rakodi & Lloyd-Jones, 2002: 15). Social capital has immense potential in decreasing household vulnerability (Woolcock, 1998; Meikle, 2002).

Vulnerability in the urban context manifests itself in the form of short-term shocks like sudden illness, death of a breadwinner in households and natural disaster or recurring seasonal changes like prices and employment fluctuations (Rakodi & Lloyd-Jones, 2002; Lyons & Snoxell, 2005a). Households' experience of vulnerability and the respective role of social capital in decreasing or avoiding those vulnerabilities and its potential towards shock recovery are assessed.

Livelihood Assets

In the sustainable livelihoods framework, five assets are identified as basic to livelihoods: social, financial, physical, human, and natural capital. Among these livelihood assets, natural capital is less significant in the urban context (Rakodi & Lloyd-Jones, 2002). Different empirical studies on social capital showed that, social capital has the potential to make other livelihood assets productive and improve access to them (Grootaert & Bastelaer, 2002). Hereunder, the different livelihood assets are reviewed and their relevance to the study is implied.

Financial capital consists of financial resources that determine the livelihood strategies and even access to other assets such as education, health, transport services and

housing. Income, saving, insurance, remittance, credit (formal and informal) institutions and pension are the major sources of financial capital (Rakodi, 2002; Rigg, 2007).

Due to its reciprocal feature, the link between financial services and social capital is especially strong. Social capital helps to form mediations which are vital for the creation of financial resources (Rutherford *et al.*, 2002). Membership in saving groups and micro-finance institutions are taken as a proxy to measure financial capital accumulation and access. Further, membership helps members in managing and accessing financial assets (Buckley, 1997 quoted in Lyons and Snoxell (2005a)). Since the area has the tradition of rotating and other saving groups, it is envisaged that social capital lubricates accumulation and access of financial resources. Trust is also a major requirement for the establishment as well as the performance of such groups. So the role of trust in the establishment, arrangement and involvement of such groups and members is investigated.

The other component of asset is human capital which refers to skill, knowledge, and health status of households which determine the ability of individuals to generate income which, in turn, influences livelihood objectives (Rakodi & Lloyd-Jones, 2002). Coleman (1988) assessed the relationship between social capital and human capital and underlined their strong correlation. The study assesses how households' social capital stock contributes to human capital.

Physical capital refers to the productive and household assets, including tools, equipment, housing and household goods, as well as stocks (such as jewellery) (Rakodi & Lloyd-Jones, 2002). In the anticipation that social capital increases the productivity or access of livelihood assets, the study analyzes households' social capital holdings and their interaction with physical capital.

Livelihood Strategy

Livelihood strategies are intended activities that individuals perform to build their livelihoods. They embrace coping strategies devised to respond to shocks in the short-term and adaptive strategies designed to improve livelihoods in the long-term (Farrington *et al.*, 2002).

The choice of livelihood strategies is highly dependent on livelihood asset holdings and access to these assets. Social capital is a potential resource which affects the decisions of

actors to devise livelihood strategies (coping or adaptive) (Grootaert, 1999; Lyons & Snoxell, 2005b; Dudwick *et al.*, 2006). Apart from facilitating other livelihood strategies, social capital itself is recognized as a crucial part of livelihood strategy (Philip, 2002; Tsedey, 2005). In connection to this, the study assesses the contributions of social capital in the selection of livelihood strategies of households and how it acts as a buffer against undesirable livelihood outcomes.

Livelihoods Outcome

These are the outcomes of chosen livelihood strategies. Livelihood outcomes can be both positive which allow individuals to nurture livelihood assets against shocks and stresses; and poor, which diminish asset bases thereby increasing vulnerability. Praising the role of social capital, Meikle (2002: 42) argued that “some families in some contexts have been able to improve the conditions of their lives has been traced back to individuals, households, social and community networks of mutual support”. In this study the role of social capital in shaping households’ livelihood outcomes is examined.

3. Methodology

3.1 Data Sources and Types of Data

The study is conducted in Debre Markos town, Amhara Regional State, which is found at a road distance of 300 kilo meters from the capital city, Addis Ababa.

Both primary and secondary sources are used to generate the necessary information. Scientific articles, books, internet, and other relevant readily available information are sources of secondary data and used to supplement the primary data.

It is argued that methodological mix is necessary in the study of social capital because it is a multidimensional asset by its nature (Krishna & Shrader, 1999; Grootaert *et al.*, 2004; Dudwick *et al.*, 2006). Mixed methodology is the strategy which combines both the traditional survey (quantitative approach) and qualitative methodology to generate necessary data (Creswell, 2009). Quantitative and qualitative methods are employed to collect the primary data. This helps to build up a more comprehensive picture of the structures and perceptions of the urban households towards the different dimensions of social capital (Grootaert *et al.*, 2004).

According to Creswell (2009: 211), mixed approach especially that of “sequential explanatory strategy” allows researchers to “explain and interpret quantitative results by collecting and analyzing follow-up qualitative data”. In view of that, two qualitative methods- Key Informants Interview and Life History- are made after the completion of the household survey. Qualitative method helps to construct the realities about social capital in line with the research inquiries and objectives as it has the merit of deep investigation of life experiences, perceptions and opinions (Kitchin & Tate, 2000). The following section presents the methods used to acquire the primary data of the study.

Household Survey

Structured questionnaire is used to conduct household survey and construct quantitative data. The survey targets to capture information on households’ socio-economic and demographic characteristics, on the different dimensions of social capital and the potential roles social capital play in their livelihoods.

Two enumerators were recruited to conduct the survey. One day training was given to the enumerators on the intents of the study and the survey questions. The questionnaire was pre-tested on sample urban households after translating into *Amharic* language. The pre-testing helped to check the compatibility of the questions and the expected results of the survey questions. Accordingly some improvements were made on the structures of the questions depending on the pre-testing.

Life History

Life History method is among the useful methods used in studying social capital (Krishna & Shrader, 1999). In order to find out the role of social capital in urban households’ livelihood trajectories and life time changes, Life History is employed. This method helps to get detailed information on career changes, changes in socio economic status and changes in personal circumstances. Life time experiences and evaluations of social capital are also significant in order to see contributions of social capital through the eyes of the households’ life experiences. Such detailed information allows a better investigation of respondents’ histories of social capital use as well as livelihood strategies.

For the life history method six respondents were selected based on purposive sampling technique (3 female and 3 male). In order to discover respondents for the Life History Method, Judgmental Sampling technique was used based on sex, age and types of

livelihood activities. This sampling technique helps to select the sample elements based on researchers' experience that are believed to produce the required results (Kitchin & Tate, 2000).

Key Informant Interview

Key informants are selected "for their knowledge or distinctive viewpoint" (Woodhouse, 2007: 165). Key informant interview was conducted with leaders of associations. The key informant interview is performed in order to get a comprehensive view of the role of the institutions, their main activities, their main strengths and weaknesses in enhancing the livelihoods of members. The leaders to be interviewed are identified after the completion of the household survey. This is done after investigating the concentration of membership of the sample households. Accordingly, three local institutions (*Idir, Iqub and Mahiber*) are selected. From the selected three local institutions, Key Informant Interview is undertaken with two leaders of *Idir* from the two selected *kebeles* (*Kebele 3 and 6*), leader of "Debre Markos *Idirs* Forum", one leader of *Iqub* and one of the members of a *mahiber*. Consequently, five key informant Interviews are undertaken.

Sampling Technique

In order to reach the sample households, two sampling techniques are used. First, from the existing seven *Kebeles* in the town, two sample *Kebeles* (*Kebele 3 and kebele 6*) are selected. Purposive sampling technique is employed to select the *Kebeles* so as to keep socio-economic and spatial distributions. From the selected *Kebeles*, households are selected by using simple random sampling technique.

Sample Size

Taking the time available for data collection, 150 questionnaires were prepared for the household survey. These 150 questionnaires were administered based on proportional sampling technique for the *Kebeles* (*Kebele 3 and Kebele 6*) depending on their total household size. The respective total household sizes of the *kebeles* are 2993 and 5067 (Respective *Kebele* administrations 2011). Calculating the proportional sample gives 56 and 94 sample households for *kebele 3* and *kebele 6* respectively. After sorting out and rejecting defective responses, the sample size comes to be 140.

Data Analysis

In order to analyze and present the quantitative data, SPSS version 17 and Microsoft Excel 2007 are used. First data pre-processing which includes coding, data entry, error

checking and data editing is performed. The coding frame includes both pre-coding and subsequent coding after collecting the data. The coding after the data collection is performed for some of the open ended questions by identifying the appropriate categories within the data and classifying before giving them code. After entering the data into SPSS, the results are presented using tables, graphs, frequencies and percentages. Cross tabulations are also performed.

The qualitative data acquired through life history, key informant interview and open ended survey questions are analyzed thematically based on, Dey's qualitative data analysis which "consists of the description, classification and making of connections between the data" (Kitchin & Tate, 2000: 231).

4. Findings and Discussions

4.1 Social Capital and its Role in Livelihoods

4.1.1 Membership

As one proxy to social capital, the sample households are asked if they are a member of any kind of group or organization available in their surroundings. The result shows that 89.3 percent of them are members of at least one group. A close look at the membership outline reveals that 70.4 percent of them are members of *Idir*, and 63.2

This is, perhaps, not surprising given that *Idir*, *Iqub* and religious groups have a long history of cooperation and support on financial and emotional related issues among community members in Ethiopia.

Table 1: Membership and type of groups (multiple responses)

Groups	Frequency	Percent
<i>Idir</i>	88	70.4
<i>Iqub</i>	79	63.2
Micro finance institutions	19	15.2
Religious or spiritual groups	57	45.6
Traders or business associations	18	14.4
Professional associations	12	9.6
Others	3	2.4

Source: Field Survey, 2011

It is worthy to note that the mere existence of associations may not necessary demonstrate social capital. According to Grootaert (1999), such cases happen when membership is not on voluntary basis and the returns of social capital are meager or do not exist. In view of that, reviewing internal structures of associations and their functioning is necessary so as to infer the benefits of social capital. Accordingly, *Idir*, *Iqub*, religious or spiritual groups and micro-finance institutions are taken for detail analysis. The groups are selected based on the membership density of sample households. Key Informant Interview, Life History and secondary documents are used to assess the features of the groups.

Idir

Idir is a local association of people who share a common interest such as family membership, friendship, residence in the same district, affiliation by employment, and membership in the same ethnic group. The main purposes of *Idir* are financial, emotional and material support during death of any member of a household (Dejene, 1993).

Social ties are very important in *Idirs*. A member is required to attend meetings, be present at funeral ceremonies, visit the sick, etc. The by-laws of *Idirs* are observed because of powerful social sanctions and fines (Key Informant Interview with leaders of *Idirs*; Dejene, 1993).

In the town there are about 92 registered *Idirs*. These *Idirs* organize themselves under a forum called “Debre Markos Forum for *Idirs*”. This number includes only those *Idirs* registered in justice bureau of the town. After forming the forum, the *Idirs* have been doing different activities in the town apart from the services they give to their members (Key Informant Interview with leader of “Debre Markos Forum for *Idirs*”).

As it is discussed above, financial support, material assistance and consolation in difficult times are the main returns that a member got. Majority of the sample households felt that they can rely on their *Idir* when they faced such vulnerable situations. Apart from these common activities of *Idirs*, some of the *Idirs* in the study area serve their members in other activities which support the livelihoods of the members. One of the leaders of *Idir* narrated it as follows.

Our Idir was established before 30 years. The Idir was oriented to provide burial services and consolation. But now we perform other activities which support our members and the whole community at large. We established consumers' union and provide basic consumer goods at fair price. We have our farm cultivating different vegetables. We have our mill which serves our members at lowest price. We participate in various community development works in many terms.

Spillover effect of group membership is manifested in *Idirs* in the study area. Apart from the main traditional purposes of *Idir*, the study finds out that *Idirs* are becoming important information conduit. A key informant interview with one of the *Idirs* revealed this.

*We have seen a tangible change, for example, in terms of some harmful cultural practices in the town. We have given frequent awareness creation programs to our members. Previously people in the town were known in cultural practices like tezkär. After our intervention people almost stopped it. Apart from our members, we managed to be role models for other *Idirs* in the town.*

In addition to better access to information, some members of *Idirs* state that they have accessed financial resources. This happens when members get credit services from non-governmental organizations through their *Idirs*.

Iqub

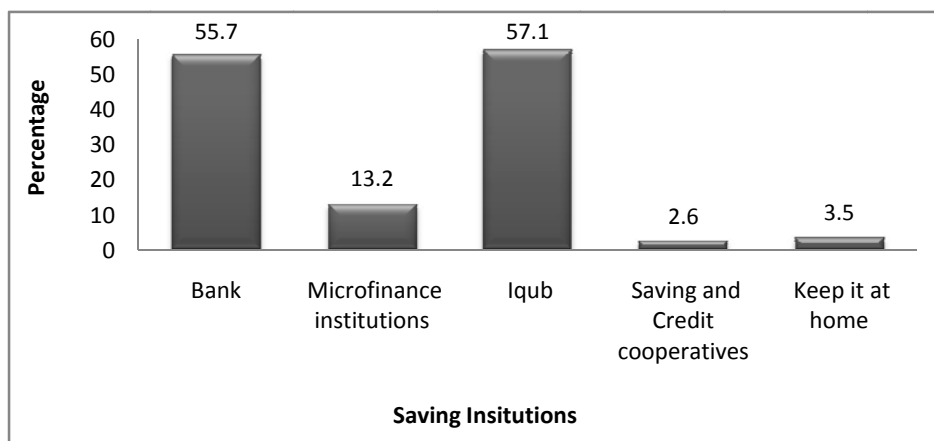
Iqub is a well known Rotating Savings and Credit Association in Ethiopia. It is an institution where members are required to put a specified amount of money at every meeting, at which one person becomes the recipient of the total amount collected. *Iqub* is usually practiced among members who are in similar income class based on a pre-established social tie and saving is enforced by virtue of membership. The small average scale of operation and cost of lending are some of the advantages of *Iqub* (Dejene, 1993; Key Informant Interview with leader of *Iqub*; Life History).

Among the livelihood assets, empirical studies confirmed that social capital has the potential to make other livelihood assets productive and improve access to them (Grootaert & Bastelaer, 2002). *Iqub* increases access to funds that members could not secure from the formal financial sector due to the necessary collateral to guarantee repayment. Those households who are members of *Iqub* point out that it increases their

financial asset, helps them to develop regular saving behavior, makes them programmed and less vulnerable when they face something unexpected and need money.

When we broadly see the saving profile of the sample households, 81.4 percent of the households have savings. From the available saving institutions, 57.1 percent and 55.7 percent of the sample households use *Iqub* and banks as their saving institution respectively (See Figure 1). Even though it is problematic to conclude with this survey, this figure shows that households prefer *Iqub* to save their money even than bank. Its regular saving scheme and the trust they have on members of the *Iqub* (which is based on long established social ties) are the basic reasons for the households to rely on *Iqub*. Assessing urban poverty in selected small and big towns of Ethiopia, Tegegne (2011) also found out that the two dominant saving institutions used by urban poor are saving or credit unions and *Iqub*.

Figure 1: Saving institutions used by the sample households

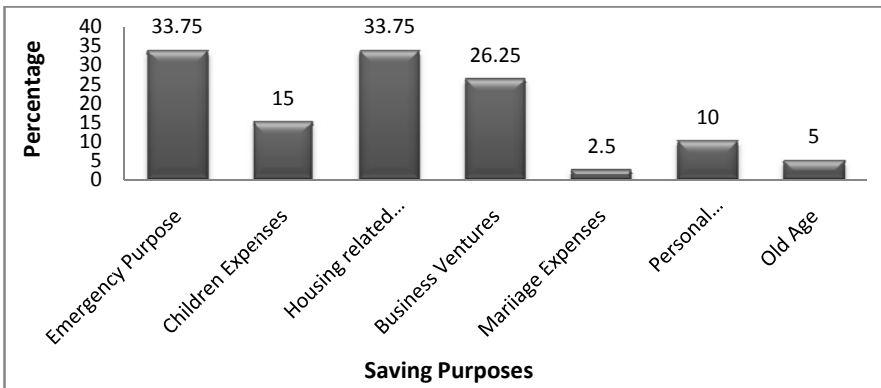


Source: Field Survey, 2011

The capital contributions of *Iqub* vary according to the purpose of the *Iqub* and the economic status of the participants (Dejene, 1993). Unarguably, if members of *Iqub* invest it in some rewarding activities than consumption, its benefits will be overwhelming in the future. The sample households are asked for what purpose they use their savings, especially savings in *Iqub*. Figure 2 graphs the cross tabulation of those households who use *Iqub* as their saving institution and the dimensions of saving purposes. As the figure shows, emergency purposes and expenditures related to housing are the major purposes of *Iqub* for the sample households. A quarter of households

report that they use their *Iqub* for business ventures which shows how members engaged in such activities use their *Iqub* to support their livelihood strategies. Children expenses and personal consumptions are other purposes of *Iqub* identified in the study. These findings confirm that *Iqub* does make economic sense (ibid). As Dejene (1993) claimed the main purposes of *Iqub* were generally purchase of durables, payment of school fees and clothing. But this survey finds out that households also mainly participated in *Iqub* for emergency purposes parallel to the other functions. This is achieved through the long established norm of the group where a member would be given priority if he or she faces something and needs money.

Figure 2: Purposes of saving- *Iqub*



Source: Field Survey, 2011

Being a member of *Iqub*, the households managed to increase their saving. From the total households who have savings, about half of them managed to increase their saving over the last five years. When we see the institutions they use to increase their savings, banks dominate (80.3 percent). Next to banks, 42.3 percent of the sample households used *Iqub*. This might be due to the reason that most people use *Iqub* for immediate expenditure than putting it as saving.

Table 2: Institutions used to increase saving (multiple responses)

Institution	Frequency	Percentage
Bank	57	80.3
Micro-finance institutions	5	7
<i>Iqub</i>	30	42.3
Saving and credit cooperatives	8	11.3

Source: Field Survey, 2011

In line with the above discussed roles of *Iqub*, the following narration amplifies how *Iqub* plays a role in the livelihoods of the households.

I was born in 1956 (E.C) in Debre Markos town. After I finished my high school, I engaged in my family small business fully. I have devoted all my time and energy to my work. I participated in different Iqubs and started other business ventures. After I collected Iqub I opened a cafeteria. People around me were better aware that I was a hard worker and they developed trust on me. Then people come to me to encourage and suggest to me other business ideas.

Since then I believe that Iqub is the best strategy to get financial asset without any interest and bureaucracy. But mind you it needs a lot of commitment to build trust and networks in your locality and benefit from Iqub. If you don't have a good reputation you will not engage in any Iqub and would not get a guarantor in your turn.

I expanded my business ventures and built a high standard hotel in the town. Currently, I pay around 40 thousand birr of Iqub per month. Apart from the interpersonal trust I have, my personal courage and commitment is basic as far as my success is concerned. Unless you proved that you can work and benefit, people may be suspicious about your actions and they may not allow you to participate in Iqub.

Religious or Spiritual Groups

Religious or spiritual groups are those groups which have religious or spiritual orientation. These groups include religious gatherings to worship God and often named after angels or saints. Although members in the group are basically affiliated by religion, kinship, occupation, place of residence, place of birth and level of income are also factors to establish or join religious groups.

The common types of religious groups in the study area are *mahiber* and *senbete*. Each member of the group is responsible to prepare the agreed types of foods and drinks. Members in the group perform religious prayers and have foods and drinks together (Key Informant Interview and Life History).

The main return of these religious groups is spiritual or religious. Apart from these observations the sample respondents describe that it gives them the opportunity to discuss social issues and promotes social interaction among them. One old woman expresses her deep attachment to her *mahiber* as follows:

I really miss the day to go to my mahiber. It gives me pleasure to go there and take part in the program. It gives me spiritual satisfaction; I get the chance to discuss different issues; we talk about our lives, we share our experiences; we hear so many new and significant issues, we have fun. I can say I pass best times when I go to my mahiber.

Membership in groups of saving and micro-finance institutions helps members in managing and accessing financial assets (Buckley, 1997 quoted in Lyons & Snoxell, 2005a). In addition to *Iqub*, the other group that reflects the role of social capital in terms of financial benefit is micro-finance institution. As we see in Table 1, 15.3 percent of the sample households are members of micro-finance institutions; and Figure 1 shows that 13.2 percent of the households use micro-finance institutions as their saving institution. As table 2 shows, micro-finance beneficiaries have also managed to increase their saving by using their membership. The main benefit to these sample households is the financial resource they get from the institution. Once they become members of the institutions, they manage to get startup capital and devise their livelihood strategies. Consequently, most of the beneficiaries report that their livelihood has changed in many ways. They have their means of living and income, and send their children to school. The social network and interpersonal trust with other people are the main resources the sample households had. These resources help them to form a group (as a criterion to benefit from the micro-finance scheme). The following extraction from life history narrations supports this.

I was born in Motta, West Gojjam. I got married to a soldier when I was 14 and came to Debre Markos with my husband when I was 22. When he retired our income became meager to cover our households' expenditures. Then the problem came; and I started to check opportunities around in order to devise income generating activities. But, unfortunately, my husband died and the worst came. Then, I confronted the entire household burden.

One day I told my worries to my friends in my mahiber. One of our members suggested organizing a group and taking loan from micro-finance. Then we talked a lot about it and went to the institution to get more information. After we got enough information on the necessary procedures, we formed a group. We all were curious while creating our group. Since we knew each other for a long time, it was easy whom to include in the group. Then we got the loan and started working. Now I have my own income and saving. I managed to send my children to school. I purchase necessary household assets.

This narration enlightens how this micro-finance beneficiary uses her membership in order to get information about available financial resource options and livelihood strategies. The trust the members have is the main asset to establish the group and access the financial resource to devise livelihood strategies.

Beside to the specific roles of the above groups, there are also roles common to all the groups. The first one is the spillover effect of membership through information access. Most households recognize the importance of their groups since they exchange various useful experiences like saving behaviors and family planning issues. This works for all groups with economic and social motives. Furthermore, members know each other more through socialization process and help them to build trust, and avoid information asymmetry for further group benefits. This is what Grootaert said the “Social nature of social capital” (Grootaert, 1999: 45). Most sample households report that the social interaction in their groups improved their access to resources. Some respondents also point out that they managed to get loan from other non-governmental organizations through their *Idir*. Newman *et al.* (2011) also empirically assessed the information spillovers of group membership in Vietnam and proved its role in shaping the saving behavior of households.

In addition to the more tangible benefits of membership, like enhancement of livelihood assets and access to crucial livelihood assets, emotional support is another return. Almost all the sample households identify emotional benefits of their membership. The sample households get emotional support directly or indirectly. The direct benefit is found when the groups are oriented for the provision of emotional supports. On the other hand, membership indirectly benefits the sample households through developing new networks. This helps them to expand their networks and benefit from their gatherings and discussions.

The sample households also feel that they are socially secure as they would rely in their social relations and groups if they seek help. The networks they develop through membership also give them a sense of social security, since they know more people in the group to access livelihood resources when they need.

Networks

The links between a household and its family members, friends, neighbors and colleagues explain a network of household. Networks can be both formal and informal. The informal ones are face-to-face relationships between a limited number of individuals who know each other and are bound together by kinship, friendship, etc. These are institutions in the sociological sense of having recurring interactions. Many social capital networks become formal organizations that are rule-bound, bureaucratic and have a legal personality (Hoddinott *et al.*, 2005).

Every society in Ethiopia relies on a mix of informal network-based institutions and formal exchanges (*ibid*). The study also reports informal and formal networks are usually linked and that they can be cooperative. In order to assess networks of the households, questions are asked how frequently the households make a visit to their neighbors, and what activities they usually perform with them. Results indicate that 67.9 percent of the households say they frequently visit their neighbors.

I proposed three common activities that could be performed among neighbors of urban households and asked if they performed them. The activities included drinking coffee together, going to religious places together and going to markets together. Almost three quarters of the sample households (72.9 percent) said they do not perform any of the activities. One tenth of the households perform coffee ceremonies, one fifth of the households go to religious places together and about 11.4 percent of them go to markets together (see Table 3). Even though more than two third of the sample households reported that they have frequent visit to their neighbors, the common activities performed with neighbors are fewer than suggested in this figure. This might be because households had other interactions than the common ones listed in Table 3.

Scholars argue that urban residents suffer from the breakdown of social capital due to various factors such as the diverse socio-economic features of urban residents and the uprising challenges of urban life (Meikle, 2002; Philip, 2002). Simple frequent visits might not guarantee the availability and positive role of social capital, but, at least, frequent

interaction by itself creates a way to build social capital and benefit from it. Households social ties with neighbors, which can be regarded as a kind of social capital, generate benefits for residents (Eiji, 2010). Tegegne (2011) also argued that social network “is manifested in terms of visiting friends, neighbors and relatives, and attending various social events” (Tegegne, 2011: 89).

Table 3: Activities to perform with neighbors (multiple responses)

Activities	Frequency	Percent
Nothing	102	72.9
Coffee ceremony	15	10.7
Go to religious places together	28	20
Go to market together	16	11.4

Source: Field Survey, 2011

The existence of this social capital dimension- network- is also well manifested through its role. The following section presents the roles that networks play in the livelihoods of the sample households.

Source of Income

Since urban life is based on monetary transactions, income is the basic financial asset to fulfill all livelihood requirements. The sample households are asked if their income from their means of living is enough to cover the expenses of their households. In doing so, 62.1 percent of them report that they have enough income to cover their households’ expenditures. But the remaining others do not. On the other hand, 5 percent of the households reply that they get financial support from other people even though they have enough income to cover their households’ expenditures. As we see from Table 4, family members are the main sources of the extra income to the households who have income deficit or have enough income.

Apart from this, the survey finds out that there are households who totally rely on financial transfers from other people. The study finds out that 5.7 percent of the sample households entirely get financial support from others to survive. This magnifies the role of social capital of the households in running their livelihoods.

Table 4: Source of additional income

Financial support	Frequency	Percent
Family members	25	41
Relatives	8	13.3
Voluntary organizations and individuals	6	10
No one	15	25

Source: Field Survey, 2011

Source of Information

Issues where households need to share information vary depending on their contribution to their livelihoods. Five themes are given to the sample households to get their priority areas for which they need to get information and the respective sources. Accordingly, 43.6 percent of the households report that they prioritize information regarding job opportunities. Market related information is selected by a quarter of the households as essential issue in their livelihoods. About 13.6 percent of the households are concerned about information sharing regarding business ideas (Table 5).

Recognizing the different types of livelihood activities of the households surveyed, the majority of the sample households are more interested about job opportunities and sources of income. Here we implicitly see how issues related to livelihood strategies are fundamental to the households.

Table 5: Important issues to share information (multiple responses)

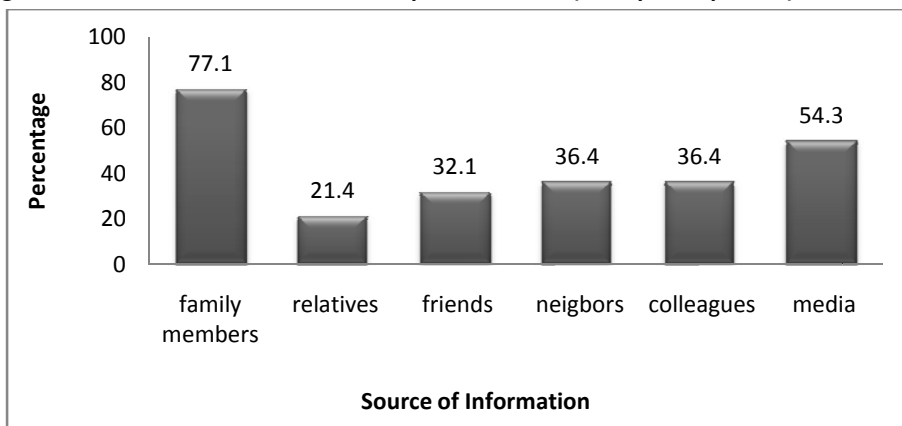
Issues	Frequency	Percent
Job opportunities	61	43.6
Market related	35	25.0
Credit services	16	11.4
Business ideas	19	13.6
Government actions	9	6.4

Source: Field Survey, 2011

Regarding the main sources of information about the important issues prioritized by the households, about three quarters of the households point out that their main source of information are their family members. Media services are used by 54.3 percent of the sample households as their source of information. Figure 3 graphs these.

These figures show how the sample households use their day to day interactions (networks) with family members, neighbors, friends, colleagues and relatives in order to get information necessary to their livelihoods. In view of this fact, the study finds out that the informal networks of the sample households are more important than media to access vital information for their livelihoods.

Figure 3: Sources of information for important issues (multiple responses)



Source: Field Survey, 2011

The role of social capital is also captured when the sample households are asked how they get into their means of living. The majority of the sample households underline the contribution of other people around them as far as their means of living is concerned. Information about available job opportunities, idea sharing on different livelihood strategies and about credit services are generally the benefits of social capital in terms of information. Apart from these information benefits, other households report that they get support in terms of financial, material and working places from other individuals when they get into their means of living. One of the respondents from life history narrations magnifies the role of networks in terms of access to various resources:

I was born to poor parents in 1966 E.C. When I was 5, I faced a disability problem. My mother told me that she tried her best to find any kind of medication but she didn't succeed. Since that time one of my legs is impaired and as you can see I use one leg and my one hand to walk. It was very difficult to go to school but I finished my high school.

After I finished my high school I was so eager to help my mother but I didn't make up the examination and I go out to the street and was busy looking around what to work and earn money. I have got so many friends there. It had become a shame to go home empty handed and I preferred to stay with my friends out. Most of the people I met were workers; they have their own work like brokers, drivers and shopkeepers. The people around me understood my great ambition to work. They always talked to me, took me wherever they went for work. That time was very challenging for me for two reasons; I felt that I am always dependent on them; and I felt that I am spending my precious time without working.

Then my friends came up with a very precious idea. They all discussed and decided to contribute money for me so that I could establish my own means of living. They found a place to work and gave me five thousand birr as a startup capital. I opened a shop in this area and started retailing. That is a great life turning point for me. Since then I have got the courage to work, to improve my shop. I have started to participate in iqub and expanded my business. I have managed to build a house for my mother and myself. My life is really changed due to the help I have got from my friends. Thanks to them now things are totally different.

I have got nothing from my parents when I started this work, but my friends helped me a lot to reach this point. I have mother, sisters and brothers but friends are behind my success. It does not matter your kinship to establish social network and benefit from it. It is the issue of finding someone who has the interest to help you. That is the important point; this changes the whole history about you like me.

In order to trace the role of social capital in terms of access to different resources and livelihood strategies, I further asked the sample households if they have made changes or improvements in their means of living and how they express the help of other people in effecting the change or the improvement. Accordingly, 85 percent of the total households replied that they have made changes or improvements in one way or another. Business expansion, change in their means of living, change of working place and upgrading in terms of education are the major changes made by the sample households. The majority of them say that they get emotional and financial support in

doing the improvement or change. On the other hand, some households emphasize their livelihood successes are mainly attributed to their effort. These mixed results show that all households may not benefit from social capital towards livelihood successes.

Source of Credit

Credit is taken as insurance where individuals use in order to smooth out their sudden shocks or reduction of their livelihood assets (Hoddinott *et al.*, 2005). The great majority of the Ethiopian population make little or no use of the formal saving and lending institutions. One explanation for this could be high interest rate, the bureaucratic lending procedures, high collateral requirements and delay of the formal institutions (Dejene, 1993). The loan experiences of the sample households show that, 86.4 percent of the sample households have borrowed money over the last five years. Of which who reported borrowing, the sources of the credit are banks (12.9 percent), micro-finance institutions (10.7 percent), family members (24.3 percent), relatives (32.9 percent), friends (30.7 percent) and neighbors (20 percent). The sources of the loans are mainly from informal sources since banks and micro-finance institutions comprise the lowest shares of the sources used. This demonstrates how informal sources of credit have significance in the livelihoods of the sample households.

The purposes of the loans are various. The most common purpose is to respond emergency case (58.7 percent). Those households who engage in business related livelihood activities borrow money for business ventures (35.5 percent). Housing related expenses (27.3 percent) are also another purpose of their borrowings. These housing related expenses comprise expenses related to housing building and fulfilling the necessary household assets. Almost a quarter of the households (23.1 percent) use their borrowing for personal consumption (see Table 6).

In this case we see the role of informal credit sources in tackling financial needs of the sample households. A close look at the purposes of borrowing also tells us how households use their social capital in order to respond to sudden financial needs, use to start or expand their livelihood strategies, and develop their housing and housing related assets. But a quarter of the sample households borrow money for personal consumption which highly determines only today's survival rather than enhancing future livelihood outcomes.

Table 6: Sources and purposes of loan (multiple responses)

	Frequency	Percent
<i>Sources</i>		
Banks	18	12.9
Micro-finance institutions	15	10.7
Family members	34	24.3
Relatives	46	32.9
Friends	43	30.7
Neighbors	28	20
<i>Purposes of borrowing</i>		
Emergency purposes	71	58.7
Children expenses	8	6.6
Housing related expenditures	33	27.3
Business ventures	43	35.5
Marriage expenses	10	8.3
Personal consumption	28	23.1

Source: Field Survey, 2011

Social Capital as Coping Strategy

Assessing vulnerability includes assessing threats to individuals and livelihood assets they own; and their ability to mobilize assets or resources in order to resist or recover from adverse consequences of changing environments (Rakodi & Lloyd-Jones, 2002). Vulnerability in the urban context manifests itself in terms of short-term shocks like illness; and seasonal changes like price fluctuations and employment opportunities (Rakodi & Lloyd-Jones, 2002; Lyons & Snoxell, 2005a). In view of that, households' loss of employment or business failure experience is assessed as a manifestation of vulnerability. Accordingly, the survey shows that 62.1 percent of the households have encountered such circumstances.

Those households who have faced such vulnerable situations have managed it differently. As Table 7 portrays loans from relatives (33.3 percent), own saving (32.2 percent), loan from family members (27.6 percent), loan from neighbors (14.9 percent) and get *lqub* in priority are the main coping strategies employed by the sample households. On the other hand, about 9.2 percent of the sample households respond to the vulnerable event by selling their household assets and 4.6 percent of them failed to manage.

As we clearly see from these figures, the majority of the households use their social capital in order to cope up with or recover from shocks. This result parallels a study by Tegegne (2011) which showed how the urban poor rely on their social asset during shocks. But it is worthy to note that all households' may not use their social capital as their coping strategy. This is due to the fact that some households fail to manage or employ "negative coping strategies" such as selling household assets (see Table 7).

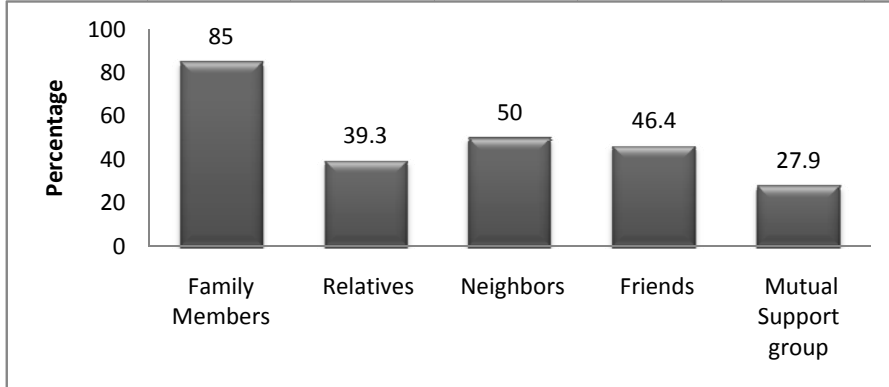
Table 7: Coping strategies of the households (multiple responses)

Coping strategy	Frequency	Percent
Own saving	28	32.2
Selling household assets	8	9.2
Loan from family members	24	27.6
Loan from relatives	29	33.3
Loan from neighbors	13	14.9
Loan from friends	12	13.8
Got <i>iqub</i> in priority	6	6.9
Take loan from bank	1	1.1
Failed to manage	4	4.6

Source: Field Survey, 2011

As we saw in the above section, 86.4 percent of the total sample households have borrowed money over the last five years for diverse purposes. Among these sample households, 58.7 percent of them borrowed money in order to respond to emergency cases (shocks). Since loss of employment or business failure is one face of shock, this case exemplifies how the majority of the households use their social capital to get financial resources and respond to shocks and resist or recover from vulnerability.

Vulnerability in the form of shock also includes some personal shocks like loss of a breadwinner and sudden costs such as medical bills (Lyons & Snoxell, 2005a). In order to assess such cases, the sample households are asked whom they would rely on when something unfortunate has happened to their household. All the sample households report that they have a network of individuals whom they would call for help in difficult circumstances; or if they face something unfortunate and ask for help. These networks largely concentrate on family members (85 percent). Figure 4 portrays the percentage of households and the respective people whom the households could rely.

Figure 4: Whom to rely on during shocks (multiple responses)

Source: Field Survey, 2011

Even though it is quite problematic to know the kind of help they would seek, questions were asked to assess the extent of the expected types of help. As we see from Table 8, 95 percent of the households would seek emotional support and about three quarters of households expect monetary support. Households also report that they would need material or in-kind supports from the people listed in Figure 4. This has a lot to show how households could rely on their social capital in order to respond to vulnerable situations. The expected help identified by the households also tells us how they use their social capital to respond to shocks and the access they have to the different resources they need.

Table 8: Types of help respondents expect

Type of help	Frequency	Percentage
Emotional	133	95
Monetary	104	74.3
In kind	88	62.9

Source: Field Survey, 2011

Among the sample households, about 89.1 percent of them also report that there are specific times where they need help from others. Some of these situations reflect their vulnerable contexts. The sample households list out the situations as; when they face something difficult and need financial and moral support; when they become pregnant and give birth; when they leave to some other places; when a family member dies; when they get sick; and when they fail to perform their job due to various reasons. In order to respond to such situations, the households say that they usually ask supports from their family members, neighbors, friends, colleagues, relatives and mutual support groups.

The networks of the households with family members, relatives, neighbors and other people contribute in providing emotional supports. Some households report that they need advice and moral support of other people when they feel destitute and helpless. This has huge benefits to the households since it gives them good state of mind. They acknowledge that their social capital acts to buffer the effects of social stress and that its presence generates a sense of well-being and belonging. Rose (1999) also found out that emotional disturbances can cause physical ill health; and social capital networks provide support that reduces emotional depression. Since health (mental or physical) is one attribute of human capital, here we see the contribution of social capital in supporting the proper functioning of human capital.

Reciprocity

Social capital can exist without the existence of any local associations in the form of neighborhood interactions, and in the norms of trust and reciprocity (Fukuyama, 2002). In order to assess the process of reciprocity, the sample households were asked if they invited people for some religious or social fests or any happy occasions. Accordingly, about three quarters of the total sample households report that they invite people during such events. Sharing or borrowing household utensils with neighbors is also another signal of reciprocity and social network. About three quarter of the sample households share or borrow household utensils with their neighbors. Similarly, as we saw in the above section, the households' frequent visit and the activities performed together exemplify reciprocity.

Exchange of favors is also another indicator that helps to demonstrate reciprocity (Lyons & Snoxell, 2005b). Questions were posed to the sample households whom would they ask to look after their children and home if they faced something sudden and had to leave to somewhere. As we see from Table 9, the sample households said that they would rely on various groups of people with different response rate. The figures show that the sample households mainly rely on their family members and neighbors in such cases. One explanation for this could be the diverse socio-economic nature of urban areas; and urban households usually have higher mobility rate in looking for adaptive opportunities.

These processes support the livelihoods of the sample households through day to day routines. Information sharing and emotional benefit are also other returns of the process of reciprocity in the study area.

Table 9: Group of people to rely on during sudden leave (multiple Responses)

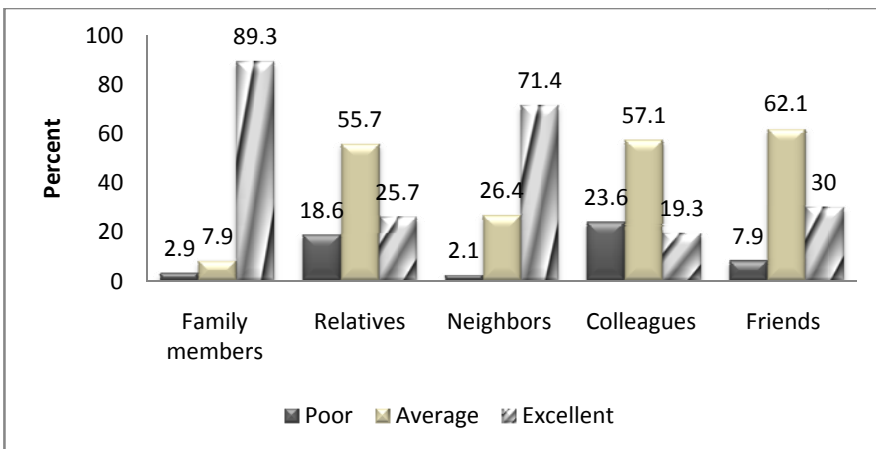
Whom to give	Frequency	Percent
No one	4	2.9
Family members	94	67.1
Relatives	14	10
Neighbors	31	22.1
Friends	10	7.1
Don't have children	21	15

Source: Field Survey, 2011

Trust

In order to trace out the other “cognitive” dimension of social capital, sample households were asked direct questions to label their level of trust towards other people. The households were given three levels of trust: poor, average and excellent. Among these three levels, 89.3 percent of the households say that they have the highest level of trust (excellent) towards their family members. When we see how they label trust towards their neighbors, more than two thirds of them say excellent (see Figure 5). Next to family members and neighbors, the sample households label the highest trust level, to friends and then relatives. Here we may think how most urban households place strong trust in their neighbors than even their relatives. One factor for this can be the diverse socio-economic features of urban dwellers and they develop new form of social capital in their new places with friends and neighbors.

Figure 5: Level of trust



Source: Field Survey, 2011

The households stress the benefits they get from their interpersonal trust in terms of social security. They narrate that their interpersonal trust gives them a sense of social security since they know that they have someone for them to draw upon hard times. This can be taken as the role of social capital which given the households a sense of socially secured agents and as a positive livelihood outcome. Tegegne (2011) also researched how social activities trigger social assets and serve as social security for the urban poor.

Households who engage in *Iqub* and micro-finance institutions stress how their trust helps them to benefit from the groups. The sample households also report how trust was the basic element in accessing various resources which were vital to their livelihoods. This happens when their trust help them to get credits and other resources through their networks and memberships.

Social capital and Livelihood Outcomes

Livelihood outcomes are highly dependent on the asset holdings of households and their vulnerability context. Sustainability of livelihoods denotes sustainability of income of households, their resilience to various shocks and adverse situations (Rakodi & Lloyd-Jones, 2002). The study investigates that the households have managed their vulnerability situations by employing their social capital. As we saw above, this is reflected when their social capital makes them less vulnerable to shocks and stresses such as sickness and loss of employment.

Their membership in groups also shows that they manage to increase their livelihood assets. From livelihood assets, access to and accumulation of financial capital is frequently reported as return of social capital. This is consistent with the arguments of Rutherford *et al.* (2002). According to the author there is strong relationship between social capital and financial capital.

Increasing households' assets and investing in housing also show the ability of social capital in nurturing the households' physical capital. Some, on the other hand, invest their *Iqub* on updating themselves. This clearly shows how the indirect benefits of social capital increases human capital of the participants. Investing the money for emergency purposes; and for personal consumptions, like medical bills, also show the benefits of social capital in securing the health status, human capital, of the households.

Improved access to resources like income, credit, employment and information are also the other outcomes identified in the study. The sample households report the various dimensions of social capital give them better access to these resources. Social security of the households is also another livelihood outcome. Since once they have their social capital to rely on (in terms membership, networks, trust and reciprocity), they feel that they are socially secured.

Determinant Factors of Social Capital

One of the common arguments in social capital literatures is its nature and benefit over time and to different socio-economic groups or households. In order to investigate this, their membership in different groups or organizations, their interaction with family members, relatives, neighbors and other people, and the norms of trust and reciprocity were asked compared to five years ago.

The survey shows mixed results for the different dimensions of social capital. About 65 percent of the households report that their membership has increased compared to five years back. One tenth of the households participate in less groups compared to five years ago. When we see the evaluation of the households about their networks with different people around them, half of them said it is improved; and almost one fifth of them say it got worse than before five years. The “cognitive dimensions” of social capital, on the other hand, show the reverse since the majority of the households said it gets worse (See Table 10).

Table 10: Social capital dimensions over time

Social capital Dimensions	Households’ Perceptions on the dynamics of social capital (percent)		
	Increased/improved	The same	Decreased/worsen
Membership	65	24.3	10.7
Network	52.1	29.3	18.6
Trust	14.3	22.9	62.9
Reciprocity	35	25	40

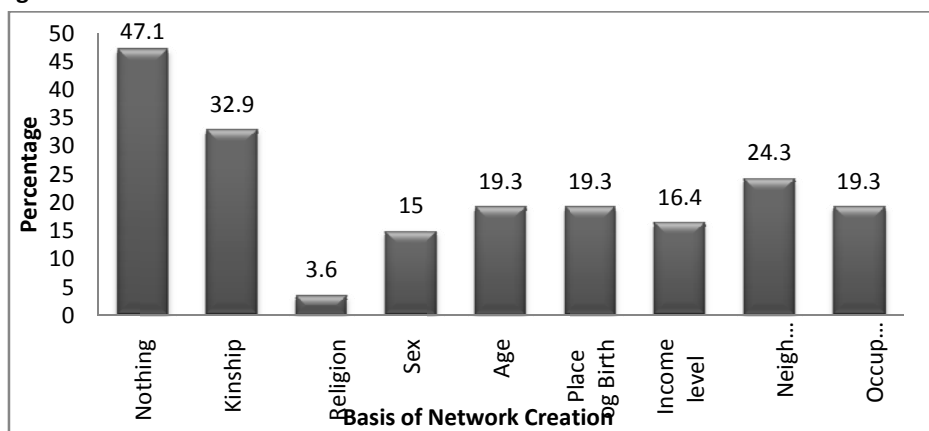
Source: Field Survey, 2011

The reasons for this mixed result can be seen as both socio-economic and personal factors. Apart from determining social capital over time, the factors also determine the creation and function of social capital for the sample households.

Socio-economic Factors

The possible socio-economic factors that could determine social capital are assessed if the factors influence network creations. Accordingly, 47.1 percent of the households are not influenced by any social or economic characteristics in network creation. This is “bridging” kind of social capital (Grootaert *et al.*, 2004). But above half of the total sample households are influenced by some social and economic characteristics while creating social networks. From these factors, one third of the households build kinship based networks and a quarter of the households prefer neighborhood networks (see Figure 6). This neighborhood network characterizes most urban areas of the country (Tegegne, 2011). The sample households who have networks based on the various socio-economic factors have “bonding” kind of social capital since they are influenced by demographic characteristics, ethnic and geographical backgrounds in creating social networks (Grootaert *et al.*, 2004).

Figure 6: Basis of network creation



Source: Field Survey, 2011

Type of livelihood Engagements and Income

Samson (2010) discussed that the poor are less likely to participate in community development since they are more concerned for survival; they spend much of their time in searching livelihoods. Those households who mainly engage in casual work, petty trading, local drink making and selling and *injera* baking say that they have no enough income to participate in the available local groups, except in *Idir*. They further explain that the increasing living cost was aggravating it since it becomes very challenging for them even to feed their family.

On the other hand, some sample households say that their work and improving income level allow them to participate in different groups and improve their interaction with different people around them. While narrating her life history, one respondent feels the changes in her social capital after she engaged in her job:

Before five years I don't have any job. But after I got small startup capital from my families I start to work in this computer center. Since then I started to meet new people and participate in different groups. I have now better networks and group memberships. This is due to the improvements of my income. My work also allows me to have frequent interaction with my customers and other people.

Analogous to the factors identified by the sample households, one 70 years old man given his perception about social capital while narrating his life history:

I have been living in this kebele for the last 45 years. At that time I had good neighbors; we used to meet in the morning and evening; we eat and drink together; we share all the things we have; we trust each other; we had happy time; we celebrate different social and religious fasts together. This time is so awful. Every one closed his door; no one is trusted; everyone has very suspicious look on his or her neighbors, friends and their family members. The time does not allow households to eat and drink together. Everybody runs to fulfill his or her livelihood needs. The income is not enough to perform activities with relatives, neighbors, and friends.

Age

As Coleman (1988) suggests social capital can be depleted if it is not renewed. In other words, contrary to other livelihood assets like physical and financial capital, social capital is nurtured or improved when someone uses it. As most of the households who are over 45 years of age reasoned out, they fail to sustain their social capital since they become weak in terms of health and income. This finding is consistent with what Rose found out in Russia where old people fall sick frequently and seek help but their social capital is ruptured (Rose, 1999).

Tenure Status and Length of Residence

Homeowners have a tendency to invest in social capital (Eiji, 2010). Those households who have their own house are found to invest more in their social capital. This is shown by their membership density (see Table 11).

Table 11: Tenure status and membership

	Membership		Total
	Yes	No	
Own	64	3	67
Private rental	34	8	42
<i>Kebele</i>	27	4	31
Total	125	15	31

Source: Field Survey, 2011

According to Kan (2007), quoted in Eiji (2010), length of residence can be considered as the degree of integration into the neighborhood. People integrated into the neighborhood are more likely to invest in social capital since the return from the investment is expected to be large. As Table 12 reveals, those households who lived more than 8 years in their specific *kebele* dominantly participate. Some households also feel that they trust people and decide to participate in different groups like *Iqub* since they lived with them for longer period of time and develop trust.

Table 12: Length of residence and membership

Length of residence	Group membership
less than 1 year	3
1-4 years	23
4-8 years	13
More than 8 years	86
Total	125

Source: Field Survey, 2011

Personal, Cultural and Religious Factors

Lyons and Snoxell (2005a) in studying the social capital of petty traders in Nairobi found out that some of the reasons for providing unpaid help were cultural and religious. Some factors in this study are also attributed to personal, cultural and religious issues. Some sample households were not members of groups since they do not believe that the

groups are important in their livelihoods. Some other sample households reason out some personal, cultural and religious explanations for the provision of unpaid help or support to others. These various reasons are exemplified by such expressions: "I provide help since in our area it is a culture to give help as much as you can"; "I help others since my religion orders to do so"; "Helping each other is part of the culture of our area"; "I feel satisfied when I see people's need are met with my help". These cases show that personal and cultural factors also determine social capital.

5. Conclusion and Recommendation

5.1 Conclusion

Assessing the social capital stocks of the sample households shows high membership density. *Idir*, *Iqub* and religious groups are the three institutions where membership of the sample households concentrated. These institutions have both social and economic orientations as far as their returns to the livelihoods of the sample households are concerned. The network of the sample households is reflected in their frequent visit to their neighbors. This is one of the manifestations of social capital and the process to get mutual benefits among the sample households.

Reciprocity and trust are also manifested in the study area. Reciprocity in the form of exchange of favors (like child care), sharing household assets and invitation during social or religious occasions prevail. The households report that they might accept emotional, monetary and other support from their networks around them. This could tell us how the sample households have a certain pattern of reciprocity since it is made anticipating future returns. But when we see the pattern of reciprocity, most of the sample households report that they make the exchange of favor with their family members and neighbors. The trust labeling also concur with this. The majority of the sample households place the highest trust level to their family members and neighbors.

The benefits of social capital are usually indirect; it operates through access to credit, information, asset accumulation and collective action (Portes, 1998; Grootaert & Bastelaer, 2002; Dudwick *et al.*, 2006). In this study the "indirect" roles of social capital are also manifested through its role towards access to various resources. Parallel to the formal information sources (media), information flow through family members, neighbors and colleagues is the most important source of information reported by the sample households. From these sources, the study investigates that family members

outweighs all the others as a means of information conduit. The study also finds out what Grootaert called “Social nature of social capital” (Grootaert, 1999: 45). This is reflected through information spillover of group memberships.

The loan experiences of the sample households also show how households tapped their social capital in order to respond to their financial needs. The networks of sample households with family members, neighbors, relatives and friends are sources of credits. This case challenges the presumption that urban areas suffer from social disaggregation. Social capital of the households in terms of membership, network, trust and reciprocity serve as coping strategy to respond to their vulnerable situations. But, among the available networks of the sample households the study found out that the households mainly rely on their family members and neighbors during sudden shocks.

Social capital contributes in nurturing other livelihood assets. The findings of the study demonstrate how social capital smoothes out access and accumulation of financial assets. Looking at the saving profile of the sample households, *Iqub* is the first institution used. Even though the functions of *Iqub* depend on the amount and the economic status of participants, the study shows that the sample households use their *Iqub* fulfilling housing and housing related assets apart from nurturing own saving.

The study also depicts how social capital of the sample households serves as a source of income. This holds true for those who have enough income and suffered from income gaps. Apart from these sample households, the study also identifies households who totally rely on transfers. These demonstrate the potentials of social capital as a source of the basic livelihood asset in urban areas. In addition to improved access to resources and contribution to other livelihood assets, emotional support is another return of social capital. The interpersonal trust the sample households have and the norm of reciprocity also give them the sense of social security.

Looking at the four dimensions of social capital comparing to five years ago, the responses are mixed for various reasons. The factors outlined by the study participants can be seen in two sides. The factors behind the increment or improvement of the different social capital dimensions are; better awareness about benefits of group participation, increasing responsibilities of the households in different forms, the number of years they stayed in their specific *kebeles*, different policies encouraging group memberships and benefits (like micro-finance), improved income levels and the

type of livelihood engagement. On the other hand, changing of place of residence, decreasing in the number of household members, deteriorating income situations, bad health status, increasing living cost and shortage of time due to different livelihood engagements are the main factors behind the decreasing or worsening of social capital status. Besides, personal, religious and cultural factors also determine the accumulation and returns of social capital.

The sustainability of livelihoods and social capital notion are reflected in terms of increasing income and saving of the households, access to employment and information, increased asset base, and recovery from vulnerable situations.

5.2 Recommendations

- Maintaining the existing social capital should be pursued. This could be performed through encouraging and supporting the existing local institutions, and creating supportive environment for the emergence of voluntary local associations and ensuring their teamwork.
- Taking full advantage of the existing social capital for various developmental activities would benefit a lot. Its contribution to development outcomes can be ensured by including social capital dimensions in the designing and implementation of policies at various stages.
- The study found out that the sample households highly rely on their social capital in order to access various resources like information and credit. This reminds us to take the potentials of social capital in designing policies which directly affect the livelihoods of urban households.
- The transformation of the “bonding” social capital into “bridging” social capital may have ample returns. This would help to open and introduce new opportunities to the available bonding kind of social capital.

References

- Coleman, C. J. (1988). *Social Capital in the Creation of Human Capital*. The American Journal of Sociology, Vol. 94, pp. 95-120.
- Creswell, J.W. (2009). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (ed.), Sage Publications: London.
- Das, R. J. (2004). *Social Capital and Poverty of the Wage-Labor Class: Problems with the Social Capital Theory*. Transactions of the Institute of British Geographers, New Series, Vol. 29, No. 1, pp. 27-45.
- Dejene, A. (1993). *The Informal and Semi-formal Financial Sectors in Ethiopia: a study of the Iqub, Idir, and savings and credit co-operatives*. African Economic Research Consortium, Research Study 21, Nairobi.
- Dudwick, N., Kuehnast, K., Jones, V. N. & Woolcock, M. (2006). *Analyzing social capital in context: A guide to using qualitative methods and data*. The World Bank: Washington D.C.
- Eiji, Y. (2010). *How do neighbors influence investment in social capital? Homeownership and length of residence*. Retrieved January 24, 2011 from (<http://mpra.ub.uni-muenchen.de/22637/>)
- Eleni, G. (2001). *Market Institutions, Transaction Costs, and Social Capital in the Ethiopian Grain Market* (Research Report No. 124). Washington, D.C.: International Food Policy Research Institute.
- Farrington, J., Ramasut, T. & Walker, J. (2002). *Sustainable Livelihoods Approaches in Urban Areas: General Lessons, with Illustrations from Indian Cases* (Working Study 162). UK: Overseas Development Institute.
- Fukuyama, F. (2002). *Social Capital and Development: the Coming Agenda*. SAIS Review vol. XXII, No. 1, pp. 23-37.
- Fukuyama, F. (2001). *Social capital, civil society and Development*. Third World Quarterly, Vol. 22, No. 1, pp. 7– 20.
- Grootaert, C. & Bastelaer, T.V. (2002) *Understanding and Measuring Social Capital: a synthesis of Findings and Recommendations from the Social Capital Initiative*. Washington D.C: The World Bank.
- Grootaert, C. (1999). *Social Capital, Household Welfare and Poverty in Indonesia*. Washington D.C: The World Bank.
- Grootaert, C., Narayan, D., Jones, V. N. & Woolcock, M. (2004). *Measuring Social Capital, an Integrated Questionnaire*. Washington D.C: The World Bank.
- Hoddinott, J., Dercon, S. & Krishnan, P. (2005). *Networks and Informal Mutual Support in 15 Ethiopian villages*. Organization for Social Science Research in Eastern and Southern Africa (EFPRI), Addis Ababa.

- Kitchin, R., & Tate, N.J. (2000). *Conducting Research in Human Geography: Theory, Methodology and Practice*. Harlow: Pearson Education Limited.
- Krishna, A. & Shrader, E. (1999). *Social Capital Assessment Tool*. Washington, D.C: The World Bank. Paper Prepared For the Conference on Social Capital and Poverty Reduction, June 22-24.
- Lin, N. (2001). Building a Network Theory of Social Capital. In Cook, K. and Burt, R.S. (eds.). *Social Capital: theory and research*, pp 3-29. New York: Walter de Gruyter, Inc.
- Lyons, M. & Snoxell, S. (2005a). *Sustainable Urban Livelihoods and Market place Social Capital: Crisis and Strategy in Petty Trade*. Urban Studies, Vol. 42, No. 8, pp. 1301–1320.
- Lyons, M. & Snoxell, S. (2005b). *Creating Urban Social Capital: Some evidence from informal traders in Nairobi*. Urban Studies, Vol. 42, No. 7, pp. 1077–1097.
- Meikle, S. (2002). The Urban Context and Poor People. In Rakodi, C. and Lloyd-Jones, T. (eds.). *Urban Livelihoods: A People-centred Approach to Reducing Poverty* (pp. 37-51). USA: Earthscan.
- Mikkelsen, B. (2005). *Methods for Development Work and Research: A new guide for practitioners* (ed). London: Sage.
- Mulugeta, A. (2006) *Social Capital and Group Based Microfinance: a case study on Dedebit Credit and Saving Institution in Mekele Zone of the Tigray Regional State*. MA Thesis. Rural and Local Development Studies, Addis Ababa University, Addis Ababa.
- Nega, F., Mathijs, E., Deckers, J., & Tollens, E. (2009) *Gender, social capital and empowerment in northern Ethiopia*. Retrieved November 26, 2011, from <http://mpra.ub.uni-muenchen.de/24629/>
- Newman, C., Tarp, F. & Broeck, K.V.D. (2011). *Social Capital and Saving Behavior: Evidence from Vietnam* (Discussion Paper No. 351). Ireland: Institute for International Integration Studies.
- Philip, S. (2002). Social Capital, Local Networks and Community Development. In Rakodi, C. and Lloyd-Jones, T. (eds.). *Urban Livelihoods: A People-centred Approach to Reducing Poverty* (pp. 133-150). USA: Earthscan.
- Portes, A. (1998). *Social Capital: Its Origins and Applications in Modern Sociology*. Annual Review of Sociology, Vol. 24, pp. 1-24.
- Rakodi, C. & Lloyd-Jones, T. (2002). *Urban Livelihoods: A People-centered Approach to Reducing Poverty*. USA: Earth Scan Publications Ltd.
- Rigg, J. (2007). *An Everyday Geography of the Global South*. London: Routledge.
- Rose, R. (1999). *What does Social Capital Add to Individual Welfare? An Empirical Analysis of Russia*. Washington D.C: The World Bank.

- Rutherford, S., Harper, M. & Grierson, J. (2002). Support for Livelihood Strategies. In Rakodi, C. and Lloyd-Jones, T. (eds.), *Urban Livelihoods: A People-centred Approach to Reducing Poverty* (pp.112-132). USA: Earth Scan.
- Samson, K. (2010). *Social Capital as a Catalyst for Community Development: a case of poor localities in Addis Ababa, Ethiopia*. Journal of Sustainable Development in Africa, Vol.12, No.6, pp. 122-139.
- Sobel, J. (2002). *Can We Trust Social Capital?* Journal of Economic Literature, Vol. 40, No. 1, pp. 139-154.
- Tegegne, G. (2011). *Livelihood and Urban Poverty Reduction in Ethiopia: Perspectives from small and big towns*. Organization for Social Science Research in Eastern and Southern Africa (OSSREA), Addis Ababa.
- Tewodaj, M. (2005) *Shocks, Livestock Asset Dynamics and Social Capital in Ethiopia*. Retrieved October 24, 2011 from (http://editorialexpress.com/cgi-in/conference/download.cgi?db_name=NEUDC2005&paper_id=226)
- Tsedey, A. (2005) *Social Capital as a Survival Mechanism: case of some Street Children and Youth in Addis Ababa*. MA Thesis. Rural and Local Development Studies, Addis Ababa University, Addis Ababa.
- Woodhouse, P. (2007). People as Informants. In Thomas, A. and Mohan, G. (Eds.). *Research Skills for Policy and Development: How to find out fast* (pp. 159-179). Los Angeles: Sage Publications.
- Woolcock, M. & Narayan, D. (2000) *Social Capital: Implications for Development Theory, Research, and Policy*. The World Bank Research Observer, Vol. 15, No. 2, pp. 225-249.
- Woolcock, M. (1998). *Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework*. Theory and Society, Vol. 27, No. 2, pp. 151-208.

THE ROLE OF TRADE IN THE ECONOMIC GROWTH OF SUB-SAHARAN AFRICA

Ambachew Mekonnen Sisay¹

Abstract

Based on the endogenous growth model on the importance of trade for economic growth via technological progress and using panel data from 44 SSA and 11 well-performing SEA economies over the period 1995 - 2006, our benchmarking empirical analysis claims to evidence the promising and independent roles of both exports and imports on SSA economic growth as they do in the benchmark region. Different from the usual claim, import is found to have superior growth effects to export; but, its effect is greater in the well-performing countries of SEA than SSA. Our empirical analyses also cast evidence on the crowding-out effect of FDI, with small magnitude and fragility; and, the causes of the divergent growth performance between the two regions to include the ineffectiveness of investment, macroeconomic instability and the severity of the adverse growth consequence of debt-burden in SSA relative to SEA. Hence, we suggest for SSA governments to favor trade, both exports and imports, followed by domestic investment more than FDI by creating conducive macroeconomic and investment environment.

Key words: Growth, Exports, Imports, Panel Data, Benchmarking, SSA

JEL Classification: E22, F13, F43.

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1. Introduction

Economic growth is the increase in productive capacity and output over time. It is represented normally by the rate of change in GDP or per capita GDP. Despite its drawbacks, income per person is one of the popular measures of the living standards of nations, as it considers the output of an economy with respect to population. Income determination involves a spectrum of economic forces. Theory hypothesizes that growth of income emanates from two main sources, *factor input accumulation and total factor productivity (TFP) growth*. The former refers to the employment of more factor inputs such as labor, capital and natural resources including land while the latter is about improvements in efficiency per unit of output, or getting higher output from a given amount of inputs.

Apart from the constraints of scarcity of resources, the growth contribution of factor input accumulation is also argued to be subject to the law of diminishing returns. However, TFP growth is thought of as a boundless source of growth opportunity by continuously lifting up the production possibility boundary of a nation through improvements in productivity either from invention/technological progress, dexterity, economies of scale or adoption. In emphasizing the importance of the latter, Paul Krugman (1994) observes “As soon as one starts to think in terms of growth accounting, ..., one arrives at a crucial insight about the process of economic growth: sustained growth in a nation’s per capita income can only occur if there is a rise in output *per unit of input*” (P. 67). According to him, Robert Solow has concluded that technological progress has accounted for 80 percent of the long-term rise in US per capita income, with increased investment in capital explaining only the remaining 20 percent (P. 68).

The experience of growth encourages us to think of other causes that contribute to explaining differences in growth performance across countries. In addition to labor and capital, most growth literatures consider other factors such as initial conditions, trade, economic policies, institutional arrangements, political and economic stability, geographic location and so forth. Furthermore, in considering the situation of developing countries, other factors like international financial injections (debt and aid) have been debated. However, Shigeyuki and Razafimahefa (2003) believe that studies on the trade-growth relationship in Africa are largely insufficient (P. 183) in scope and substance. Hence, this study will add to the existing literature on the contribution of trade to economic growth in sub-Saharan Africa (hereafter SSA) contrasted with some

well-performing and emerging economies of South East Asia (henceforth SEA). In doing so, the rest of the paper is organized as follows. The second section reviews related literatures; the third section describes growth trends; the fourth section estimates empirical models and discusses the results on the separate growth attributes of exports and imports; and, the fifth section summaries the main findings and concludes the chapter.

2. Literature Review

2.1. *The Importance of Trade to Growth*

Trade has been regarded as an engine of economic growth for its static gains from resource reallocation; and dynamic gains that have many links in improving productivity and other channels that it works through. Many empirical studies have been devoted to address questions like: What is the relationship between trade and economic growth? Does trade openness or trade volume affect economic growth positively? Is growth import-led or export-led?

However, the net effect of trade on economic growth has been an area of controversial debate; yet, like other debates in economics, the trade-growth controversy is wide ranging involving contested theories and empirical evidence. There are at least four broad channels through which trade affects income. Firstly, trade allows countries to specialize based on their comparative advantage and motivates investment. According to Grossman and Helpman (1991), trade enhances growth by enlarging the availability of intermediate inputs and capital equipments which can expand the productivity of a country's other resources. Secondly, trade can increase productivity by facilitating the transfer of technology-knowledge through imports of technology embodying capital goods and direct investment by foreign firms with proprietary knowledge, increase contact with foreigners (Ghura, 1995, P. 763-764, Yanikkaya, 2003, P. 73, Shigeyuki and Razafimahefa, 2003, P. 174, Thirlwall, 2006, P. 529). Endogenous growth theory regards trade openness to serve as a conduit for knowledge spillover (results of R and D, technologies, learning-by-doing, etc) that ultimately would result in productivity gains. Thirdly, trade can affect economic performance through its impact on the political process, in particular rent-seeking activities (Frankel and Romer, 1996, P. 32-33, Wacziarg, 2001, P. 395-398, Anderson and Babula, 2008, P. 9). Fourthly, trade allows access to large markets and greater exploitation of increasing returns. Krugman and Helpman's (1985) new trade theory takes monopolistic competitive practices through product differentiation as motives for exploiting the advantages of economies of scale

and the consequent continuous productivity improvements. Trade might affect the degree of product-market competition, mark-ups and firms' incentives to innovate and increase efficiency. It also stimulates the expansion of efficient sectors that generate positive externalities & the contraction of inefficient ones (Hallack and Levinson, 2004, P. 11-12).

Nonetheless, the pro-trade arguments are still in dispute. There are studies that argue the importance of trade has been overhyped. Rodriguez and Rodrik (1999) assert the need for some caution and humility in interpreting the existing evidence on the relationship between trade and economic growth because the tendency to greatly overstate the systematic evidence in favor of trade openness has had a substantial influence on policies around the world. In stressing the methodological pitfalls, they also state "...the challenge of identifying the connections between trade and economic growth is one that still remains before us." (P. 62). In concluding their extensive survey of studies, Rodriguez and Rodrik put forward their skepticism on both trade '*promotion versus protection*' claims. They say,

We do not want to leave the reader with the impression that we think trade protection is good for economic growth. We know of no credible evidence - at least for the post-1945 period - that suggests that trade restrictions are systematically associated with higher growth rates. On the other hand, we believe that there has been a tendency in academic and policy discussions to greatly overstate the systematic evidence in favor of trade openness (P. 62).

Others believe that this argument is hardly conclusive and convincing against the net positive benefits of trade evident from economic history. Although inward-oriented development strategies flourished in the 1950s and 1960s, the policies unsustainable effects had discredited the idea that the costs of an open trade regime may outweigh its potential benefits; and on balance, general economic openness is regarded as more favorable to growth than a general inward-looking economic approach (Wacziarg, 2001, P. 393, Baldwin, 2003, P. 29).

In evaluating the trade-growth link, different studies provide conflicting evidence and varying explanations. The evidence shows that some countries such as Hong Kong, Singapore and Luxemburg have benefited from trade; and, flourished as regional trade centers with their trade intensity ratio exceeding 150 percent. Contrarily, trade intensity in Japan had actually fallen from around 21 percent in 1960 to 18 percent in 1992

despite rapid per capita GDP growth while nearly all of the SSA countries have trade intensities higher than Japan's. The trade intensity measures of SSA had increased from 1960 to 1990 (Jones, 2002, P. 17) and continued to increase to 50 to 60 percent (Morrisey and Mold, 2006, P. 9) with no considerable growth outcomes. There is no coherence in trends between trade and economic growth. The observed patterns are mixed: high trade intensity and fast economic growth in some countries (e.g., Hong Kong, Singapore and Luxemburg), high trade intensity but low growth in other countries (e.g., SSA), low and declining trade intensity but high economic growth (e.g., Japan).

Caves *et al* (1999) have also documented the past economic performance of different parts of the world. According to them, growth experience varies from country to country. In North America and Europe relatively moderate growth rates (2 or 3 percent) alternate with periods of much slower growth. In many parts of Africa, the situation appears grimmer, with long periods of zero or negative growth. In the past decades, until the financial collapse in 1997-1998, the success stories were to be found primarily in Asia. Japan, in the early post World War II years comes readily to mind, but even more rapid rates of growth were being experienced by the so-called tigers of Southeast Asia: South Korea, Taiwan, Hong Kong and Singapore joined by Thailand, Malaysia, Indonesia and China in the latter years. More recently, countries in Latin America are also experiencing high growth rates. Caves *et al* characterize all these countries as "outward-looking" linking their fast growth with export activities. They have also emphasized, however, that growth has been accompanied by higher rates of capital accumulation, both physical and human capital (P. 133).

In their endogeneity-controlled empirical study focused on the cause and effect relationship of trade and growth in East Asian countries, Frankel and Romer (1996) have concluded that openness, not factor accumulation, is the dominant explanation, apparently accounting for more of the growth miracle than investment and schooling combined (P. 14). According to them, many of the explanations offered for East Asian growth indeed appear to play an important role: simply catch-up (particularly China, Indonesia and Thailand), investment and education (especially Japan, Korea, Malaysia, Singapore and Taiwan) and unknown residual (especially Japan which has a large positive residual, and the Philippines). Openness plays a substantial role in many countries especially Hong Kong and Singapore (P. 15). However, Frankel and Romer have recognized two important caveats in their conclusions. Firstly, the effects of trade are not estimated with great precision. In addition, the hypothesis that 'the estimates based

on the IV and OLS estimators are equal' is far from rejection. Secondly, the employed geographic instruments cannot be applied without qualification of the effects of trade policies. It is unlikely that variations in openness due to policy involve exactly the same mix of the various mechanisms (1996, P. 31-32).

In spite of alleviating the potential endogeneity problem, the analysis could also be criticized for its reliance on the IV estimates while the Hausman coefficient comparison or OLS consistency test is far from rejecting the null "no systematic differences in coefficients". It simply follows the "greater" openness coefficient (3.9%) ignoring the possibility of inconsistency of IV estimation in the case of weak instruments. Rather, it is a practical demonstration of the tendency of favoring the growth attribute of trade cautioned by Rodriguez and Rodrik (2000, P. 62).

2.2. *The Debate on the Importance of Exports and Imports to Growth*

The conventional wisdom assumes growth as export-led with a positive impact of trade on growth. One of the distinct characteristics of the earlier literature is that it gives too much emphasis on exports, which are viewed as causing growth (Levine and Renelt, 1992, P. 953, Yanikkaya, 2003, P. 61). One school of thought sees the stumbling block in attaining self sustaining growth is a lack of demand for one's products. Represented by Rosenstein-Rodan (1943), along with Nurkse (1953), Scitovsky (1954), and Fleming (1955), an influential set of ideas called the "big push" or "balanced growth" doctrine explains the presence of a "vicious circle", where firms do not industrialize because there is no market for their goods, and the latter in turn happens because income is low. Income is also low because firms do not industrialize. Hence, it was argued that, this kind of low level equilibrium could be broken by the simultaneous export-led industrialization of a large part of the economy. The "unbalanced growth" camp led by Albert Hirschman (1958) argues that industrialization of certain "leading" sectors would break the vicious circle and pull forward the rest of the economy. Exports, especially in leading sectors, could jump start the industrialization process. Exports may be seen as causing growth for other reasons, as well. Growth beginning at a low level requires the import of technology embodying capital goods and other indispensable intermediate inputs that could not be produced locally. Exports enable countries to pay for the imports that are required for growth. Hence, exports or foreign aid can fill in the "foreign exchange gap" that was perceived as an obstruction to growth. Exporting firms, especially multinationals, have also been seen as providing externalities by serving as conduits for

the dissemination of world class technology to less dynamic, domestically oriented firms. Exporting firms are also believed to learn from exporting (Krishna *et al*, 2003, P. 480).

A number of other empirical studies have also estimated the influence of exports on growth of developing countries. Some argue that exports may be a major source of economic growth, both directly because exports are part of production and indirectly as exports facilitate imports of goods, services and capital, and thereby new ideas, knowledge and technology. The rapid expansion of exports relative to output in the fast-growing East Asian economies over many years is mostly taken as a practical demonstration (Gylfason, 1999, P. 1031). Specialization and large exports are likely to stimulate efficiency and growth, and thus, raise the level of per capita income over time. However, there are arguments that view specializing on agricultural exports as unpromising. Highlighting the adverse trends and the high variance of the prices of primary products, Bleaney and Greenaway (2001) conclude "Specialization in primary product exports reduces growth" (P. 491). As discussed in Thirlwall (2006), the evidence provided by Dowrick and Golley (2004), based on a sample of 127 countries for 1960-2000, reveals that the average productivity growth of countries specialized in primary products was 0.5 to 0.8 percent slower and 2 percent slower in the 33 poorest countries; and, they justify it as the major reason that trade has widened world income inequality in the period since 1980. Similarly, a study by Sachs and Warner (1997) finds that specialization in primary product exports is awful for growth (Thirlwall, 2006, P. 528-529). Trade in farm products is also less free than trade in manufactures and most services because of the restrictive stance of the common agricultural policy of the EU and the exclusion of most farm products from the General Agreement on Tariff and Trade (GATT) (Gylfason, 1999, P. 1036). In spite of the dramatic fall in their tariff levels to about 4 percent, rich countries still protect their agricultural and textile sectors (Thirlwall, 2006, P. 529). Therefore, specialization in agricultural exports is likely to hurt nations' overall export performance compared with countries that emphasise manufacturing and services. Plus, agriculture does not generate significant educational and technological externalities for the expansion of other industries.

The debates go beyond the types of specialization. There are also disagreements among researchers on the special importance of exports to growth in general. Referring to the importance of learning from plant or micro-level panel data studies, another line of argument arises as rather than learning-by-exporting, self-selection of high productivity firms into exporting sectors seems to be the main reason for the growth of exports

(Rodriguez and Rodrik, 2000, P. 62). According to this line of argument, it is not export oriented firms which become productive; rather, it is productive firms which export.

From the empirical side, the significantly positive results in growth regressions have come under criticism for the reason that they do not account for the possible interactions between investment, imports, exports and growth which could lead to misleading estimates. Levine and Renelt (1992) claim three results on the interaction between investment, trade and growth that may lead to ambiguities in interpretation. According to them, the substitution of total trade or import indicator in place of exports in cross-country growth or investment regressions gives almost identical results. Thus, researchers who identify a significant correlation using an export performance measure should not associate this result with exports; because, it could be obtained using the corresponding measure of imports or total trade. Moreover, the share of trade in GDP is robustly positively correlated with the share of investment in GDP. Controlling for the investment variable yields insignificant coefficients for any trade indicator on growth, implying that the importance of trade in growth regressions may be based on enhanced resource accumulation and not necessarily on the improved allocation of resources. They also noted that exports are not robustly correlated with growth when investment is controlled for. But, it became robust when investment is dropped, suggesting a two-chain link between trade and growth through investment. According to them, Romer (1990a) also has found robustly positive link between exports and investment to GDP ratios (P. 953-955).

There are also other explanations on the routes through which investment could be linked with exports and growth. One hypothesis holds that an increase in exports would be related to growth because higher investment demand causes a rise in exports. Young (1994) argues that in contrast to export-led growth, the success of the SEA NICs can be explained by policies that promoted investment in productive resources and human capital. According to this view, investment would be causally prior to exports, imports and output growth (Krishna *et al*, 2003, P. 482). Thus, understanding the links between income growth, exports, imports and investment is central for development policy.

Another strand of the existing literature gives more weight to the growth impact of imports rather than exports. Lawrence and Weinstein (1999) show import-led growth (in Sohn and Lee, 2003, P. 2). With a particular focus on the impact of imports on international R and D spillovers, Ledesma (2002) argues “countries importing more from

technologically advanced countries or with a higher degree of openness seem to benefit from their stock of knowledge” and “... this impact seems to be stronger in small economies and increasingly important in recent years.” (P. 19). A recent work by Henry *et al* (2009) emphasises the importance of the imports of capital machinery for growth in developing countries. Based on their estimation of the elasticity of output with respect to R and D using data from 57 developing countries over the period 1970-1998, Henry *et al* (2009) conclude “technologies embodied in capital goods (machinery) imports are an important source of output growth in developing countries and by extension, trade is an important channel for transferring these technologies from R and D performing countries to these (developing) economies.” (P. 243).

However, the importance of exports and imports may vary from country to country depending on the level of development. According to the theory of comparative advantage, international trade leads to a more efficient use of a country’s resources through the import of goods; and, trade plays an independent and indispensable role to growth. Thus, following Yanikkaya (2003), it is probably safe to conclude that imports are as important as exports for improving economic performance; hence, both should be considered (P. 61). The separate treatment of imports and exports in growth regressions is one of the recommended research extensions in Frankel and Romer (1996) to distinguish whether the spillover effects from trade partners come via exports or imports (P. 16).

There is also evidence that shows both export and import measures enter positively in growth regressions justifying the need for the simultaneous consideration of both components of trade in growth analysis. Krishna *et al* (2003) have estimated the causal linkage between exports, imports, investment and growth using a Vector Error-Correction (VEC) model for each of 39 developing countries for the period 1951-1998 and concluded: firstly, growth is best explained by models which include exports and/or imports (22 countries), investment (16 countries), and a mixture of imports/exports and investment (1 country). Secondly, in 32 out of 39 countries, the evidence shows a uni-directional causality from either of the three to GDP growth while a bi-directional causality is exhibited in 7 countries. Thirdly, the simultaneous inclusion of exports, imports and investment is useful as growth in some countries appears to be led by investment, while it is driven by exports or imports for others (P. 484, 487 and 497). Furthermore, based on his growth regression where both export and import shares in GDP enter significantly and positively, Yanikkaya (2003) recommends the inclusion of

both trade components in growth regressions to understand the trade-growth link (P. 61). From the review, we understand that there could not be a single generalization on the importance of the two or whether growth is export-led or import-led. Growth in some countries could be export-led while it could be import-led in others.

The importance of trade in SSA is not clear. The trade performance of SSA is mostly explained as increasing over time while growth is stagnating. In evaluating the overall contribution of international trade to GDP growth in the period 1970-1998, Henry *et al* (2009) have decomposed its contribution to the increased stock of technical knowledge and efficiency gains. According to their results presented in Table 1, GDP growth has been declining over the period on average in their 4-groups sample of 57 developing countries from 4.55% in 1970-80 to 3.71% in 1990-98. However, the growth of GDP in SSA and Asian groups was stable being at the two extreme ends, i.e., SSA growth was the lowest while the highest were recorded in Asia. Although the growth in TFP has declined in all country groups, a negative growth was recorded only in the SSA group for the latter period. The growth in TFP declined from 2.03% to 1.35% and then to -0.38% in SSA where as it did from 3.08 to 2.27% and 1.13% in Asia over the same periods. Much of the fall in TFP growth was explained by the decline in the contribution of trade (the stock of foreign technical knowledge embodied in imported capital goods) in all of the developing country groups. However, the decline was severe in the SSA group where it fell from 1.02% in 1970-80 to 0.09% in 1990-98 while, in Asia, it declined only slightly from 1.27% to 1.24% over the same period (P. 247).

Similarly, the contribution of trade to efficiency (which measures movements towards or away from the frontier) has been calculated for the same country groups; and, found to be strongest in Asia while the weakest is in SSA (P. 248). The implication of this evidence is that the contribution of trade to technological progress and efficiency gains and so to the TFP growth of developing countries is high. The authors emphasise that the contribution of technical progress to GDP and TFP growth in developing countries is shown to be quantitatively more important than technical efficiency improvements throughout the sample period. Hence, they conclude that the influence of trade on efficiency and technological transfers is non-negligible and point to the important roles of trade and trade policy in productivity growth of developing countries (P. 244, 246-248).

Table 1. Contribution of Trade to Technological Progress, 1970-1998
(average annual % change)

Country groups	Period	GDP growth	Components of GDP growth		Components of TFP Growth		TEC
			F_ACC	TFP growth	TP (I_R and D)	TP (TT)	
All Countries	1970 - 80	4.55	6.39	2.83	1.78	-0.49	0.71
	1980 - 90	2.90	3.77	1.55	1.23	-0.29	0.12
	1990 - 98	3.71	3.80	0.44	0.76	-0.12	-0.70
SSA	1970 - 80	2.44	5.35	2.03	1.39	-0.37	0.31
	1980 - 90	2.17	2.96	1.35	0.97	-0.19	0.18
	1990 - 98	2.24	1.76	-0.38	0.12	0.03	-0.76
Asia	1970 - 80	6.07	7.81	3.08	1.81	-0.54	0.79
	1980 - 90	6.04	6.19	2.27	1.57	-0.38	0.27
	1990 - 98	6.17	6.33	1.13	1.52	-0.28	-0.93

Notes: *F_ACC* stands for the rate of growth of accumulated factor inputs; *TP (I_R and D)* is technical progress from the import of *R* and *D* embodying capital goods; *TP (TT)* is non-*R* and *D* technical progress; and, *TEC* stands for technical efficiency change which measures movements towards or away from the production frontier.

Source: Henry, Kneller and Milner (2009, P. 247).

Their decomposition of the contribution of trade to technical progress and efficiency gains places the Asian and SSA groups at the two extreme ends. Trade in Asia had contributed the highest to technological progress (through technology embodying imports) and technical efficiency improvements, while it contributed the least in SSA. They argue that the results indicating the least contribution of trade to growth of output and TFP in SSA are consistent with the view that trade reform was relatively late and muted in SSA. They stressed that, for the set of developing countries over the period as a whole, foreign-sourced technical progress is the dominant source of productivity improvement; trade and trade openness play a role in moving a country's production frontier and in fashioning its ability to move towards the frontier (P. 248).

In supporting the positive contribution of trade to SSA economic growth, Ahmed and Suardi (2007) have reported that the openness variable (trade/GDP ratio) is significantly positive suggesting a 1% increase in the average growth rate of the trade sector raises per capita real GDP growth by about 0.1 percent to 0.2 percent in SSA (P. 168).

According to them, SSA countries with more open and outward orientation are likely to experience higher growth (P. 175).

Contrarily, other evidence shows that African economies are not responsive to access to advanced technologies. In Henry *et al* (2009), the elasticity of output with respect to R and D estimated for the SSA group is the lowest (0.04%) and insignificant while that for the Asian group is the second highest (0.12) and strongly significant (P. 243). Africa is lagging in maximizing its benefits from the available opportunities. One reason for the divergent results is the difference in human capital endowments; they are low in SSA restricting the region's ability to make the most of technology transfers through trade (P. 244). However, according to their estimates, the response of output to human capital in Asia is also small (0.09%), a little greater than that in SSA (0.08%), which is the lowest. This is an indication of the need to explore the undiscovered causes of the difference between the two regions in accessing the available technology. Thus, from this review we understand that the existing evidence is mixed and lacks robustness to support the view that the net effect of trade on growth in SSA is positive and strong.

2.3. A Brief Review on the Other Determinants of Growth

Different researchers consider different sets of variables in growth regressions. For instance, Sala-i-Martin (1997) has surveyed a number of studies and found that different authors have included at least 62 different variables to explain growth, besides the growth of capital and labour (in Thirlwall, 2003, P. 172). However, a few variables appear consistently in growth regressions such as initial income, investment, population growth, inflation, government consumption, debt, and aid, among others.

In most of the studies considered, the growth of per capita GDP is positively related to initial human capital, investment, and measures of political stability; while it is negatively related to population growth, initial level of per capita GDP and government share of consumption in GDP. Its relation with the share of public investment is insignificant (Barro, 1991, P. 407-437, Mankiw *et al*, 1992, P. 425-433 and Thirlwall, 2006, P. 157-160). In the studies of Levine and Renelt (1992) and Levine and Zervos (1993) variables such as government consumption distortion, monetary and fiscal variables, trade and inflation have shown fragile or weak relationships with growth (Thirlwall, 2006, P. 158). However, most of these factors such as government consumption distortion, inflation, external debt, and political and economic instability are found strong to retard growth in

Africa (Ahmed and Suardi, 2007, P. 175). Even, the importance of investment and aid in SSA growth does not have strong empirical support. Many studies have reported insignificant estimates for these variables (Blomstrom *et al*, 1993, P. 14, Devarajan, Swaroop and Zou, 1996, P. 313 and 338, Gylfason, 1999, P. 1049-1050, Dollar and Easterly, 1999, P. 552, and Devarajan, *et al*, 2001, P. 81). In a cross-country growth analysis, most empirical studies include regional dummies - the SSA dummy is significantly negative highlighting the adverse growth effect of being in SSA (Barro, 1991, P. 413 and 436, Levine and Renelt, 1992, P. 950), and so something important for growth is missing in the region.

In general, the existing evidence on the effect of trade on SSA economic growth is neither sufficient nor strong. The debate on the separate growth attributes of exports and imports also remains unresolved. This research aims to provide additional evidence on the relative contribution of exports and imports to the growth of SSA economies benchmarked to some well-performing SEA economies, as a reference bloc. The study uses recent panel data and a variety of estimators that allow for heterogeneity, correcting for complicated error processes and endogeneity problems. In checking the robustness of the estimates against the potential endogeneity problem, the study employs IV as in Frankel *et al* (1996) and dynamic panel data estimation approaches as in Bond, Hoefler and Temple (2001) and Ahmed and Suardi (2007) that allow for heterogeneity and accommodate one of Hallak and Levinson's worries (2004, P. 13). As strategies of the benchmarking, a regional dummy and comparison of estimates from the two regional sample growth equations have been followed.

2. Descriptive Analysis on the Trend of Per Capita Income and Growth of SSA

The overall situation of SSA places the region in a disadvantageous position. SSA economies face unpleasant geographic, demographic and economic circumstances. Tropical climate and land-locked borders (about one-third of the population) are among the geographic obstacles while high fertility, ever-growing population, low life-expectancy and ethno-linguistic fractionalisation are among the demographic challenges complicating the task of policy making. Easterly and Levine (1997) argue that ethnic diversity leads to social and political divisions that divert attention from sound policy making and harms growth since it leads to poorer policy choices (in Sachs and Warner, 1997, P. 351-352).

Population in SSA is growing faster than the world average while GDP growth has been lagging behind for a long time (data from World Bank, online Database, 2007). These have resulted in lower per capita GDP growth leading to low living standards. Despite its pitfalls, per capita income is the available summary indicator of welfare of a society as it embraces economic and population developments. Its rapid rise signifies an improvement in welfare and vice versa. In this descriptive analysis, we use GNI per capita at current dollar prices due to its availability in covering a reasonably long period back to 1960.

Using GNI per capita could be a preferable measure to income per person in indicating the average income and welfare status of citizens of a nation regardless of the sources of the income. However, it would not be preferable in explaining the domestic source of income. Nonetheless, the non-domestic component of per capita income, presumed net to be small, does not detract from the importance of GNI per capita in demonstrating the economic and welfare situation of a nation.

There are two common ways of measuring per capita income particularly for international comparisons. One way is the Purchasing Power Parity, PPP, method that adjusts for the cost of living in each country. The other is the Atlas² method that adjusts for currency values and inflation using the formula set out in the next footnote. In using the PPP method, the common approach is to use the USA as the base to compare the price of a basket of goods. When this is done, the USA's figures are the same in both PPP and Atlas methods. The special Atlas method of conversion as used by the World Bank applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation (the change in GDP deflator) between the country and the G-5 countries (France, Germany, Japan, the UK and the USA). The figures obtained from the two methods, nonetheless, could vary to a great extent. For instance, in 2007, Ethiopia's per capita GNI figure is \$780 adjusted for

² The Atlas conversion factor for year t is given by:

$$e_t^* = \frac{1}{3} [e_{t-2} \left(\frac{P_t}{P_{t-2}} / \frac{P_t^{\$}}{P_{t-2}^{\$}} \right) + e_{t-1} \left(\frac{P_t}{P_{t-1}} / \frac{P_t^{\$}}{P_{t-1}^{\$}} \right) + e_t]$$

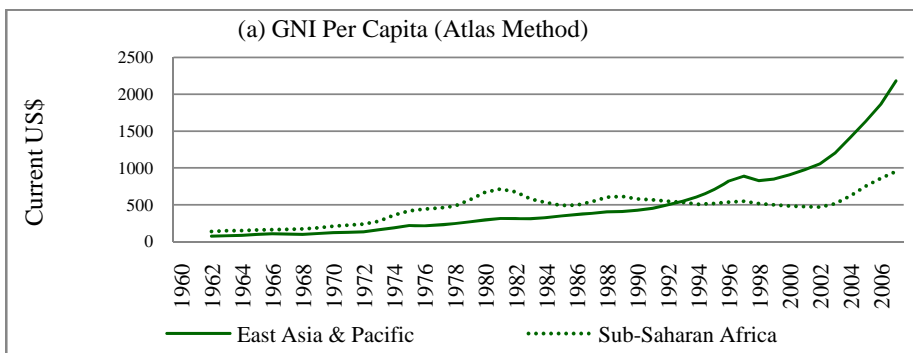
and the GNI per capita in U.S. dollars for year t is calculated as: $Y_t^{\$} = (Y_t / N_t) / e_t^*$ where e_t^* is the Atlas conversion factor (national currency to the U.S. dollar), e_t is the average annual exchange rate (national currency to the U.S. dollar), p_t is the GDP deflator, $p_t^{\$}$ is the SDR deflator in U.S. dollar terms, $Y_t^{\$}$ is the Atlas GNI per capita in U.S. dollars, Y_t is current GNI (in local currency), and N_t is the midyear population in year t (World Bank, 2009, Web site).

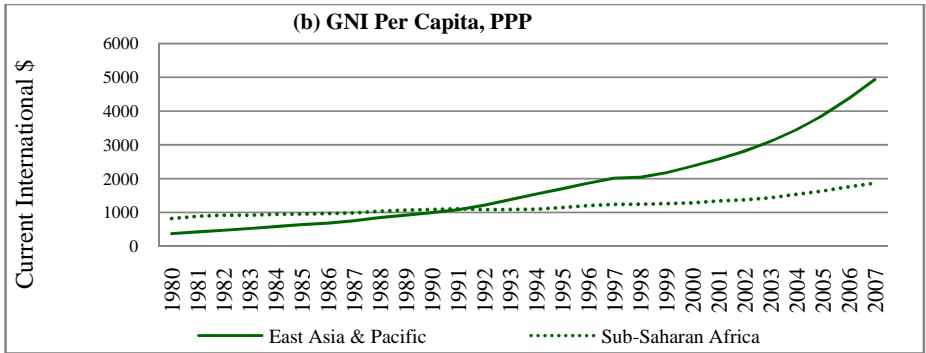
PPP, the 196th highest in the world while it is \$220 using the Atlas method, the 205th highest in the world (Data from the World Bank, online database, 2009).

Bearing these ideas in mind, we have tried to explain the trend of SSA per capita GNI compared to other parts of the world. Figure 1 plots the trend of per capita GNI of SSA compared to other parts of the world, measured by the Atlas method that adjusts for currency values and inflation (1960-2007) and purchasing power parity, PPP, which adjusts for the cost of living (1980-2007). According to Figure 1 (a), we could classify the last five decades into three economic performance periods for SSA, i.e., the 1960s and 70s increase, the 1980s and 90s stagnation and gradual decline, and the post-2002 revival. This pattern is also evident in the GNI per capita figures, even after taking the purchasing power of money income into account in that the cheaper cost of living in developing countries inflates their per capita income levels as measured by the PPP method. Figure 1 (b) reveals the 1980s and the first half of the 1990s stagnation and the relatively faster revival, post 2002.

A comparison that magnifies the freeze and stagnation of SSA economies is the average exponential growth path followed by the East Asia and Pacific (EAP) countries. In the latter region, GNI per capita, measured either by Atlas or PPP methods, has followed a steadily rising path for the three decades, 1960-1990, and a sharper overshooting for the post-1990 period with the path-breaking exception of the late 1990s, that could have been due to the aftermath of the contagious financial crisis that hit part of the region in this period.

Figure 1. The Average per Capita GNI of SSA Countries, *International Comparison, 1960-2007*





Source: Own Plot, data from the World Bank online database, 2007

The third observation from the comparison is that the average GNI per capita of SSA was growing faster than EAP for two decades (1960-1980), until it came to a halt in 1981, with the two series converging in 1991, and SSA being left behind since then - the era of widening divergence between the two regions is striking on Figure 1.

Besides, if we look at the records a few end years, the average per capita GNI of SSA has been lagging from its pre-1992 superior position to below half of that of the EAP. From 1995 to 2008, the average per capita GNI of SSA declined from 75% or 68% to 41% or 37% of that of the EAP averages, measured by Atlas or PPP methods, respectively (Table 2). Despite common for all countries and no disputing the comparison, the rising pattern of the nominal GNI series might have been magnified by the adjustment to the cost of living & the rising general price level of the world.

Table 2. Per Capita GNI of Sub-Saharan Africa (SSA), International Comparison, 1995 -2008

	GNI per capita, Atlas (current US\$)					GNI per capita, PPP (current international \$)				
	1995	2000	2005	2006	2008	1995	2000	2005	2006	2008
World	5042	5265	7045	7487	8613	5603	6885	8730	9345	10357
Low-Income	257	291	379	414	524	677	834	1134	1229	1407
SSA	529	486	757	874	1082	1155	1296	1650	1798	1991
EAP	702	906	1630	1851	2630	1689	2363	3875	4350	5399

Source: World Development Indicators database, World Bank, 2009.

N.B. An international \$ has the same purchasing power over GNI as a US\$ has in the US.

Although SSA average per capita income seems above the low income average, most of its member countries are queued at the lowest rim of the World Bank's ranking list based on the 2007 records (World Bank, WDI online database, 2008). However, in the recent decade (1996-2006), economies in SSA & SEA, on average, have been enjoying positive real GDP growths. Real GDP in SSA had grown at positive rates, indeed, above the world averages. Table 3 provides supplementary economic performance indicators in the decade, 1996-2006. SSA economy had recorded above 5 percent annual growths in real terms in 1996 and 2006 from the years considered while the lowest growth (3.02%) was recorded in 2002. Even so, the average economic growth in the benchmark (SEA) had been higher in all years except in 1998, the year of financial crisis. Mostly, the average growth in the 11 SEA economies is near or above 6 percent with the second exception of the 2002 slower growth perhaps due to the global political turmoil.

Real per capita GDP in SSA had followed the same growth patterns, mostly less by about 2.5 to 3 percent than the corresponding GDP growths. This obviously reveals the population pressure on real per capita GDP growth. The average per capita GDP growth rates of the benchmark bloc, however, are far above the corresponding SSA growth rates - above double of the SSA growth rates in more than half of the years considered. The gaps between the growth rates in per capita GDP from the real GDP growth rates in SEA is only about 1 percent with the exceptional 2 percent gap in 1998. From these facts, we perceive that the differences in per capita GDP growths of the two regions come from two sides; i.e., higher GDP growth and lower population growth of SEA *vis a vis* SSA.

Table 3. Growths of GDP, Per Capita GDP, Exports, Imports and Investment in SSA, International Comparison, 1996-2006

Indicators		Sub-Saharan Africa, 44 Economies						The Benchmark Region, 11 SEA Economies					
		1996	1998	2000	2002	2004	2006	1996	1998	2000	2002	2004	2006
Number of Countries		43	44	44	44	44	44	10	10	10	11	11	11
Average Annual Growths	Real GDP	5.19	3.66	6.8	3.02	4.86	5.32	6.95	-2.22	6.65	4.55	6.46	5.83
	Per Capita GDP	2.37	0.52	3.12	0.48	2.36	2.65	4.98	-4.22	5.36	3.54	5.39	4.67
	World Real GDP	3.25	2.41	4.16	1.98	3.99	3.97	3.25	2.41	4.16	1.98	3.99	3.97
	Volume of Export	13.2	2.09	5.98	6.62	10.4	2.18	2.89	6.55	9.59	8.85	14.62	11.39
		(35)	(36)	(36)	(36)	(36)	(36)	(9)	(9)	(9)			
	Nom./Export value	4.95	-5.73	12.17	4.99	18.94	15.72	9.29	-8.08	17.57	7.24	20.21	13.28
	Volume of Import	6.8	6.14	1.10	2.64	12.29	5.73	4.91	21.10	20.92	8.32	15.08	6.21
		(35)	(36)	(36)	(36)	(36)	(36)	(9)	(9)	(9)	(11)	(11)	(11)
Nom/Import value	3.28	1.99	1.45	8.06	18.03	11.83	9.48	-20.53	20.56	6.49	22.06	11.01	
GCF to GDP ratio	-1.10	3.85	0.05	-1.05	3.78	1.08	-1.45	-23.76	12.93	-3.40	5.03	-0.04	
	(41)	(42)	(42)	(43)	(43)	(43)							
GCF (% GDP)		19.13	19.91	18.69	19.13	20.36	21.12	32.90	25.55	23.98	25.56	25.93	25.72

Note: 1. Except Real GDP growth rates, all the other growth figures are calculated as the first-differences of the log-levels of the respective variables. 2. The figures in parenthesis indicate the number of countries in the calculation when it differs from the number of countries in the sample.

The corresponding GDP or per capita GDP growths are accompanied with positive growths of exports and imports in volume as well as nominal value terms. In five of the six years considered, the growths of export volume in SEA exceeded that in SSA; and, so did growths in nominal value terms in four of the six years. Likewise, with the exception of 1998 in SEA, whether measured in volume or nominal terms, imports have been growing with positive rates often greater in SEA. However, the growths in gross capital formation (GCF) net of GDP growth do not give clear trends. It has experienced positive and negative growths in the regions. Over the same period, SEA seems experienced negative growths in GCF to GDP ratio and declining rates of investment, on average. Nonetheless, in comparing growth performances between less developed and relatively advanced economies, one should notice that it is easy to grow faster beginning at a lower base. Still, the real values added to the economies are also different; because, in large economies, a small growth results in a large addition to GDP (see Table 3).

From the above description, we observe that, per capita GNI of SSA had experienced stagnation and decline in 1981-1995 amid the upward trends of the 1960-80 and post-1995 periods. Besides, per capita income of SSA relative to that of EAP (in ratio) is declining since 1992 signifying income divergence. The rates of growths of real GDP and per capita GDP are superior in the benchmark region to those in SSA. Whether measured in growths of volume or value, trade performance, both exports and imports, is also higher in the benchmark. In spite of the story of higher capital accumulation in SEA, the recent growths in GCF to GDP ratio do not reveal clear patterns in both regions.

What cause such divergence in per capita income, their growths and the consequent wellbeing between SSA and EAP at least from equality in 1991 to far less than a half in 2005 is a crucial question. Hence, this question will be addressed following the empirical investigation focused on the role played by trade in SSA economies compared to 11 well performing SEA countries (Japan, South Korea, Taiwan, Hong Kong, Singapore, China, Indonesia, Malaysia, Thailand, the Philippines and Vietnam) based on a sample data over 1995-2006 if it has caused the divergence. Hence, the empirical analysis follows to test the hypothesis of this chapter that proposes *trade as a promising source of SSA economic growth; and, the low trade performance as the main reason for SSA low growth performance against the higher performance in SEA.*

4. Empirical Analyses on the Contribution of International Trade in SSA

4.1. Theoretical Background

Economic growth and development has been a field of study for more than two centuries evolving through different schools of thoughts. Based on the main belief of increasing returns to reproducible capital, the classical idea of growth takes the role of founding the field of study. In the latter years, the Keynesian school of thought that emphasizes on the role of demand and active policies in enhancing economic stability and growth followed by the contemporaneous emergence of neoclassical and endogenous growth theories attributed to the tremendous flows and advancements of growth ideas.

The neoclassical growth theory, due to the US economist Robert Solow (1956) and Australian economist Trevor Swan (1956), extends Harrod-Domar (1946) model by introducing productivity growth into the model. The model underlies on three basic assumptions such as: rates of saving, population growth and technological progress to be exogenous; all saving is invested and output is a function of labour and capital, $y = f(K, L)$, in that labour and capital are being paid their marginal products; and, Cobb-Douglass production function is the main form of the model with constant returns to all but diminishing returns to each inputs. Hence, the implied production function is a homogenous of degree one designated by $y = AK^\alpha L^\beta$, where y is the level of output, A is technological progress, K is capital input and L is labour input while α and β represent the capital and labour shares of output, respectively.

The endogenous growth model that emphasizes the growth attributes of the externality effects of human capital or education (Lucas, 1988), and, the stock of knowledge, invention and technological progress (Romer, 1986, 1990) is represented by King and Rebelo's (1991) "AK" model where output is expressed as a linear function of a broadly defined concept of capital. It is known as the "AK" model since the production function is written $Y = AK$, where Y , A and K stand for output, technological progress and reproducible inputs, respectively. The model assumes endogenous technological change and non-diminishing returns to capital accumulation (Plosser, 1992, P. 68).

The neoclassical and endogenous growth models labeled as the 'old' and the 'new' growth theories, respectively, have common insight in explaining the sources of growth. The two theories explain that technological progress is an important source of sustained

growth. As explained by Jones (1998), the neoclassical model takes technological progress as the engine of growth (P. 88). Endogenous growth theory also shares this idea in a sense that technological progress is one of the forces perpetuating growth. According to endogenous growth theory, technological progress prevents the return to capital from falling while capital-labour ratio rises.

However, neoclassical and endogenous growth theories have differences in explaining cross-country growth disparities and on other predictions. They also differ on the growth attributes of trade. Referring to some representative seminal works, Gylfason (1999) has noted the major thought difference on the growth attributes of trade. According to him, in models of exogenous growth (Solow, 1956, Mankiw *et al*, 1992, and Mankiw, 1995), the effects of trade on growth are temporary and peter-out over time. In models of endogenous growth (Romer, 1986, 1994), however, increased trade provides a permanent boost to growth (P. 1044).

In the Solow model, steady state level of income per effective labour units (y^*) is given by

$$\frac{Y_t}{A_t L_t} = y_t^E = y^*$$

In the long run, $Y_t = y^* \cdot A_t L_t$. Dividing both sides by L_t results the long-run per capita income

$$\frac{Y_t}{L_t} = \frac{y^* \cdot A_t L_t}{L_t}$$

$$y_t = y^* \cdot A_t$$

Taking the natural log of both sides

$$\ln y_t = \ln y^* + \ln A_t$$

Differentiating over time re-expresses the equation in terms of growth rates

$$\frac{d}{dt}(\ln y_t) = \frac{d}{dt}(\ln y^*) + \frac{d}{dt}(\ln A_t)$$

In steady state, output per effective labour (y^*) is constant implying its growth ($\frac{d}{dt}(\ln y^*)$) is zero. This condition reduces the equation for long-run growth of per capita output into:

$$\frac{\dot{y}_t}{y_t} = \frac{\dot{A}_t}{A_t}$$

Where the dot (.) notation expresses the change in the variable.

According to the prediction of the Solow model, in the long-run, output per person grows at the rate of technological progress which is exogenous by assumption. The model does not address how technology evolves in an economy (Plosser, 1992, P. 60 & 63). As a basic departure, however, endogenous growth model takes technological progresses as endogenous to economies through learning-by-doing, R and D activities and diffusion, and presumes non-diminishing returns to reproducible capital. In accordance with endogenous growth theory, technological progress prevents the productivity of labour from falling as the capital-output ratio rises; and, trade plays an important role in technological progress $\left(\frac{\dot{A}_t}{A_t}\right)$ through increasing innovation and exposure to the existing stock of ideas. Hence, the appropriate model that shows the importance of trade for technological transfer and growth, particularly, for developing countries is the Endogenous Trade and Growth Theory (EGT). According to EGT, trade facilitates the transmission of ideas, international flows of goods & services and capital flows (Grossman and Helpman, 1990, P. 86, 1991, Ch. 6). For that reason, various studies interested in the trade-growth link have employed the formal model of *'the importance of trade for technological transfer and growth'* as a theoretical basis (Edwards, 1991, P. 5-8, 1998, P. 386-387, Cameron, Proudman and Redding, 2005, P. 779-781, Khan, 2006, P. 8-12). Thus, underlying our empirical investigation of the impact of trade on growth, the mathematical representation of the EGT model is discussed as follows.

1.2. A Model of the Importance of Trade for Technological Transfer and Growth

The endogenous growth model assumes three possible effects of trade. Trade can increase (1) innovation in the follower or less developed (y_B) and leader (y_F) economies, because the higher the competition, the higher is the incentive to innovate; (2) the amount of transferable knowledge (w_B) through imported goods; (3) the speed of technology transfers (λ) from the leader to the follower (by reducing cost of technology adoption). The model assumes two economies: frontier economy (F), which is the technological leader, and behind the frontier economy (B); each produces goods through:

$$Y_i = A_i F(K_i, L_i) \quad (1)$$

Where A = technical efficiency (TFP); $F(.)$ = CRS production function, K = capital & L = labour of country i .

Growth of technology (A) in country B is given by:

$$\frac{\dot{A}_B}{A_B} = \gamma_B + \lambda \log(w_B A_F / A_B) \quad (2)$$

While that of the frontier country is given by

$$\frac{\dot{A}_F}{A_F} = \gamma_F \quad (3)$$

By subtracting the corresponding terms in (3) from (2)

$$\begin{aligned} \frac{\dot{A}_B}{A_B} - \frac{\dot{A}_F}{A_F} &= (\gamma_B - \gamma_F) + \lambda \log(w_B A_F / A_B) \\ &= (\gamma_B - \gamma_F) + \lambda (\log w_B + \log(A_F / A_B)) \\ &= \gamma_B - \gamma_F + \lambda \log w_B + \lambda \log(A_F / A_B) \\ \frac{\dot{A}_B}{A_B} - \frac{\dot{A}_F}{A_F} &= \gamma_B - \gamma_F + \lambda \log w_B + \lambda (\log A_F - \log A_B) \end{aligned} \quad (4)$$

By taking the first-difference of the technological progress differential, in log levels, and undertaking some algebraic manipulations, we can rewrite the equation as:

$$\frac{d}{dt}(\log A_B - \log A_F) = \gamma_B - \gamma_F + \lambda \log w_B - \lambda (\log A_B - \log A_F) \quad (5)$$

At steady state, growth is stable meaning there will be no changes in differences in levels:

$$\frac{d}{dt}(\log A_B - \log A_F) = 0 = \gamma_B - \gamma_F + \lambda \log w_B - \lambda (\log A_B - \log A_F)$$

By rearranging the equation, equality can be written as:

$$\lambda (\log A_B - \log A_F) = \gamma_B - \gamma_F + \lambda \log w_B \quad (6)$$

Dividing both sides by λ yields

$$\log A_B - \log A_F = \log w_B + \frac{\gamma_B - \gamma_F}{\lambda}$$

By the law of logarithm, the above equation can be reinstated as

$$\log \left[\frac{A_B}{A_F} \right] = \log w_B + \frac{\gamma_B - \gamma_F}{\lambda} \quad (7)$$

Substituting (7) into (2)

$$\begin{aligned} \frac{\dot{A}_B}{A_B} &= \gamma_B + \lambda \log w_B + \lambda \log \left[\frac{A_B}{A_F} \right] \\ &= \gamma_B + \lambda \log w_B - \lambda \log \left[\frac{A_B}{A_F} \right] \end{aligned}$$

Taking the relation in (7) and substituting $\log \left[\frac{A_B}{A_F} \right]$ by $\log w_B + \frac{\gamma_B - \gamma_F}{\lambda}$

$$\begin{aligned} \frac{\dot{A}_B}{A_B} &= \gamma_B + \lambda \log w_B - \lambda \left[\log w_B + \frac{\gamma_B - \gamma_F}{\lambda} \right] \\ &= \gamma_B + \lambda \log w_B - \lambda \log w_B - \lambda \left[\frac{\gamma_B - \gamma_F}{\lambda} \right] \\ &= \gamma_B - \gamma_B + \gamma_F \\ \frac{\dot{A}_B}{A_B} &= \gamma_F \end{aligned} \tag{8}$$

According to equation (8), in the long run, technological progress and then growth of the behind economy is limited up to the innovation of the frontier economy. However, acquiring the technology invented by the frontier is a function of the strength of the trade tie of the two economies; i.e., the fraction of the transferable amount of the technology, $w_B = w(\text{openness})$, and the speed of technology transfers, $\lambda = h(\text{openness})$, where $w > 0$ and $h > 0$. If we further assume that innovation of the leader is a function of openness, $\gamma_F = L(\text{openness})$, long-run growth in the leader economy also depends on the extent of its trade liberalization.

4.3 Empirical Model Specification and Variables

Growth regression and correlation parameters have been widely used to estimate the contributions of various factors of growth and test the predictions of the respective models. To mention some among many, Robert Barro (1991) has used simple correlation and regression equations, Mankiw *et al* (1992) have used the production function approach, simple correlation and regression, and all the six studies summarized by Thirlwall (2006) have employed regression equations to test their hypotheses. Hence, following Barro (1991), Levine & Renelt (1992) and Thirlwall (2003), for our panel data estimation, we propose a linear equation of the form:

$$y_{it} = \beta_0 + \beta_1 I_{it} + \beta_C C_{it} + \beta_Z Z_{it} + w_{it}; \quad w_{it} = u_i + \varepsilon_{it} \tag{9}$$

where y is real per capita GDP growth, I is a set of variables of interest, C is a set of variables always in the growth regression and Z is a set of variables added to the

regression to account special characteristics, β_0 is a constant, β_b , β_c and β_z are vectors of coefficients of the corresponding sets of variables and w is a composite of the unobserved panel-level effects (u) and the random error (ϵ) while i and t are the panel unit and time identifiers, respectively.

In our specification, the I variables include real values of exports (*rexp*) and imports (*rimp*); the C variables include initial income (*pcgdp₆₀*), total labor force (*labor*), investment to GDP ratio (*gcf_gdp*), FDI to GDP ratio (*fdi_gdp*), inflation (*gdpdef*) and share of government consumption in GDP (*govesh*). The Z variables, considered as special characteristics of the study area, are debt-ratio (*debt_gdp*) and official development assistance & aid (ODA) ratio (*oda_gdp*). Transforming the data at hand into their logarithmic levels and differentiating all the time varying variables over time, i.e., all except the initial income (*lnpcgdp₆₀*), and adding a dummy variable (*SSAD*) to account for region-specific characteristics yields the following form of the equation where country-specific effects are removed by first-differencing. First-differencing is implemented as a remedy to the detected severe multicollinearity problem (i.e., *Variance Inflation Factors, VIFs > 5*); but, at the cost of losing some information. In this set up, all the time-varying variables appear as changes (Δ) in their log-levels such that the coefficients are growth elasticities.

$$\Delta \ln rgdppc_{it} = \beta_0 + \beta_1 \Delta \ln rexp_{it} + \beta_2 \Delta \ln rimp_{it} + \beta_3 \Delta \ln labor_{it} + \beta_4 \Delta \ln gcf_gdp_{it} + \beta_5 \Delta \ln fdi_gdp_{it} + \beta_6 \Delta \ln gdpdef_{it} + \beta_7 \Delta \ln govesh_{it} + \beta_8 \Delta \ln debt_gdp_{it} + \beta_9 \Delta \ln oda_gdp_{it} + \beta_{10} \ln pcgdp_{60i} + \beta_{11} SSAD + \Delta \epsilon_{it} \quad (10)$$

1.3. Data

The variables used in the analyses include real per capita GDP (*regressand*), real values of exports and imports, gross capital formation (GCF) to GDP ratio, FDI to GDP ratio, debt-ratio, aid-ratio, total labour force, government share of GDP, initial per capita GDP (of 1960), GDP deflator and SSA dummy (*regressors*). Variables such as net barter terms of trade (*NBTOT*), world real GDP Growth and freight cost to US are taken as potential instrumental variables.

Type and sources: the analyses employ a panel data set originally taken from 47 SSA and 11 SEA countries (the benchmark) for 1995-2006. However, because of outlying and lots of missing observations, three SSA countries (Equatorial Guinea, Sao Tome Principe and

Somalia) have been dropped. Hence, the effective panel data are that from 44 SSA and 11 SEA countries. This effective data set is an unbalanced panel with a maximum of 526 observations for the SSA and 126 observations for the benchmark giving a total of 652 observations. The data are collected from two sources: the World Bank (2007) and UNCTAD Handbook of Statistics (2008) online databases.

The data for real GDP (*rgdp*), GDP in current US\$ (*gdpcup*), initial GDP (of 1960), total population (*tpop*), gross capital formation as a percentage of GDP (*gcf_gdp*), FDI, debt, official development assistance (*oda*), GDP deflator (*gdpdef*) and net barter terms of trade (*NBTOT*) are taken from the World Bank Group (2007) online database while freight cost to US is taken from World Trade Indicators (World Bank, 2008). The data for exports, imports, total labor force (*labor*) and government share in GDP (*govesh*) are taken from UNCTAD Handbook of Statistics (2008). The data for debt, ODA and others for some of the countries in the benchmark have been complemented from different sources and generating mechanisms, detailed in Appendix Table 1.

Measurement and transformations: most of the data are measured in ratio scale or cardinal units; i.e., real GDP in 2000 US\$ price, gross capital formation (% of GDP), NBTOT in indices (2000=100), world GDP growth (%) and freight cost to US (% of total import value) while the rest are measured in current US\$ or simple numbers (total population and labor force). Real per capita GDP is calculated as the quotient of the annual real GDP in US\$ to the corresponding total population. Values of exports and imports in current US\$ have been deflated by the world and domestic GDP deflators, respectively, to obtain their real values. The regional dummy, SSA dummy, holds 1 for SSA countries and zero otherwise. For computational convenience, all cardinal values have been converted into billions (*real GDP, GDP at current US\$, FDI, debt and ODA*). After standardizing measurement units, some of the cardinal values have been normalized by GDP at current US\$ prices so as to yield ratios to GDP (*FDI, debt and ODA*). The entire data except the dummy have been transformed into their natural logarithmic counterparts, in order to exploit the advantages of data smoothing, and estimated with their first-differenced forms, except initial GDP. Thus, the coefficients are interpreted as measures of growth elasticity, i.e., changes in growth rates of real per capita GDP with respect to changes in growths of the respective variables.

Preliminary inspection and description: the statistical summaries of the data from the two regional samples are displayed separately in Table 4. From the summary statistics,

we observe: (1) the average growths of real per capita GDP ($\Delta \ln r g d p p c$) and real import value ($\Delta \ln r i m p v$) are greater in SEA than those in SSA. The average growths of debt-ratio ($\Delta \ln d e b t _ g d p$) and the share of government consumption in GDP ($\Delta \ln g o v e s h$) are not only greater in SEA but also negative in SSA while they are positive in SEA; (2) despite the fact that it does not suggest equal performance as the starting bases are different, the mean growths of real exports ($\Delta \ln r e x p v$) of both regions are equal at an annual rate of 11.6 percent; (3) based on the magnitudes of the respective standard deviations and ranges (the difference between the maximum and minimum), the five variables with high growth variability are FDI ratio, aid ratio, real export, debt ratio and rate of investment in both regions. If we interpret the figures as indicators of volatility, FDI, export, investment and import are more volatile in SSA than in SEA where as aid and debt are more variable in SEA. Next to these are growths in government consumption and inflation which are more unstable in SSA than in SEA. Despite low in both regions, the variability of per capita GDP growth is greater in SSA than that in SEA suggesting, relatively, volatile growth in the former and stable growth in the latter.

Table 4. Statistical Summary of the Data Variables of the Regions in Separate

Variable	SSA					SEA				
	Obs	Mean	St.Dv.	Min	Max	Obs	Mean	St.Dv.	Min	Max
$\Delta \ln r g d p p c$	482	0.016	0.058	-0.389	0.689	115	0.033	0.040	-0.156	0.102
$\Delta \ln r e x p v$	482	0.116	0.318	-1.015	0.983	115	0.116	0.252	-0.292	0.798
$\Delta \ln r i m p v$	482	0.045	0.197	-1.044	0.984	115	0.072	0.112	-0.447	0.302
$\Delta \ln l a b o r$	449	0.024	0.014	-0.045	0.105	115	0.017	0.012	-0.016	0.067
$\Delta \ln g c f _ g d p$	465	0.011	0.256	-2.411	1.089	115	-0.025	0.148	-0.638	0.671
$\Delta \ln f d i _ g d p$	435	0.088	1.416	-9.755	9.986	107	0.074	0.793	-2.377	2.819
$\Delta \ln d e b t _ g d p$	471	-0.081	0.257	-1.476	1.226	115	0.028	0.737	-2.618	6.194
$\Delta \ln n o d a _ g d p$	482	-0.043	0.470	-2.078	2.180	115	-0.255	2.379	-23.52	4.218
$\Delta \ln g d p d e f$	482	0.025	0.147	-0.975	0.934	115	0.004	0.111	-0.675	0.375
$\Delta \ln g o v e s h$	482	-0.002	0.173	-1.019	1.047	115	0.003	0.057	-0.180	0.195
$\ln p c g d p_{60}$	526	5.748	0.615	4.717	6.975	126	5.89	0.589	5.037	7.006

The correlation matrices of the variables have also been organized for the two regional samples separately as Tables 5 (a) and (b). From these tables, we observe that the mean growth of per capita GDP is weakly associated with import (0.31), export (0.24) and rate of investment (0.1) in SSA. However, its associations with those variables are strong in SEA; the average growth of per capita GDP is strongly correlated with rate of investment (0.7) and import (0.6) but weakly with export (0.11). Its correlation with initial income is negative and considerable (-0.4) in SEA while it is negligibly positive (0.01) in SSA giving a

clue on convergence in SEA but not in SSA (see Appendix Figure 1 for scatter plots). However, the correlation coefficients and the scatter plots highlight merely the rough associations of the variables with real per capita GDP growth and amongst themselves; but not growth effects. The growth effects of the variables require the estimation of growth equations.

Table 5. (a) Correlation Matrix of the Variables (SSA, Number of Observations = 385)

Variables	$\Delta \ln r g d p p c$	$\Delta \ln r e x p v$	$\Delta \ln r i m p v$	$\Delta \ln l a b o r$	$\Delta \ln g c f _ g d p$	$\Delta \ln f d i _ g d p$	$\Delta \ln d e b t _ g d p$	$\Delta \ln n o d a _ g d p$	$\Delta \ln g d p d e f$	$\Delta \ln g o v e s h$	$\ln p c g d p_{60}$
$\Delta \ln r g d p p c$	1.000										
$\Delta \ln r e x p v$	0.240	1.000									
$\Delta \ln r i m p v$	0.306	0.055	1.000								
$\Delta \ln l a b o r$	-0.061	-0.028	0.031	1.000							
$\Delta \ln g c f _ g d p$	0.104	-0.098	0.446	-0.002	1.000						
$\Delta \ln f d i _ g d p$	-0.000	-0.069	0.147	-0.034	0.086	1.000					
$\Delta \ln d e b t _ g d p$	-0.244	-0.179	0.226	0.012	0.158	0.036	1.000				
$\Delta \ln n o d a _ g d p$	-0.068	-0.137	0.211	-0.006	0.131	0.161	0.179	1.000			
$\Delta \ln g d p d e f$	-0.019	0.164	-0.501	-0.009	-0.239	-0.092	-0.578	-0.305	1.000		
$\Delta \ln g o v e s h$	-0.033	-0.092	0.176	-0.047	0.055	0.048	0.103	0.062	-0.177	1.000	
$\ln p c g d p_{60}$	0.010	0.010	-0.028	-0.230	-0.061	0.029	-0.034	-0.026	0.032	-0.038	1.000

Table 5. (b) Correlation Matrix of the Variables (SEA, Number of Observations = 107)

Variables	$\Delta \ln r g d p p c$	$\Delta \ln r e x p v$	$\Delta \ln r i m p v$	$\Delta \ln l a b o r$	$\Delta \ln g c f _ g d p$	$\Delta \ln f d i _ g d p$	$\Delta \ln d e b t _ g d p$	$\Delta \ln n o d a _ g d p$	$\Delta \ln g d p d e f$	$\Delta \ln g o v e s h$	$\ln p c g d p_{60}$
$\Delta \ln r g d p p c$	1.000										
$\Delta \ln r e x p v$	0.107	1.000									
$\Delta \ln r i m p v$	0.602	-0.082	1.000								
$\Delta \ln l a b o r$	0.105	0.010	0.079	1.000							
$\Delta \ln g c f _ g d p$	0.700	-0.021	0.617	0.083	1.000						
$\Delta \ln f d i _ g d p$	-0.009	-0.072	0.074	-0.154	-0.002	1.000					
$\Delta \ln d e b t _ g d p$	-0.078	0.083	-0.076	-0.066	-0.024	0.247	1.000				
$\Delta \ln n o d a _ g d p$	-0.060	-0.007	-0.082	0.009	-0.062	0.017	0.244	1.000			
$\Delta \ln g d p d e f$	0.579	0.065	0.165	0.101	0.477	-0.052	-0.006	0.040	1.000		
$\Delta \ln g o v e s h$	-0.310	0.112	-0.201	-0.303	-0.208	-0.084	-0.083	-0.014	-0.090	1.000	
$\ln p c g d p_{60}$	-0.401	-0.157	-0.159	-0.222	-0.133	0.114	0.014	0.014	-0.167	0.147	1.000

4.5 *Methods of Estimation*

Panel data give more information, high degrees of freedom, flexibility and explain behavioral relations better than otherwise. But, panel data are prone to heterogeneity, heteroscedasticity and autocorrelation problems causing estimation complications. The potential endogeneity among the regressand and regressors is also the other problem that complicates estimations. Hence, the choice for appropriate estimators is a vital step. Panel data set can be estimated with standard linear panel data models; i.e., Pooled OLS if the individual panel-level effects are equal; otherwise, it has to be estimated with either FE or RE if the panel-level effects are fixed or random, respectively.

Although Ordinary Least Squares (OLS) estimator is often taken as a baseline for its BLUE (Best, Linear and Unbiased Estimator) properties under the assumptions of zero conditional mean and independently & identically distributed (i.i.d) errors, it could be restrictive for panel data estimation that might have been plagued by heterogeneity and complicated error process. Hence, the other options are Fixed-Effects (FE) and Random-Effects (RE) models that could allow heterogeneity and alleviate, to some extent, omitted variables bias despite the need for further treatments if the errors are non-i.i.d. In dealing with non-i.i.d. errors, we employ white's (1980) robust approach of computing heteroscedasticity robust standard errors with consistent point estimators, checked by Park's (1967) efficient approach, i.e., FGLS estimator. FGLS is more efficient than OLS and provide flexibility to work with non-i.i.d errors. These estimators are anticipated to produce similar estimates if heterogeneity is minor importance.

However, all the above estimators do not solve the possible endogeneity bias. To mitigate the influence of the potential endogeneity problem on the estimations, the chapter employs Anderson-Hsiao (1981) Instrumental Variables (IV) estimator as suggested by Judson & Owen (1999, P. 13), Bruno (2005, P. 10) and Dynamic Panel Data estimator originally developed by Holtz-Eakin, Newey & Rosen (1988) and Arellano-Bond (1991) as corrected in Arellano-Bover (1995) and Blundell & Bond (1998), known as 'System-GMM'. The Arellano-Bover/Blundell and Bond system-GMM is praised over the Anderson-Hsiao IV & the Arellano-Bond difference-GMM estimators in mitigating '*the weak instruments problem*', for its superior finite sample properties and flexibility in specifying more and using the same set of IVs in a system of equations (see Hayakawa,

2005, P. 37, 2008, P. 2 & 19, Soto, 2009, P. 10). Bond, Hoeffler and Temple (2001) also recommend its application in empirical growth research (P. 4).

Briefly, the main variables of interest of this research are exports and imports while the others are either control variables which consistently appear in growth regressions or in account of special characteristics of the study area (debt and aid). Our panel data analysis employs OLS and FE/RE estimators with White's (1980) robust option, FGLS to deal with complicated (non-i.i.d) error processes where all the regressors are treated as exogenous; the Anderson-Hsiao IV where only exports and imports are instrumented while all the rest are treated as exogenous; and, the Arellano-Bover/Blundell-Bond System-GMM where all the regressors are treated as endogenous.

4.6 Results and Discussion

In this section, results of parameter estimations and diagnostic tests with robust standard errors have been reported. The first part of the section reports tentative results from OLS, FGLS and FE/RE estimators. The second part discusses results from endogeneity-controlled estimations, i.e., IV in first-differences and System-GMM. Despite incompatible to undertake Hausman specification test on the FE/RE models with White's (1980) robust option, what we do is to estimate both FE and RE models without the robust option, inspect the results, select the consistent estimator as suggested by Hausman specification test and then re-estimate the selected model correcting for heteroskedasticity. From the inspection, we observe that the corresponding point estimates are much similar but the Hausman test rejects the consistency of RE in all the sample groups. Then, we re-estimate the equations using FE with White's (1980) robust option. Since our interest in the estimation of the combined sample is the coefficient of the SSA dummy, the RE model is employed with robust option, however, for its ability to identify time-invariant variables. The results are discussed as follows beginning with those from estimators that do not account for endogeneity as suggestive evidence and then passing to those that correct for endogeneity.

i) Suggestive Results

The tentative results presented in Table 6 provide some evidence on the influences of the determinants of growth. The SSA dummy is estimated significantly negative at all levels of significance in all of the regressions in which it enters. Its coefficient is estimated to be -0.021 in the OLS and RE, and -0.016 in the FGLS estimations. If we

interpret the two estimates as the lower and upper bounds, being in SSA causes growth to lag behind SEA by about 1.6 to 2.1 percent. These results are consistent with the findings in Barro (1991, P. 413, 2003, P. 261) and Levine & Renelt (1992, P. 950). Being in SSA appears to have an adverse effect on economic growth. Barro (1991) says something important for growth is missing in SSA (P. 436).

The estimates for the initial GDP from our growth regressions of both regions cast some evidence of conditional convergence. However, the estimates are weak in SSA while they are strong in SEA with no considerable difference in magnitude, -0.015 and -0.017. According to the estimates, within the benchmark group, each doubling of initial per capita GDP reduces annual growth by about 0.01% (i.e., $\ln(2) \times \text{the estimate}$) while tripling it does by about 0.02% (i.e., $\ln(3) \times \text{the estimate}$). Hence, conditional convergence amongst the economies in the benchmark is supported by the results from our estimations while there is no strong evidence for convergence amongst SSA economies. The estimates from the combined sample are also weak and fragile. This pattern of results is consistent with those in Gylfason (1999) who reports strong evidence for convergence within convergence clubs but weak evidence for convergence amongst open vs. closed; and, high- vs. low-inflation categories and for the whole sample (P. 1050). Despite differences in data structure, sample, specification, etc, striking similarities also arise amongst the significant rates of convergence (λ) implied by *our regressions*/Islam's (1995) pooled OLS estimations for the *Combined*/Intermediate (0.0074), *SSA/Non-oil* (0.0048) and *SEA/OECD* (0.0161) sample groups, correspondingly (P. 1142 & 1151; see also Mankiw *et al*, 1992, P. 426, Table IV).

The results from all the regressions suggest that growth in real exports has a positive effect on the per capita GDP growth of both regions. The estimated coefficients are greater in magnitude and stronger in significance in the SSA growth regression than the corresponding estimates of that in SEA. The point estimates suggest that a 1 percent increase in real export growth raises real per capita GDP growth by about 0.02% in SSA and 0.015% in SEA. Roughly, the estimates are parallel to those in Wang *et al* (2004) in that the trade variable is estimated with the lowest coefficient in the high-income group and highest in the low-income group (P. 577).

The growth impact of import is found positive, stronger and greater in magnitude than that of exports in both regions. However, its growth effect seems greater in SEA than that in SSA. According to the results, a 1 percent increase in real value of import growth

results in real per capita GDP growth of about 0.08 to 0.11 percent in SEA and 0.08 to 0.09 percent in SSA.

Turning to the growth effects of the other variables, the results are generally consistent with the previous studies. They cast also differences on the importance of some of the variables in the growth performance of the two regions. One of the differences is the contribution of investment to growth. The coefficients for growth in rate of investment are positively significant at all conventional levels with a coefficient of 0.1 in SEA while it is insignificantly positive with small magnitude in SSA. The insignificance of investment in SSA growth regressions is, in fact, consistent with the results discussed in Dollar and Easterly (1999), Devarajan, Easterly and Pack (2001) implying no evidence for the importance of investment on economic growth in the region. Based on their growth regressions using a sample of 100 developing countries for the period 1965-1985, Blomstrom *et al* (1993) have also concluded that “we find no evidence that fixed investment is the key to economic growth” (P. 14). In Gylfason (1999), the effect of investment on growth of per capita GDP is estimated to be insignificant in the low-income and high-inflation groups of countries while it is supported to have a strong impact on growth in the middle and high-income and low-inflation countries regardless of the degree of openness. Gylfason argues that gigantic investment does not guarantee rapid and sustainable growth, because only factors that encourage high-quality investment (like stable prices and proper incentives) can be expected to foster growth (P. 1049-1050). Thus, our results from the SSA and SEA sample groups are similar to the respective results for low-income and high-inflation groups, and middle and high-income and low-inflation groups reported in Gylfason. Using data from African countries, Dollar and Easterly (1999, P. 552) and Devarajan, Easterly and Pack (2001) have reported insignificant relationship between growth and investment in Africa. Based on cross-country and micro-data from Tanzania, Devarajan *et al* stressed as there is no evidence that private and public capitals are productive in Africa implying that investment in Africa is too high rather than too low (P. 81). Thus, despite tentative, the results from our standard linear regressions support the above claims of ‘no evidence on the importance of investment on SSA growth’. FDI and aid are also estimated with negligibly small and insignificant coefficients in all estimations of the combined or regional samples.

The second difference is on the effect of debt-ratio. The growth in debt-ratio is estimated with strongly negative coefficient in the SSA growth equations falling in a

range of -0.029 to -0.064 while it is estimated with negligibly insignificant at all conventional levels in SEA.

The third plausible reason for the divergent growth in the two regions is the difference in the effects of inflation. It is estimated with negative coefficients despite insignificant in SSA while it is estimated to contribute positively in the economic growth of the benchmark bloc, on average, with relatively higher coefficients, 0.149 in the OLS and 0.135 in the FGLS and FE estimations. In empirical growth studies, inflation is mostly taken as a proxy of macroeconomic stability, as explained in Gylfason (1999, P. 1033) and Barro (2003, P. 240). Thus, the results may be indicating the growth effects of the differences in macroeconomic stability of the two regions.

The growth impact of government consumption is estimated to be adverse in both regions but with higher magnitude and strength in SEA. In the SSA growth estimations, it is significant only in the FGLS estimation (see Table 6). Indeed, the coefficients from SSA estimations are comparable in size to those reported in Ghura (1995) while those reported in Ahmed and Suardi (2007) are 10 times of our estimates. Despite the periods covered by Ghura, 1970-1990, and by Ahmed and Suardi, 1971-2000, share 20 common years, but no common years with ours, the results reported in Ghura are relatively closer to our estimates than to those in Ahmed and Suardi.

Table 6. Estimation Results of Growth Equations, for the Combined, SSA and SEA Sample Groups

Dependent Variable: Real Per Capita GDP Growth ($\Delta \ln r_{gdppc}$)

Variables	Combined			SSA			SEA		
	OLS	FGLS	RE	OLS	FGLS	FE	OLS	FGLS	FE
$\Delta \ln r_{expv}$	0.026***	0.013***	0.025***	0.024***	0.015***	0.022**	0.015*	0.009	0.015*
$\Delta \ln r_{impv}$	0.112***	0.095***	0.105***	0.094***	0.078***	0.077***	0.114***	0.087***	0.080*
$\Delta \ln labor$	-0.244	-0.374***	-0.223	-0.263	-0.499***	-0.377	-0.263*	-0.160	0.122
$\Delta \ln gcf_gdp$	0.007	0.019***	0.010	0.001	0.011	0.012	0.093***	0.107***	0.109***
$\Delta \ln fdi_gdp$	-0.001	0.000	-0.001	-0.001	0.000	-0.001	0.001	0.001	0.002
$\Delta \ln debt_gdp$	-0.014	-0.006**	-0.014	-0.064***	-0.029***	-0.055***	-0.003	-0.002	-0.005
$\Delta \ln oda_gdp$	-0.000	-0.001	-0.000	-0.010	-0.004	-0.008	-0.000	0.000	0.000
$\Delta \ln gdpdef$	0.054**	0.051***	0.051**	-0.032	-0.001	-0.024	0.149***	0.135***	0.135***
$\Delta \ln govsh$	-0.022	-0.016*	-0.019	-0.017	-0.015*	-0.013	-0.117**	-0.091**	-0.129**
$\ln pcgdp60$	-0.004	-0.008***	-0.004	-0.001	-0.004*	-	-0.015***	-0.017***	-
SSA Dummy	-0.021***	-0.016***	-0.021***	-	-	-	-	-	-
Constant	0.054***	0.085***	0.053***	0.012	0.046***	0.012	0.122***	0.129***	0.028***
Number of Obs.	492	492	492	385	385	385	107	107	107
R ²	0.243		0.243	0.241		0.217	0.736		0.741
Root MSE	0.042		0.041	0.044		0.039	0.020		0.016
OV test	0.000		-	0.000		-	0.000		-
Implied λ (σ)	0.0084 (0.0002)			0.0042 (0.0002)			0.0167(0.0004) 0.0182(0.0004)		

Note: 1. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively; 2. OV test stands for Ramsey RESET (Regression Specification Error) test against 'correct functional form specification' or 'no omitted variable' null hypothesis; 3. OLS, RE and FE are estimated with White's (1980) robust standard errors; 4. FGLS estimation has been corrected for arbitrary heteroscedasticity & AR(1) errors. 4. The test results (not reported) obtained from FE estimations (without robust option) on the first-difference specification have rejected the null hypothesis of 'zero country-specific effects' justifying the application of panel data models. 5. $\hat{\lambda} = -t^{-1} \ln(1 + t\beta)$; $\hat{\sigma}_{\lambda} = t^{-1}(1 - \beta)\hat{\sigma}_{\beta}$; $t = 11$.

However, the reliability of the estimated equations is doubtful at least for three reasons. Firstly, the Ramsey RESET test rejects the 'no omitted variable null hypotheses' in all the OLS estimations. Secondly, the SSA growth equation lacks precision where the Root MSE (Mean Square Error) statistic (0.042) is greater than the mean of the dependent variable (0.016) while it shows better precision in SEA where the Root MSE (0.02) is less than the mean of the dependent variable (0.033). Thirdly, the results have not yet been checked against the potential endogeneity bias. *The robustness of the estimates needs further check with estimators that alleviate endogeneity problems.*

ii) Main Results

The same equations have been estimated with IV in first-differences and System-GMM (SYS-GMM) estimators for their advantages in alleviating endogeneity problems. Two variants of the main specification have also been estimated for the SSA sample with SYS-GMM by alternatively excluding investment and FDI to see the possible interaction between the two and the sensitivity of the other variables. The results are displayed in Table 7. The AR(1) and AR(2) test results jointly suggest the validity of the 2nd and deeper lags as internal IVs while Hansen/Sargan tests support the validity of the employed IVs and the reliability of the estimations. Despite slight differences, the results from these estimations do not affect most of the findings suggested by the previous estimations.

The results from both the IV and SYS-GMM confirm the independent positive contributions of growths in exports and imports to real per capita GDP growth in both regions. The estimates for the SSA growth equation from the IV and the three optional SYS-GMM estimations are nearly the same to the previous estimates where export growth attains a coefficient of about 0.02 in all of the estimations. In spite of little increase in magnitude of the coefficients of import growth from a range 0.08-0.09 in the previous estimations to 0.11 in the IV estimation, the estimates from SYS-GMM are either in the range or nearly equal to the previous estimations. The estimates for exports growth in the SEA growth equation obtained from both the IV and the SYS-GMM estimations are also nearly the same (between 0.014 to 0.02) as the previous estimations while those of imports growth have shown increase in magnitude from a range of 0.08-0.11 in the previous to a range of 0.15 in the SYS-GMM to 0.17 in the IV estimations. However, for its ability in exploiting the available information in mitigating the potential endogeneity and superior finite sample properties, we use the estimates from SYS-GMM in interpreting the results into quantitative growth effects, albeit narrow differences.

The economic growth impact of export growth, here also, is found to be a little greater in SSA. *According to the SYS-GMM* point estimates, a 1 percent growth in export induces per capita real GDP to grow by about 0.02 percent in SSA and 0.014 percent in SEA, despite trivial differences. The growth impact of imports is estimated positive, stronger and greater in magnitude than that of exports in both regions. However, comparing the corresponding estimates, its growth effect is greater in SEA than that in SSA. *According to the results from SYS-GMM*, a 10 percent growth in imports would lead into per capita income growth of about 0.7 percent to 1 percent in SSA and 1.5 percent to 1.7 percent in SEA. The evidence from these estimations on the relatively large and strong coefficient of import growth upholds the recent inference by Henry *et al* (2009). According to them, foreign-sourced technological progress is the dominant source of productivity improvement in their sample of 57 developing countries over the period 1970-1998; especially, trade in Asia had contributed the most to technological progress through technology embodying imports and technical efficiency improvements while it did the least in SSA. They justify the least contribution of trade to growths of output and TFP in SSA as consistent with the view that trade reform was relatively late and muted in SSA (P. 248). Hence, our results provide additional evidence for these conclusions.

In addition, our estimates for the growth impacts of exports and imports are consistent with those discussed in Yanikkaya (2003) obtained from estimations of a panel data of over 100 developed and developing countries over three periods: 1970-1979, 1980-1989, and 1990-1997 in that export shares and import shares in GDP enter positively in the growth regressions (P. 61), and the positive growth impact of the expansion in the trade sector of SSA drawn in Ahmed and Suardi (2007, P. 168) though the latter did not disentangle the impacts of exports and imports.

In all growth regressions of both regions, the estimates on the export and import growths are not affected by the inclusion of the growth of investment ratio. Three of the variables are significant in all of the growth equations of both regions despite differences in magnitude. As indicated in the first and second SYS-GMM estimations of the SSA growth equation, the inclusion or exclusion of FDI does not alter the coefficient of the rate of investment in spite of significant only marginally with a magnitude of about 0.04 against our previous estimates and the claims of Dollar and Easterly (1999), Devarajan et al (2001) and Gylfason (1999) as discussed in the suggestive section. Although all our suggestive results in the regressions where the growth of FDI enters apparently seem supporting the aforementioned conclusions, the latter endogeneity-controlled

estimations produce significant coefficients, regardless of the inclusion of FDI, providing support to the positive importance of investment growth in SSA economic growth. However, according to the estimations of SYS-GMM, its magnitude is estimated to be smaller in SSA (0.04) than that in SEA (0.06). Moreover, different from its estimates in all SEA growth regressions where it is significant, stronger and greater in magnitude, even the marginal significance of the rate of investment in SSA growth regression requires correction for endogeneity in regressions where it is tested. The estimated magnitudes for the growth of the rate of investment are greater than that of export growth in both regions. Hence, drawing a conclusion as investment in SSA is too high and unproductive is dangerous with adverse policy implications; hence, needs humility in interpreting estimation results. *The reasons for the seemingly insignificant estimates of the investment variable in SSA growth equations might be attributable to multicollinearity and endogeneity issues.*

The significant estimates supporting the independent positive contributions of growths of exports, imports and rate of investment also dispute the *conclusions in Levine and Renelt (1992) that states export is not robustly correlated with growth when investment is controlled, but it turns robust when investment is dropped (P. 954-955) and Esfahani (1991) who claims that export loses its significance once the supply effect of imports is considered (in Thirlwall, 2000, P. 19 & 2006, P. 535). Despite the possible interaction, the significance of export in our estimations does not require the exclusion of investment or imports. Although all the three are estimated significantly with the expected signs in all estimations, either export or investment is significant only marginally, indeed.*

However, in the SYS-GMM estimations for SSA growth, FDI appears negatively despite marginally significant only in the third specification where rate of investment is excluded from the regression. The negative FDI estimates could be signifying its crowding-out effect consistent with the results reported in Hansen and Tarp (2001) who conclude, "In our regressions, crowding-out effects related to fdi seem to be a general phenomenon in all countries" (P. 565). *Thus, taking our results as additional evidence for the crowding-out effect of FDI on domestic investment could be reasonable, particularly, when a country's resource base, efficiency and market capacity are insufficient to accommodate both. However, our results lack strength, similar to those reported in Wang et al (2004) who find weak, negative and small magnitude coefficients for FDI in their low-income group growth regressions and conclude that FDI does not play a positive role in developing countries (P. 576-580).*

A rising debt-ratio is reconfirmed to have a strong growth depressive influence in SSA as it is estimated with significantly negative coefficients in the IV and all of the SYS-GMM estimations. The magnitudes of the coefficients from the latter estimators fall in the range of the previous estimations. Consistent with our previous estimations, the results from the IV and SYS-GMM estimations do not provide strong support for the harmful growth effects of a rise in debt-ratio in SEA. Despite all negative, none of the estimates is significant. The estimates from the SSA growth equations are in line with the results in Ahmed and Suardi (2007) who reported a negative role of growth in debt-servicing²² albeit the difference in measuring debt-burden. Based on their estimations, they suggest that a 10 percent increase in debt-servicing ratio is likely to reduce annual GDP per capita growth by about 1.7 to 2.6 percent. But, in all of our endogeneity-controlled estimations, a 10 percent growth in debt-ratio is likely to reduce real per capita GDP growth by about 0.34 to 0.5 percent. Although the estimates may not be directly comparable as the two measures are different, they are in line with the main belief that hypothesises the optimum threshold of external debt to be 150 percent of export or 30 percent of GDP (Thirlwall, 2006, P. 499, Reisen and Ndoye, OECD, 2008, P. 13). The accumulation of debt in excess of the threshold level hampers growth by producing perverse incentives for investors and debtors (Reisen and Ndoye, 2008, P. 11). Hence, these results support the harmful consequence of a growing debt-burden in SSA.

The anticipated positive role of aid in the growth performance of SSA is not supported by the results from all the estimations. It is estimated to attain invariably small, negative and insignificant coefficients in all of the estimations except in the IV of the SEA (-0.004) and the 2nd SYS-GMM of the SSA (-0.01) growth regressions where it turns significantly negative despite with the simultaneous and significant inclusion of investment. The exclusion of investment from the SSA regression, as recommended in Hansen and Tarp (2001, P. 563), turns it positive but nearly zero at 3-decimal places. Hence, we tend to conclude that there is no evidence supporting the positive impact of aid in the SSA growth process. Rather, most of the coefficients are estimated to be negative despite negligibly small in magnitude and not significantly different from zero. Nonetheless, the estimates do not contradict to the main economic principle and existing evidence. Aid is meant to impact on growth via capital accumulation. But, it is subject to diminishing returns after a certain level (Hansen and Tarp, 2001, P. 565). Even in good environments,

²² Debt-servicing is defined as the ratio of total debt repayment to the sum of the value of exports and remittances.

the returns to aid peaks when it reaches 10 percent of GDP (Thirlwall, 2006, P. 468). Over the period considered, the average aid ratio of the SSA countries in the sample is about 12 percent, passing the hypothesised optimum. Based on their regressions using data from 34 SSA countries for 1965-1995, Dollar and Easterly (1999) conclude that the traditional aid-to-investment-to-growth linkages are not very robust, and assert that the effectiveness of aid-investment-growth links depends on policies (P. 546). Thus, our estimates on the aid variable do not contradict to this conclusion. Rather, the estimates for exports, imports and aid jointly lend a support to the slogan *'trade, not aid'* (in Begg, 2009, P. 294).

Despite the changes in sign from insignificantly negative in the previous estimations to insignificantly positive in both IV and SYS-GMM²³ estimations of SSA growth regressions, the conclusions that could be drawn from the latter do not contradict to our previous suggestions on the growth impact of inflation in SSA. It is estimated insignificant in all of the SSA but significantly positive in all of the SEA growth equations. If we interpret it as an indicator of macroeconomic stability (as in Gylfason, 1999, P. 1033 and Barro, 2003, P. 240) rather than as a growth effect of inflation merely, we can deduce that the macroeconomic environment in SEA is favorable for economic growth while it is not in SSA. The insignificance of inflation in the SSA growth equation is in harmony to the results reported in Levine and Zervos (1993) (in Thirlwall, 2006, P. 158). Levine and Renelt (1992, P. 956) and, Hansen and Tarp (2001, P. 562) have also reported all negative but fragile coefficients for inflation. Contrarily, Gylfason (1999) finds a reduction in the rate of growth of GDP by 1.8 percent when inflation increases from 5 to 50 percent per year (P. 1050). However, he reports also that the exclusion of 8 countries with average annual inflation in excess of 110 percent in 1985-94 from the estimation rendered the inflation coefficient insignificant. He has also stated that this result is consistent with the conclusions in Bruno and Easterly (1998) who find no evidence that annual inflation below 40 percent is harmful to growth and Sarel (1996) who reports that only single-digit inflation seems harmless to growth (P. 1050). However, our results using the recent data from 44 SSA economies are weak in supporting the strong negative impact of inflation estimated in Ghura (1995, P. 774) using panel data from 33 SSA countries for the period 1970-90 and Ahmed and Suardi (2007) based on panel data from 28 SSA countries for 1971-2000 (P. 169).

²³ See Jung & Kwon (2007) for the pattern of empirical test results following their simulation where the coefficients of labor, capital and intermediate inputs in the estimations of production functions are argued to be biased upward in pooled OLS, whereas the LSDV estimator controlled for unobserved heterogeneity provides very small estimates (P. 10).

Table 7. IV in First-Differences and System-GMM Estimation Results: SSA and SEA Sample Groups

Dependent Variable: Real Per Capita GDP Growth ($\Delta \ln r_{gdppc}$)

Variables	DIFF-IV, Robust		SYSTEM-GMM, One-Step Robust				
	SSA	SEA	SSA 1	SSA2	SSA3	SEA	
$\Delta \ln r_{expv}$	0.023*	0.019**	0.023**	0.023**	0.016*	0.014*	
$\Delta \ln r_{impv}$	0.110***	0.173***	0.075***	0.072**	0.097***	0.150***	
$\Delta \ln labor$	-0.286**	-0.088	-0.446	-0.480*	-0.418	0.001	
$\Delta \ln gcf_gdp$	0.008	0.084**	0.037*	0.041*	-	0.062**	
$\Delta \ln fdi_gdp$	0.002	0.001	-0.003	-	-0.003*	0.002	
$\Delta \ln debt_gdp$	-0.030***	-0.003	-0.045***	-0.050***	-0.036***	-0.002	
$\Delta \ln oda_gdp$	-0.004	-0.004*	-0.003	-0.011**	0.000	-0.001	
$\Delta \ln gdpdef$	0.025	0.158***	0.006	0.011	0.023	0.187***	
$\Delta \ln govsh$	-0.025*	-0.083*	-0.009	-0.020	-0.008	-0.072	
$\Delta \ln r_{gdppc_1}$	0.313***	0.107*	0.182***	0.257***	0.195**	0.156	
Constant	0.006	0.018***	0.011	0.011*	0.011	0.017**	
Number of Obs.	253	82	349	384	363	96	
Tests for							
AR(1), Z – Statistics			-3.05	-2.79	-2.92	-2.37	
P-value			0.002	0.005	0.003	0.018	
AR(2), Z – Statistics			0.82	0.84	1.51	-1.53	
P-value			0.415	0.400	0.131	0.125	
Hansen/ Sargan Test	χ^2	1.556	3.311	151.54	139.71	138.81	91.6
	P-value	0.459	0.346	0.900	0.980	0.982	0.123

Note:

, ** and * denote statistical significance at 10%, 5% and 1% levels, respectively;*

- In the DIFF-IV of both samples, real exports and real imports are instrumented with the second-lag of the log of real exports, the logs of freight cost to US, and NBTOT while world real GDP growth is also included in the SEA equation while the rest are treated as exogenous.*
- In the System GMM, all regressors are treated as endogenous and instrumented with the 2nd lag of the log of export volume, the 1st lag of the log of freight cost to US, the log of NBTOT and all their deeper lags in the SSA; the 2nd - 6th lags of the log of the volume index of export and the current as well as the first 4 lags of the log of NBTOT in the SEA samples as GMM style instruments.*

Lastly, the growth impact of government consumption growth, here also, is estimated with negative but fragile coefficients. It loses its significance in the SYS-GMM. Despite lacking strength, the estimates tend to indicate the growth retarding influence of government consumption similar to the results reported in Barro (1991, P. 774), Ghura (1995, P. 772) and Ahmed and Suardi (2007, P. 169) (see Appendix Table 2 for further

test results; Appendix Figure 2 for the scatter plots of the predicted versus actual values, and residuals versus the fitted values).

3. Conclusion

Based on the endogenous growth model of the importance of trade to technological progress and economic growth, using a panel data set from 44 SSA and 11 SEA countries for a decade long period (1995-2006), and various estimators that allow to account for heterogeneity, non-i.i.d errors and endogeneity problems, this chapter provides evidence for the positive and independent contributions of exports and imports to the economies in SSA and the benchmark bloc. The hypothesised '*promising role of trade in the SSA economic growth*' is supported by the evidence from both exports and imports. The importance of imports is found superior to that of exports in both regions in the period considered. However, this finding is contrary to our a priori expectation and the usual claim, particularly for economies in SEA where export growth was regarded and expected to come out as the superior source of growth. Despite the negligible difference between the estimated growth effects of exports in the two regions, the growth effect of imports is found greater in SEA than that in SSA. Hence, the second part of our hypothesis that proposes '*the low trade performance as the main reason for SSA low growth performance against the higher performance in SEA*' has also been supported by the evidence on the growth effect differential of imports growth in the two regions.

The evidence from the corresponding growth equations also suggests a tendency of conditional convergence in both regions. Nonetheless, the observed conditional convergence is strongly supported in SEA; but, not strong in SSA. In general, being in SSA retards growth compared to the benchmarking bloc. This inference is in line with Barro's (1991) conclusion that states as something important for growth is missing in SSA (P. 436). Consistent with the prediction of the neoclassical growth model, most of the significant coefficients of labour force growth in the SSA growth regressions concentrate near -0.5.

The study also identifies some other factors that might have been among the causes for the divergent growth performance between the two regions to include the effectiveness of investment, macroeconomic management as represented by inflation and the severity of the harmful effects of debt-burden and population pressure while all the

other factors are found to influence growth in both regions to the same direction albeit vary in extent.

The contribution of investment is one of the differences. It is one of the strong contributors of growth in SEA while its contribution to the SSA economic growth is not found unconditional and robust. Its coefficient is estimated to be positive but very small, and insignificant in the SSA estimations where it is treated as exogenous. However, as in the SYS-GMM estimations, the control for endogeneity problem turns it to appear significantly positive while its exclusion lends strength to the negative coefficient of FDI growth signifying the crowding-out effect of FDI consistent with the findings reported in Hansen and Tarp (2001, P. 565). As stated in Wang *et al* (2004, P. 578), FDI may not be beneficial for SSA as long as the absorptive ability is low, due to its low human capital stock.

Hence, SSA economies could benefit from encouraging trade but not FDI. Growth in SSA could be favoured if policies and efforts favour exports and imports. The estimated higher growth effect of imports could be taken as an indication for its role in transferring technology to the region as predicted by endogenous growth theory. The strong appearance of imports with relatively higher magnitude supports the model. This conclusion is also in harmony to the conclusion in Leon-Ledesma (2002) that attaches greater importance to imports from technologically advanced countries particularly for small economies (P. 19), Yanikkaya (2003), Ahmed and Suardi (2007) and Henry *et al* (2009). According to Henry *et al*, technologies embodied in capital goods are important sources of output growth in developing countries (P. 243); trade in Asia had contributed the most to technological progress through technology embodying imports while it did the least in SSA (P. 248). Thus, SSA governments need to give more incentive to trade, both imports and exports, followed by domestic investment than FDI. In doing so, creating stable macroeconomic and investment environment should be given due attention.

References

- Ahmed, D. A. and Suardi, S. (2007). "Sources of Economic Growth and Technology Transfer in Sub-Saharan Africa". South African Journal of Economics, Vol. 75, No. 2, P. 159-178.
- Andersen, L. and Babula, R. (2008). "The Link Between Openness and Long-Run Economic Growth". Journal of International Commerce and Economics, Web Version, P. 1-20.
- Arellano, M. and Bond, S. (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations". Review of Economic Studies, Vol. 58, No. 2, P. 277-297.
- Arellano, M. and Bover, O. (1995). "Another look at the instrumental variable estimation of error-components models". Journal of Econometrics, Vol. 68, No. 1, P. 29-51.
- Baldwin, E. R. (2003) "Openness and Growth: What's the Empirical Relationship?". NBER Working Papers, No. 9578.
- Barro, J. R. (1991) "Economic Growth in a Cross Section of Countries". The Quarterly Journal of Economics, Vol. 106, No. 2, P. 407-443.
- Barro, J. R. (2003) "Determinants of Economic Growth in a Panel of Countries". Annals of Economics and Finance, Vol. 4, P. 231-274.
- Baum, F. C. (2006) "An Introduction to Modern Econometrics Using Stata". StataCorp LP, Texas.
- Begg, D. (2009) "Foundations of Economics". 4th edition, McGraw-Hill, London.
- Bleaney, M. & Greenaway, D. (2001) "The impact of terms of trade and real exchange rate volatility on investment and growth in sub-Saharan Africa". Journal of Development Economics, Vol. 65, No. 2, P. 491-500.
- Blomstrom, M., Lipsey, R. and Zejan, M. (1993) "Is fixed Investment the Key to Economic Growth?" NBER Working Papers, No. 4436.
- Blundell, R. and Bond, S. (1998) "GMM Estimation with Persistent Panel Data: An Application To Production Functions". IFS, Working Paper Series No. W99/4.
- Bond, S. R., Hoeffler, A. and Temple, J. (2001) "GMM Estimation of Empirical Growth Models". Centre for Economic Policy Research, Discussion Paper 3048.
- Cameron, G., Proudman, J. and Redding, S. (2005) "Technological convergence, R & D, trade and productivity growth". European Economic Review, Vol. 49, No. 3, P. 775-807.
- Caves, R., Frankel, J. and Jones, R. (1999) "World Trade and Payments: An Introduction". 8th Edition Addison Wesley, New York.
- Devarajan, S., Easterly, W. and Pack, H. (2001) "Is Investment in Africa Too High or Too Low? Macro-and Micro-evidence". Journal of African Economies, Vol. 10, No. 2, P. 81-108.
- Devarajan, S., Swaroop, V. and Zou, H. (1996) "The composition of public expenditure and economic growth". Journal of Monetary Economies, Vol. 37, P. 313-344.

- Dollar, D. and Easterly, W. (1999) *"The Search for the Key: Aid, Investment and Policies in Africa"*. *Journal of African Economies*, Vol. 8, No. 4, P. 456-577.
- Dubarry, R. and Sinclair, M. T. (2003) *"Market Shares Analysis: The Case of French Tourism Demand"*. *Annals of Tourism Research*, Vol. 30, No. 4, P. 927-941.
- Edwards, S. (1989) *"Openness, Trade Liberalization, and Growth in Developing Countries"*. NBER Working Papers, No. 2908.
- Edwards, S. (1993) *"Openness, Trade Liberalization, and Growth in Developing Countries"*. *Journal of Economic Literature*, Vol. 31, No. 3, P. 1358-1393.
- Edwards, S. (1998) *"Openness, Productivity and Growth: What Do we really Know?"*. *The Economic Journal* Vol. 108, P. 383-398.
- Frankel, A. J. and Romer, D. (1996) *"Trade and Growth: An Empirical Investigation"*. NBER Working Papers, No. 5476.
- Frankel, A. J., Romer, D. and Cyrus, T. (1996) *"Trade and Growth in East Asian Countries: Cause and Effect"*. NBER Working Papers, No. 5732.
- Frankel, A. J. and Romer, D. (1999) *"Does Trade Cause Growth?"*. *The American Economic Review*, Vol. 89, No. 3. P. 379-399.
- Ghura, D. (1995) *"Macro Policies, External Forces, and Economic Growth in Sub-Saharan Africa"*. *Economic Development and Cultural Change*, Vol. 43, No. 4, P. 759-78.
- Greene, H. W. (2003) *"Econometric Analysis"*. 5th Edition. Pearson Education, Inc., New Jersey.
- Grossman, G. M. and Helpman, E. (1990) *"Trade, Knowledge Spillovers, and Growth"*. NBER Working Papers, No. 3485.
- Grossman, G. M. and Helpman, E. (1991) *"Innovation and Growth in the Global Economy"*. MIT Press, Cambridge, MA.
- Gujarati, D. N. (1995) *"Basic Econometrics"*. 3rd Edition, McGraw-Hill, Inc, Singapore.
- Gujarati, N. D. (2004) *"Basic Econometrics"*. 4th Edition, McGraw-Hill, Inc, Singapore.
- Gylfason, T. (1999) *"Exports, inflation and growth"*. *World Development*, Vol. 27, No. 6, P. 1031-1057.
- Hallak, J. C. and Levinsohn, J. (2004) *"Fooling Ourselves: Evaluating the Globalization and Growth Debate"*. NBER Working Papers, No. 10244.
- Hansen, H. and Tarp, F. (2001) *"Aid and growth regressions"*. *Journal of Development Economics*, Vol. 64, P. 547-570.
- Hayakawa, K. (2005) *"Small Sample Bias Properties of the System GMM Estimator in Dynamic Panel Data Models"*. Institute of Economic Research, Discussion Paper Series, No. d05-82.
- Hayakawa, K. (2007) *"Small sample bias properties of the system GMM estimator in dynamic panel data models"*. *Economics letters*, Vol. 95, No. 1, P. 32-38.

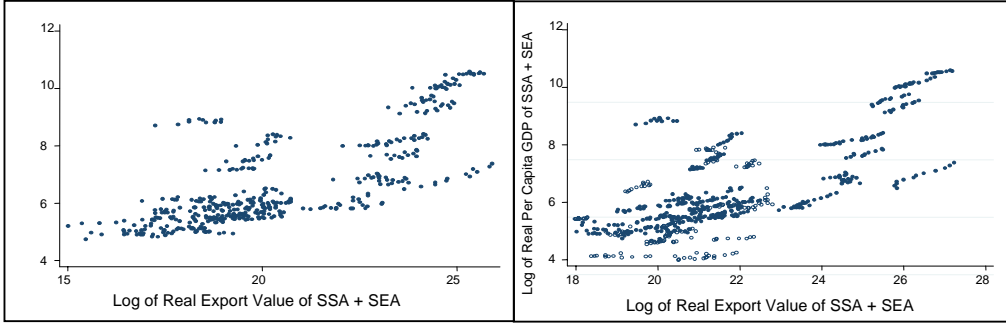
- Hayakawa, K. (2008) *"The Asymptotic Properties of the System GMM Estimator in Dynamic Panel Data Models When Both N and T are Large"*. SSRN WPS, <http://ssrn.com/abstract=1412035>.
- Henry, M., Kneller, R. and Milner, C. (2009) *"Trade, technology transfer and national efficiency in developing countries"*. European Economic Review, Vol. 53, No. 2, P. 237-254.
- Islam, N. (1995) *"Growth Empirics: A Panel Data approach"*. Quarterly Journal of Economics, Vol. 110. No. 4, P. 1127-1170.
- Jones, C. (1998) *"Introduction to Economic Growth"*. 21st Edition, W.W. Norton & Co, London.
- Jones, C. (2002) *"Introduction to Economic Growth"*. 2nd Edition, W.W. Norton & Co, London.
- Judson, R. & Owen, A. (1999) *"Estimating dynamic panel data models: a guide for macroeconomists"*. Economics Letters, Vol. 65, P. 9-15.
- Jung, H. & Kwon, H. U. (2007) *"An Alternative System GMM Estimation in Dynamic Panel Models"*. Hitotsubashi University, Hi-Stat Discussion Paper Series, No. 217.
- Khan, T. (2006) *"Productivity Growth, Technological Convergence, R & D, Trade, and Labor markets: Evidences from the French Manufacturing Sector"*. IMF Working Papers, No. 06/230, P. 1-38.
- Krishna, K., Ozyildirim, A. and Swanson, R. N. (2003) *"Trade, Investment and growth: Nexus, Analysis and Prognosis"*. Journal of Development Economics, Vol. 70, P. 479-499.
- Krugman, P. (1994) *"The Myth of Asia's Miracle"*. Foreign Affairs, Vol. 73, No. 6, P. 62-78.
- León-Ledesma, M. (2002) *"R & D Spillovers and Export Performance: Evidence from the OECD Countries"*. Universidade de Brasília Instituto de Ciências Humanas, ISSN: 1466-0814.
- Levine, R. and Renelt, D. (1992) *"A Sensitivity Analysis of Cross-Country Growth Regressions"*. The American Economic Review. Vol. 82, No. 4, P. 942-63.
- Lewis, W. A. (1965) *"Theory of Economic Growth"*. George Allen & Unwin Ltd, London.
- Lim, C. and McAleer, M. (2001) *"Cointegration analysis of quarterly tourism demand by Hong Kong and Singapore for Australia"*. Applied Economics, Vol. 33, No. 12, P. 1599-1619.
- Lim, C. and McAleer, M. (2002) *"A cointegration analysis of annual tourism demand by Malaysia for Australia"*. Mathematics and Computer in Simulation, Vol. 59, No. 1-3, P. 197-205.
- Lucas, R. (1990) *"Why doesn't Capita Flow from Rich to Poor Countries?"*. The American Economic Review, Vol. 80, No. 2, P. 92-96.
- Mankiw, N. G., Romer, D. and Weil, N. D. (1992) *"A Contribution to the Empirics of Economic Growth"*. The Quarterly Journal of Economics, Vol. 107, No. 2, P. 407-437.

- Morrissey, O. and Mold, A. (2006), "Explaining Africa's Export Performance: Taking a New Look". Paper Presented at the 7th GTAP Conference, Addis Ababa, Ethiopia. <https://www.gtap.agecon.purdue.edu/resources/download/2643.pdf>.
- Plosser, C. (1992) "The Search for Growth". Federal Reserve Bank of Kansas City, Symposium Series, P. 57-86.
- Reisen, H. and Ndoye, S. (2008) "Prudent Versus Imprudent Lending to Africa: From Debt Relief to Emerging Lenders". OECD Working Paper No. 268.
- Rodriguez, F. and Rodrick, D. (1999) "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-national Evidence". NBER Working Papers, No. 7081.
- Sachs, J. and Warner, A. (1997) "Sources of Slow Growth in African Economies". *Journal of African Economies*, Vol. 6, No. 3, P. 335-376.
- Shigeyuki, H. and Razafimahefa, F. I. (2003) "Trade and Growth Relationship: Some Evidence from Comoros, Madagascar, Mauritius and Seychelles". *Journal of Asian and African Area Studies*, Vol. 3, P. 174-185.
- Sohn, C. and Lee, H. (2003) "Trade Structure and Economic Growth: A New Look for the relationship between Trade and Growth". Korea Institute for International Economic Policy, Working Paper Series 03-17.
- Soto, M. (2009) "System GMM estimation with a small sample". Barcelona Economics Working Paper Series, No. 395.
- Thirlwall, A. P. (2000) "Trade, Trade Liberalization and Economic Growth: Theory and Evidence". The African Development Bank, Economic Research Papers, No. 63.
- Thirlwall, A. P. (2003) "Growth and Development: With Special Reference to Developing Economies". 7th edition, Palgrave Macmillan, New York.
- Thirlwall, A. P. (2006) "Growth and Development: With Special Reference to Developing Economies". 8th edition, Palgrave Macmillan, New York.
- Wacziarg, R. (2001) "Measuring the Dynamic Gains from Trade". The world Bank Economic Review, Vol. 15, No. 3, P. 393-429.
- Wang, C., Liu, X. and Wei, Y. (2004) "Impact of Openness on Growth in Different Country Groups". Vol. 27, No. 4, P. 567-585.
- Yanikkaya, H. (2003) "Trade openness and economic growth: a cross-country empirical investigation". *Journal of Development Economics*, Vol. 72, P. 57-89.

Appendix

Appendix Figure 1: Scatter Plots of Real Per Capita GDP, Exports and Imports (in log levels and Growths)

(a) Real Per capita GDP and Real Export value (log levels) (b) Real Per capita GDP and Real Import value(log levels)

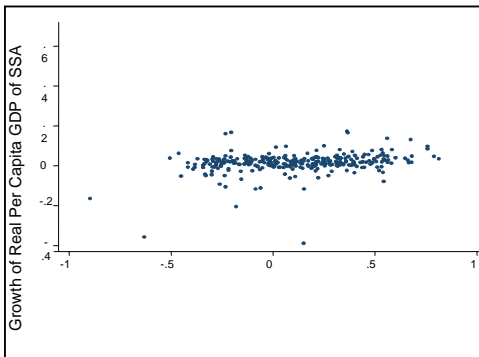


Note: Observations on the upper left side of the scatter plot belong to Seychelles (1995-2006) while to the extreme right side with the log value of real per capita GDP ranging in 6-8 belong to China (1995-2006).

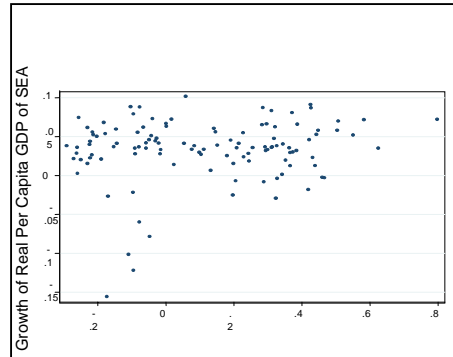
(c) Real Per capita GDP and Real Export value (growths)

(i) SSA

(ii) SEA



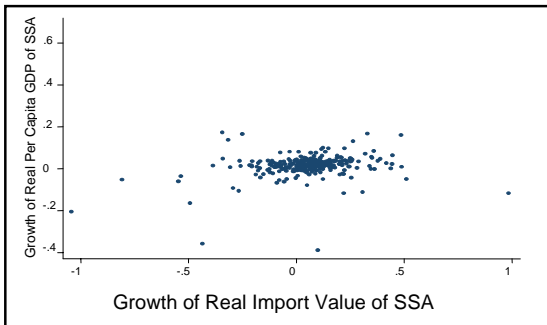
Growth of Real Export Value of SEA



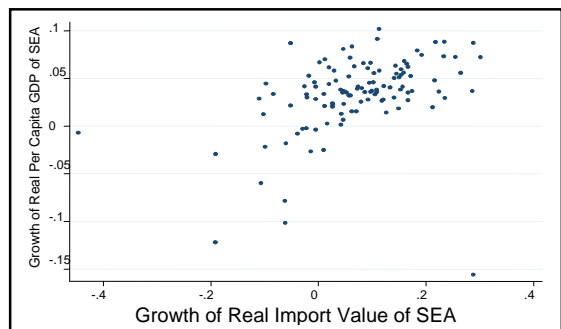
Growth of Real Export Value of SEA

(d) Real Per capita GDP and Real Import value (growths)

(i) SSA



(ii) SEA



Note: 1. In the SSA sample, the outlying per capita GDP growth data points (below or equal to -0.2) are recorded in Guinea-Bissau (1998), Liberia (2003) and Sierra Leone (1997) and import growth below -1 is recorded in Sierra Leone (1997) while the extremely high per capita GDP growth data point is recorded in the Democratic Republic of Congo (2000).

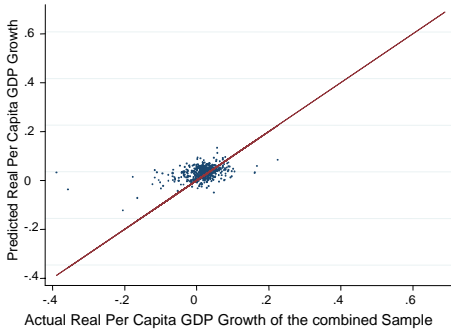
2. In the SEA sample, per capita GDP growths below -0.05 were recorded in Hong Kong, Indonesia, Malaysia, South Korea and Thailand (all in 1998) while import growth of below -0.4 is recorded in Indonesia (1999).

Appendix Figure 2: Scatter Plots of Fitted Versus Actual Values or Residuals

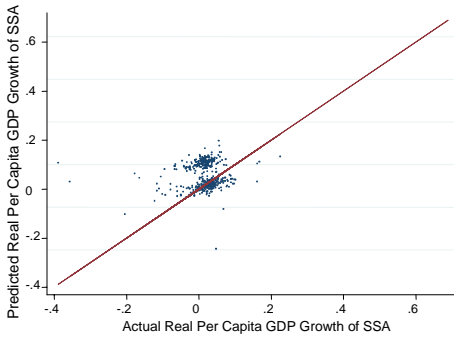
(i) Fitted Versus Actual Values of RPCGDP Growth

(Aspect Ratio is constrained to unity (1) so that points on the 45° line represent perfect predictions)

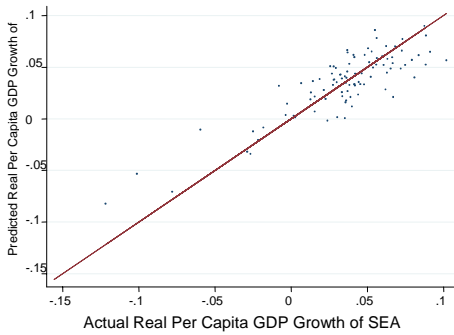
(a) Combined Sample, OLS Estimation



(b) SSA, SYS-GMM Estimation, Main Specification



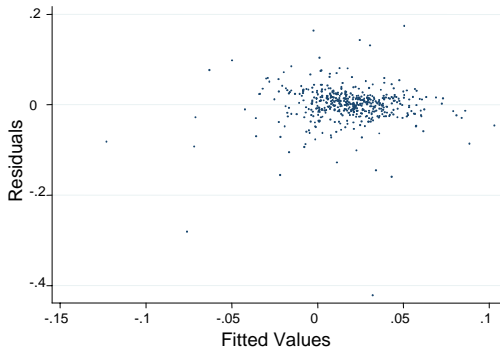
(c) SEA, SYS-GMM Estimation, Main Specification



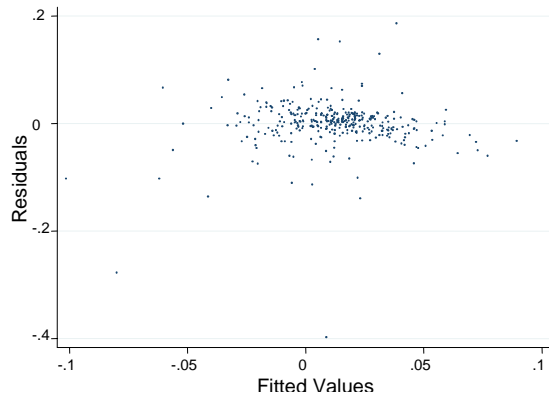
(ii) Residuals Versus Fitted Values

The points in the plots seem to be distributed randomly around zero in a non-systematic pattern except few outliers. Thus, the plots do not suggest violations of the assumptions of zero mean and constant variance of the residuals.

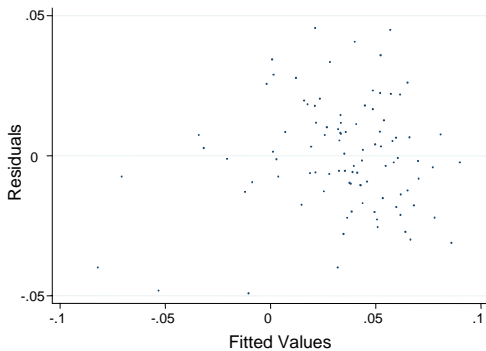
(c) Combined Sample, OLS Estimation



(a) SSA, SYS-GMM Estimation, Main Specification



(c) SEA, SYS-GMM Estimation, Main Specification



Appendix Table 1. Sources of Supplementary Data on Some Variables for some SEA countries

The data of debt (% of GDP) and military expenditure for Hong Kong, Singapore, South Korea and Taiwan have been collected from CIA World Factbook 1995-2006 annual series. The ODA data for Japan (1995-2006) and South Korea (2001-2006) have also been taken from the same source. The ODA data for Taiwan (1995-2006) are taken from UNCTAD (2008) online database while that for others have been complemented from OECD (2009) online database. However, ODA received data for donors, Japan (1995-2006) and South Korea (2001-2006), have been replaced by small positive numbers around 0.001 in a sense that these countries have not received any aid in the specified years²³. The initial GDP of some countries for which that of the 1960 is unavailable, the nearest possible GDP data have been taken as initial GDP figures, collected from CIA World Factbook of the corresponding years. The countries (year) are the Sudan (1987), Sierra Leon (1970), Swaziland (1989), Vietnam (1989) and Eritrea (1960, of Ethiopia).

In complementing the data, separate sources and different data generating mechanisms have also been employed for Taiwan and Vietnam for variables that we could not find the required data from the principal sources.

For Taiwan:

- The share of hi-tech export in total manufactured export is assumed to be similar to that of South Korea.
- NBTOT has been assumed to be the same as TOT;
- Labor force data have been taken from National Statistics of the Republic of China (Taiwan) online database, 2009.

For Vietnam

- The 1995-1996 entries of the share of hi-tech export to total manufactured export have been interpolated following the previous and the latter trends.
- Based on the actual data obtained from CIA World Factbook for 1995-1998 and 2005, the other entries (1999-2004 & 2006) of military expenditure to GDP ratio have been interpolated.
- The 1995-1999 NBTOT data have been interpolated following the trend of Philippines
- Foreign reserve data for the period 1995-2004 have been collected from IMF (2005, IFS Tables), complemented with extrapolation for the two subsequent years (2005-2006) proportional to the preceding changes.

²³ In addition, all zero values have been replaced by a very small positive number (like 0.001) so as to conserve observations from missing during log transformation. The variables (number of observations replaced) include: *htecexp* (26), *tele_100* (87) and *dist_sea* (472, all landlocked countries of SSA) in the SSA sample; *milt_gdp* (12, Hong Kong) and *oda_gdp* (53) in the SEA sample.

Appendix Table 2. Econometric Estimation and Diagnosis Test Results

(a) Growth Equation, *Suggestive Results*

Variables	Combined			SSA			SEA		
	OLS	FGLS	RE	OLS	GLS	FE	OLS	GLS	FE
$\Delta \ln \text{rexp}$	0.026	0.013	0.025	0.024	0.015	0.022	0.015	0.009	0.015
	0.001	0.000	0.002	0.007	0.000	0.012	0.055	0.122	0.035
$\Delta \ln \text{rmp}$	0.112	0.095	0.105	0.094	0.078	0.077	0.114	0.087	0.080
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
$\Delta \ln \text{labor}$	-0.244	-0.374	-0.223	-0.263	-0.499	-0.377	-0.263	-0.160	0.122
	0.201	0.000	0.286	0.208	0.000	0.146	0.075	0.354	0.587
$\Delta \ln \text{gcf}_{\text{gdp}}$	0.007	0.019	0.010	0.001	0.011	0.012	0.093	0.107	0.109
	0.780	0.010	0.681	0.954	0.169	0.547	0.010	0.000	0.002
$\Delta \ln \text{fdi}_{\text{gdp}}$	-0.001	0.000	-0.001	-0.001	0.000	-0.001	0.001	0.001	0.002
	0.756	0.902	0.776	0.751	0.893	0.791	0.812	0.667	0.249
$\Delta \ln \text{debt}_{\text{gdp}}$	-0.014	-0.006	-0.014	-0.064	-0.029	-0.055	-0.003	-0.002	-0.005
	0.114	0.050	0.119	0.001	0.000	0.002	0.253	0.388	0.155
$\Delta \ln \text{oda}_{\text{gdp}}$	-0.000	-0.001	-0.000	-0.010	-0.004	-0.008	-0.000	0.000	0.000
	0.790	0.510	0.795	0.156	0.126	0.071	0.726	0.878	0.935
$\Delta \ln \text{gdpdef}$	0.054	0.051	0.051	-0.032	-0.001	-0.024	0.149	0.135	0.135
	0.030	0.000	0.029	0.308	0.928	0.336	0.000	0.000	0.000
$\Delta \ln \text{govesh}$	-0.022	-0.016	-0.019	-0.017	-0.015	-0.013	-0.117	-0.091	-0.129
	0.361	0.059	0.403	0.445	0.092	0.485	0.014	0.020	0.008
$\ln \text{pcgdp60}$	-0.004	-0.008	-0.004	-0.001	-0.004	-	-0.015	-0.017	-
	0.110	0.000	0.193	0.800	0.068	-	0.000	0.000	-
SSA Dummy	-0.021	-0.016	-0.021	-	-	-	-	-	-
	0.000	0.000	0.000	-	-	-	-	-	-
Constant	0.054	0.085	0.053	0.012	0.046	0.012	0.122	0.129	0.028
	0.002	0.000	0.007	0.522	0.002	0.065	0.000	0.000	0.000
No. Obs.	492	492	492	385	385	385	107	107	107
R^2	0.243	-	-	0.241	-	0.217	0.736	-	0.741
R^2_{a}	0.226	-	-	0.221	-	0.198	0.709	-	0.717
Root MSE	0.042	-	0.041	0.044	-	0.039	0.020	-	0.016
OV test	0.000	-	-	0.000	-	-	0.000	-	-

(b) Growth Equation, Difference IV and One-Step System-GMM

Variable	DIFF-IV		System GMM (One-Step)			
	SSA	SEA	SSA1	SSA2	SSA3	SEA
$\Delta \ln \text{rexp}$	0.023	0.019	0.023	0.023	0.016	0.014
	0.077	0.044	0.017	0.011	0.063	0.052
$\Delta \ln \text{rimpv}$	0.110	0.173	0.075	0.072	0.097	0.150
	0.001	0.000	0.009	0.012	0.005	0.000
$\Delta \ln \text{labor}$	-0.286	-0.088	-0.446	-0.480	-0.418	0.001
	0.029	0.562	0.235	0.095	0.240	0.996
$\Delta \ln \text{gcf_gdp}$	0.008	0.084	0.037	0.041	-	0.062
	0.657	0.012	0.083	0.055	-	0.014
$\Delta \ln \text{fdi_gdp}$	0.002	0.001	-0.003	-	-0.003	0.002
	0.177	0.649	0.174	-	0.092	0.605
$\Delta \ln \text{debt_gdp}$	-0.030	-0.003	-0.045	-0.050	-0.036	-0.002
	0.001	0.330	0.005	0.005	0.007	0.317
$\Delta \ln \text{oda_gdp}$	-0.004	-0.004	-0.003	-0.011	-0.000	-0.001
	0.437	0.058	0.484	0.047	0.994	0.351
$\Delta \ln \text{gdpdef}$	0.025	0.158	0.006	0.011	0.023	0.187
	0.459	0.000	0.811	0.669	0.323	0.000
$\Delta \ln \text{goves}$	-0.025	-0.083	-0.009	-0.020	-0.008	-0.072
	0.063	0.081	0.714	0.314	0.739	0.204
$\Delta \ln \text{rgdppc}_1$	0.313	0.107	0.182	0.257	0.195	0.156
	0.000	0.076	0.009	0.000	0.016	0.141
Constant	0.006	0.018	0.011	0.011	0.011	0.017
	0.314	0.000	0.229	0.096	0.243	0.012
No. Obs.	253	82	349	384	363	96
Root MSE	0.032	0.019	-	-	-	-
Tests for						
AR(1), Z-Statistics	-	-	-3.05	-2.79	-2.92	-2.37
P-value	-	-	0.002	0.005	0.003	0.018
AR (2), Z-Statistics	-	-	0.82	0.84	1.51	-1.53
P-value	-	-	0.415	0.400	0.131	0.125
Hansen/Sargan Test						
χ^2	1.556	3.311	151.54	139.71	138.81	91.60
p-value	0.459	0.346	0.900	0.980	0.982	0.123

Note: The detection of autocorrelation in differenced residuals (AR) indicates that lags of the dependent variable and any other variables used as instruments that are not strictly exogenous are in fact endogenous and thus weak instruments. AR(1) is expected as two consecutive differences share the same error term; i.e., $D.\epsilon_{it}$ ($=\epsilon_{it}-\epsilon_{i,t-1}$) should correlate with $D.\epsilon_{i,t-1}$ ($=\epsilon_{i,t-1}-\epsilon_{i,t-2}$) since they share the $\epsilon_{i,t-1}$ term. AR(2) in differences tells us also AR(1) in the original equation; because, it detects the relationship between $\epsilon_{i,t-1}$ in $D.\epsilon_{it}$ and the $\epsilon_{i,t-2}$ in $D.\epsilon_{i,t-1}$.

PRICE DETERMINANTS OF WASHERA SHEEP AT YILEMANADENSA AND QUARIT DISTRICTS OF AMHARA REGION, ETHIOPIA

Asresu Yitayew, Mengistie Taye, Shigdaf Mekuriaw and Alemayehu Kebede¹

Abstract

The study aims at analyzing sheep price variation and identifying factors affecting Washera sheep price. Animal characteristic, season and buyer purpose data were collected at Yilemanadensa and Quarit markets from October 2004 to April 2010. A total of 1185 transactions were recorded. A descriptive statistics was used to analyze price variations between the two markets and sex categories across months. A multiple regression model was used to identify factors influencing sheep price that are taken as a dependent variable is affected by animal characteristics (such as sex, age, weight, and color), season and body condition. Month-to-month price variations were recorded corresponding to animals' sex and markets. At Quarit market, Price of sheep was negatively and significantly affected by marketing season (Christmas). The body weight of sheep has a positive and statistically significant effect on price of sheep. The marginal price of sheep was increased in body weight, in turn encourage sheep fattening at market accessible district, Yilemadensa market. The coefficient of dummy variables categories representing animal characteristics such as sex, age, and color has shown statistically significant price discount and/or premium at all markets. The study recommends that measure on sheep productivity, improving infrastructure (transporting and communication) and market information system could enhance gains generated from sheep production.

Keywords: Washera Sheep, Price Determinants, Yilemanadensa and Quarit districts, Animal characteristics

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1. Introduction

Washera sheep is an indigenous sheep breed which inhabits mainly the wet and warmer mid-highlands of Amhara Region, Ethiopia (Solomon *et al.*, 2010). Washera sheep is kept in the traditional smallholder production system as an adjunct to other agricultural activities along with other livestock species providing cash income from sale of live sheep, meat and skin, manure and social and cultural functions for the smallholder farmers (Mengistie *et al.*, 2011). According to Mengistie *et al.* (2010), People in the Washera sheep production area keep small flocks of sheep (about 9.58 sheep per household) and practice mixed crop-livestock agriculture.

The report of Chipman (2003), Solomon *et al.* (2008) and Mengistie *et al.* (2009; 2011) indicated that Washera sheep is among the potential sheep breeds of the country for commercial mutton production for the local as well as export market with relatively high reproductive and productive performances. Research effort has been undertaken by Andassa Livestock Research Center through '*Community and Conservation-based Improvement Scheme for Washera Sheep*' using improved management systems, genetic selection and health care to improve its productivity and conserve the genetic resource.

The ultimate goal of the interventions was to enhance farmers' income. Understanding price attributes on sheep price formulation allows to insight and also provide information to fetch better income from sheep production. Knowing animals' characteristic preferred by the market and price pattern helps to design selection criteria, and plan controlled breeding and feeding program consistent with the best seasonal prices and consumer preferences. Andargachew and Brokken (1993) and Beneberu *et al.* (2011) conducted a study to identify factors determining price levels in a given market in the central highlands of Ethiopia. However, to the knowledge of the authors of this paper, there has not been a similar study specific to Washera sheep in the selected areas. The purpose of this paper is to fill the gap. More specifically, this paper aims at assessing sheep price variation and identifies factors affecting Washera sheep price.

2. Methodology

2.1 Data collection

Yilmanadensa and Quarit districts located in western Gojjam were selected purposively based on their importance as sheep producing districts. The data were collected from producers that are selected based on production experience for a period of 6 years running from beginning of October 2004 to end of April 2010. The data collected were live weight, price, age, color, sex, and buyer purpose. A total of 1185 transactions were recorded. Recordings were done weekly at producers' resident. Live weight of each animal was taken a week before the animals were sold using Salter balance with 50 kg capacity. Price of sellers was recorded after a will transaction has taken place.

Qualitative explanatory variables including age, color, sex, and buyers purposes were introduced as dummy variables in the model. Age was approximate by birth date and number of teeth. Sex was taken as male and female. Color was recorded based on the external color of skins as red, white, red and white, black, and others. Buyer purpose was taken as consumption, resale/profit, reproduction, growing and others.

2.2 Data analysis

Multiple regression model was used for modeling and testing of multiple independent variables. The effect of animal characteristic on price was analyzed using Statistical Package for Social Sciences version 16.0 (SPSS, 2009) by general linear model techniques. The model is given by:

$$P = \beta_0 + \beta_1 W + \beta_2 W^2 + \sum_{i=1}^5 \beta_i A_i + \sum_{i=1}^1 \beta_i S_i + C_i + \sum_{i=1}^4 \beta_i B_i + \sum_{i=1}^2 \beta_i N_i$$

Where: P is price per head in Eth. Birr, and W is live weight in kilogram
 A , S , C , B , and N are dummy variables signifying age, sex, color, buyers purpose, and season, respectively. The β_i 's are structural parameters of the equation, and the error term e_i represents unobservable random variable which is assumed to be independently distributed over the sample.

Categories of independent variables are defined as follows:

A_i = six age in year: $A \geq 0.5$, $0.5 < A \leq 1$, $1 < A \leq 2$, $2 < A \leq 3$, $3 < A \leq 4$ and $A > 4$, where $A \geq 0.5$ is the base²

C_i = five colors: Red, white, Red and white, Black, and others, where black is the benchmark.

S_i = two sexes: male and female, where female is the base.

B_i = five buyer purposes: consumption, profit/resale, reproduction, growing, and others, where reproduction is the base.

N_i = four seasons: New Year, Christmas, Easter, and non-festival, where non-festival is the base.

For each qualitative regressor, the number of the dummy variables introduced must be less than the categories of that variable. If you do not follow this rule you will fall into what is called the dummy variable trap, that is, the situation of perfect collinearity or perfect multi-collinearity, if there is more than one exact relationship among the variables. The category for which dummy variable is assigned is known as base (Gujurati, 2004).

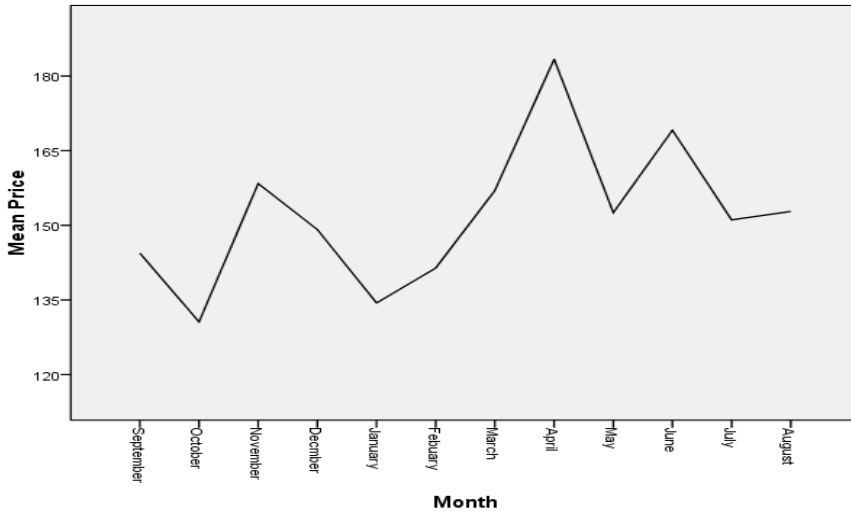
3. Result and Discussion

3.1 Price Variation

Price per head fluctuated monthly ($\sigma^2=142.93$, $\sigma < 0.001$) and average price varied between 14.10 and 52.24 ETH Birr. The highest price per head for sheep was recorded in April and June. These months are times of festivities and high cash demand occurred. April is the month in which Easter market is appearing which is famous and a widely celebrated religious festival. Ethiopian Easter is demanding mostly sheep for home consumption. In June, farmers were supplied sheep regardless of their merit to get cash for agricultural input purchase. The lowest price per head for sheep was recorded in October and January months which are coming immediately after Ethiopian Meskel (the Finding of the True Cross) and Christmas.

² Base is represented by the overall intercept in a multiple regression model.

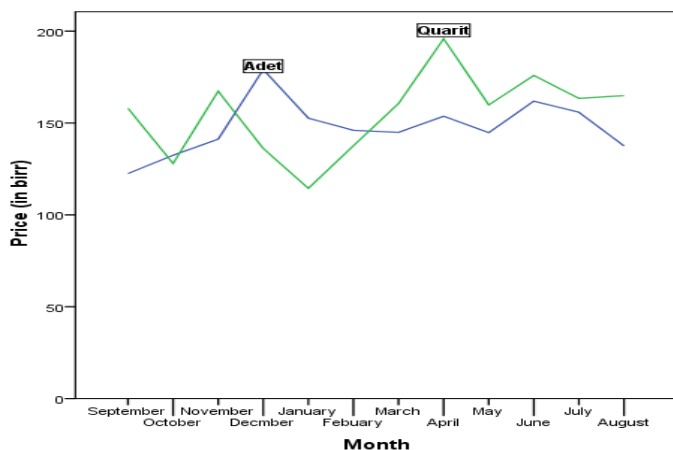
Figure 1: Monthly average live weight price of sheep.



Source: own data collected

Live weight price of sheep varied between the two markets and sex categories across months. The highest and lowest live weight price of sheep was observed at both markets on different months. The highest average price of sheep was recorded in December and April while the lowest was recorded in September and January at Yilmandensa market and Quarit market, respectively. This has resulted from differences in demand for sheep and supply of sheep across months which are interrelated with feed availability and agricultural production. Price variation (highest price minus lowest price) was high at Quarit market compared to Yilemandensa market. This implies that price fluctuation is a problem of Quarit markets relative to Yilemandensa market.

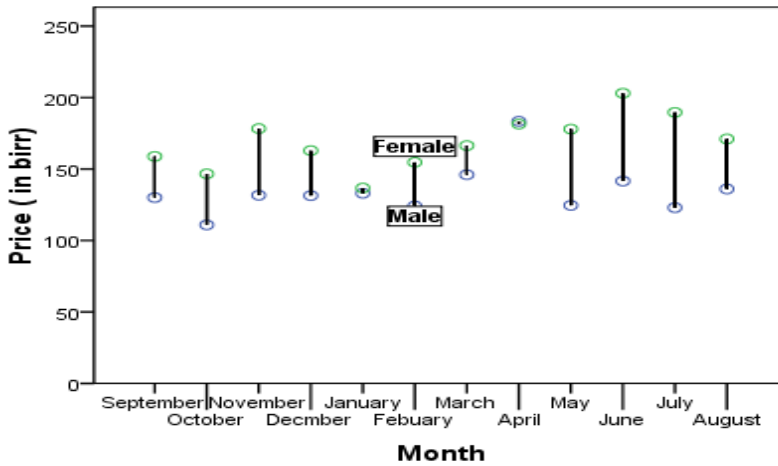
Figure 2: Monthly average sheep price at Yilemadensa and Quarit market.



Source: own data collected

Average live weight price of female was higher than male sheep which resulted from their higher economic purposes. The highest average live weight price of male and female sheep was recorded in April and June, respectively. Producers most often grow ram lambs and add value on it to gain advantage from Ethiopian Easter market which mostly occurred in April. In contrast, farmers sold sheep regardless of their merit to mitigate cash shortage mainly during June. This month comes after a will of Ethiopian Easter in which flocks kept for breeding purpose were sold to obtain cash for agricultural input purchase.

Figure 3: Monthly average price of male and female sheep



Source: own data collected

Factors affecting sheep price

Sheep are sold on a per head basis by a long one-on-one bargaining between sellers and buyers. Under such situations, the major determinants of price are buyers' preference on animals' characteristics, buyers' purpose, and season (Andargachew and Brokken, 1993; Beneberu *et al.*, 2011). Animal characteristics that affect price are weight, sex, age, and color. In addition, the purpose for which the animal was purchased, whether for resale, slaughter, fattening or reproduction, affected price.

Table 1 indicates estimated parameters of factors affecting price per head in the study districts. The intercept value represents the mean value of the bench mark. The coefficients attached to the dummy variables are the differential intercept coefficients because they tell by how much the value of the intercept that receives the value of one differs from the intercept coefficient of the bench mark category. Thus the sign of the coefficients within set of dummy variables signify premiums and discounts relative to the intercept value in Ethiopian Birr.

The F-value of the model is significant at 1 percent level. The value of adjusted R^2 shows that about 66% and 60% of the variation in the price per kilogram live weight of sheep is explained by the explanatory variables included in the model at Yilmanadensa and Quarit market, respectively.

The coefficient of dummy variables representing Christmas was negatively and statistically significant at Quarit market. This implies that selling of sheep during Christmas results in a significant price discount relative to non-festival seasons. This appears not only because the majority of consumers prefer and consume beef than mutton but also Quarit district is so closed economy due to inaccessibility.

The weight of sheep has a statistically significant effect on price as found Andargachew and Brokken (1993), and Beneberu *et al.*, (2011). Because of market accessibility variation between the study districts, the quadratic structure of effect of weight on price tends to vary. The result reveals that price of sheep increased in weight at Yilemadensa in which market is accessible but not at Quarit.

The sex of animals has statistically significant impact on price in all markets. At Yilemadensa market, selling of male sheep results in significant price premium compared to female animals. In contrast, there is significant price discount of selling of male sheep at Quarit market. This is maybe because of difference in buyers' preference which is related with market accessibility to tertiary markets. There is a remarkable high demand for female at Quarit for reproduction purpose whereas at Yilemandensa male have high demand for slaughter purpose.

A significant age effect on live weight price has been observed in both markets. Price formation in the animal market transaction considers age factors, consistent with Andargachew and Brokken (1993), Teressa (2006) and Beneberu *et al.*, (2011). The result reveals that lambs and ewes fetch higher price. According to Beneberu *et al.*, (2011), this is due to economic purpose, and taste and preference of buyers like tenderness, softness, and attractiveness. The coefficient of dummy variables indicates that price increases up to six months and one year at Yilemadensa and Quarit market, then decreases, respectively.

Table 1: Estimated parameters of the effect of live weight price of sheep at Yilemadensa and Quarit market.

Parameters	Yilemadensa		Quarit	
	Coefficient	t-value	Coefficient	t-value
Intercept	205.040(64.576)	3.175***	126.208(54.559)	2.313**
Weight	2.928(1.361)	2.151**	7.503(1.350)	5.557***
Weight ²	.071(.032)	2.223**	-.028(.029)	-.967
Sex (base, female)				
Male	11.141(3.851)	2.893***	-8.608(4.930)	-1.746*
Age (year) (base, A ≤ 0.5)				
0.5 < A ≤ 1	-6.876(4.962)	-1.386	3.560(5.322)	.669
1 < A ≤ 2	-41.427(8.042)	-5.151***	-6.869(7.593)	-.905
2 < A ≤ 3	-73.261(10.578)	-6.929***	-26.963(10.540)	-2.558**
3 < A ≤ 4	-71.730(12.543)	-5.719***	-26.330(10.466)	-2.516**
A > 4	-8.838(14.728)	-.600	-15.866(13.299)	-1.193
Color (base, black)				
Red	28.972(15.062)	1.924*	2.118(12.856)	.165
White	18.615(16.132)	1.154	.100(13.200)	.008
Red & white	22.823(15.078)	1.514	6.490(12.52)	.518
Other	36.558(16.207)	2.256**	6.679(16.864)	.396
Buyers purpose (base, reproduction)				
Consumption	-.738(13.497)	-.055	-21.780(5.635)	-3.865***
Resale	-14.835(6.336)	-2.341**	7.233(5.783)	1.251
Growing	NA		1.055(7.339)	.144
Others (sacrifices and ceremony)	-29.896(12.399)	-2.411**	-16.016(29.867)	-.536
Season (base, non-festival)				
New year	4.803(6.560)	.732	.276(6.950)	.040
Christmas	8.006(7.641)	1.048	-20.582(7.669)	-2.684***
Easter	.097(4.644)	.021	4.554(4.547)	1.002
N	438		747	
F value	47.54		58.806	
Adjusted R ²	0.657		0.595	
Significance	<0.0001		<0.0001	
DW	1.644		1.533	

Base represents the base of the dummy in the respective group* $\square < 0.1$, ** $\square < 0.05$, *** $\square < 0.01$, statistically significant; figures in parenthesis are standard error; NA= No value

Color has effect on live weight price at Yilemandensa market. In this market, most of the buyers are resellers who emphasize to make profit, hence they undertake transaction based on consumers preference on sheep color, for instance, red sheep and mixed colored sheep. Some buyers’ purpose has an impact on price. Buyers’ purpose for resale, and sacrifices and ceremony at Yilemadensa market and for consumption (slaughter during festivals) at Quarit market shows significant price discount relative to production purpose.

The estimate parameters in the econometric model can be reduced to interpret the regression analysis as follows. In order to determine the effect of sex on live weight price at Quarit market, we estimate the model.

$$P = 37.42 - 7.80 S_i + 7.18W$$

(12.14)
(4.16)
(1.25)

(3.08)
(-1.872)
(5.74)

Adjusted R² = .551 N = 767 F-value = 317.16

The coefficient on male (-7.80) measures the average difference in live weight price between female and male animals, given the same level of live weight. If we take ewes and rams with the same level of live weight, other variables being equal, ewes would be more expensive, on average, 7.80 birr than rams which is statistically significant (p < 0.1).

For Quarit market the equation for a sheep sold during Christmas festival (relative to non-festival) would be as follows:

$$P = 36.94 - 25.56N_i + 7.15W - 0.003W^2$$

(12.02)
(7.72)
(1.24)
(0.027)

(3.05)
(-3.31)
(5.77)
(-1.12)

Adjusted R² = .558 N = 770 F-value = 325.05

For a sheep with the same level of live weight, other variables being controlled there is live weight price difference between sheep sold during Christmas and non-festival seasons. During Christmas sheep price would be less expensive, on average, 25.56 birr than the later season which is statistically significant (p < 0.001).

For Yilemanadensa market the equation for a sheep of yearling (sheep age between one to two years) would be as follows:

$$P = 73.91 - 21.19A_i + 3.05W + 0.12W^2$$

(16.38)
(7.67)
(1.42)
(0.03)

(4.51)
(-2.76)
(2.15)
(3.32)

Adjusted R² = .599 N = 477 F-value = 238.74

For a sheep with the same level of live weight, other variables being controlled; there is live weight price difference between lambs whose age is less than six months and between one to two years. The lambs whose age is less than six months would be more expensive, on average, 21.17 birr than the later age which is statistically significant ($\alpha < 0.001$).

Conclusion and Recommendation

Months in which transactions taken place have significant effect on sheep price variation. Similarly, price variation was observed between sheep sexes and among markets. These price variations occurred in response to change in demand and supply on sheep markets across months which is likely influenced by religious festivals, cash shortage of producers and availability of inputs (feed). Furthermore, live weight price of sheep was significantly affected by animals' characteristics (including weight, sex, age, and color) and buyer's purpose.

Producers could be better off from this sub-sector given complete information on demand and supply of sheep. The result suggests that price discrepancy could be tapered off by improving infrastructure (transporting and communication), and market information system. On the supply side, animal characteristics would be taken into account in sheep productivity improvement activities to gain the best advantage from some preferred animal characteristics. In addition, in areas at which market is accessible, sheep fattening is recommended.

Reference

- Andargachew, K. and Brokken, R. F. 1993. Intra-annual sheep price patterns and factors underlying price variations in the central highlands. *Agric. Econ.*, 8 (1): 125–138.
- Asresu Yitayew, Mengisite Taye, Shigdaf Mekuriaw and Hailu Mazengia. 2010. Off take and mortality rate of Washera sheep at Yilemanadensa and Quarit districts of Amhara region, Ethiopia. Proceedings of the 4th Annual Regional Conference on Completed Livestock Research Activities, December 13-19.
- Beneberu Tefera Kassie, Anteneh Girma Haile and John Abdu Essa. 2011. Determinants of sheep prices in the highland markets of Ethiopia: implication for sheep value chain development. *Trop Anim Health Prod* 43:1525-1533.
- Chipman, J. 2003. Observations on the potential of Dangila sheep for improved food security around Quarit and Adet, West Gojjam, northwestern Ethiopia. A Field Study Hosted by International Livestock Research Institute (ILRI), Addis Ababa, Ethiopia
- Gujarati, D. N., 2004. *Basic Econometric*, 4th Edition, The McGraw-Hill, New York.
- Mengistie Taye, Girma Abebe, Solomon Gizaw, Sisay Lemma, Abebe Mekoya and Markos Tibbo. 2009. Growth performances of Washera sheep under smallholder management systems in Yilmanadensa and Quarit districts, Ethiopia. *Trop Anim Health Prod*. DOI 10.1007/s11250-009-9473-x.
- Mengisite Taye, Girma Abebe, Sisay Lemma, Solomon Gizaw, Abebe Mekoya and Marikos Tibbo. 2010. Traditional management systems and linear body measurements of Washera sheep in the western highlands of the Amhara National Regional State, Ethiopia. *Livestock Research for Rural Development* 22 (9).
- Mengisite Taye, Girma Abebe, Sisay Lemma, Solomon Gizaw, Abebe Mekoya and Marikos Tibbo. 2011. Reproductive performances and survival of Washera Sheep under traditional Management Systems at Yilmanadensa and Quarit Districts of the Amhara National Regional State, Ethiopia. *Journal of Animal and veterinary Advances* 10 (9):1158-1165.
- Solomon Gizawa, Aynalem Haile and Tadelle Dessie. 2010. Breeding objectives and breeding plans for subsistence and market-oriented Washera sheep production in Ethiopia. *Eth. J. Anim. Prod.* 10(1):1-18.
- SPSS for windows, 2009. Statistical Package for Social Science (SPSS). Release 16.0. The Apasche software foundation.
- Teresa Adugna. 2006. Determinants of market price of cattle in Eastern Ethiopia. Contributed paper prepared for presentation at the International Association of Agricultural Economists conference, Gold Coast, Australia, August 12-18, 2006.

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