International Migration, Remittances and Poverty Alleviation in Ethiopia

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Abstract

The article explores the impact of international remittances on the Ethiopian economy as well as the livelihoods and welfare of households. A simple dynamic econometric model, Vector Autoregressive (VAR) model, was used to assess the impact of international remittances on absorption, spending and output. Moreover, we used binary outcome model to test whether remittances have an impact on the welfare of households. Besides, the study made use of macroeconomic data and data from the Ethiopian urban household survey. It was found that remittance shocks positively affect macroeconomic variables; the effect remained to be volatile in the very first periods after the shock. However, the impacts tend to sustain in the years after the fifth period. Moreover, through the positive (but inelastic) relationship between growth and poverty, private remittance inflows have an important implication for poverty in Ethiopia. Internatjonal remittances significantly reduced the poverty incidence among the urban households in the country. It was also found that female-headed households are more likely to use remittance more effectively than male-headed households are.

Keywords: migration, poverty, remittance, Ethiopia, vector autoregressive

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Introduction

Migration refers to a change of the usual place of dwelling on a permanent basis or temporarily (Arsole *et al.*, 2003 in Adamnesh, 2008), which could be either voluntary or forced (Kokpari, 2000). People migrate to take advantage of opportunities in host countries such as economic, social, political, and environmental or a combination of all these. The tempting wage gaps between developed and developing countries, inviting immigration programs in the developed world, lack of democracy and good governance in the home countries, and poverty and environmental degradation in the home countries are some of the factors for international migration (Portes,1996).

Recent estimates show that nearly 200 million people live outside their country of birth. According to the United Nations estimates between 1960 and 2005 the number of international migrants doubled exceeding an estimated 75 million in 1960 to almost 191 million in 2005 (UN, 2006).

Migration has diverse socio-economic impact ranging from increased and better opportunities for the migrant to an improved livelihood of sending households and to contributing to economic growth. Remittances [from migrant workers] have reduced the share of poor people in the population by 11 percent in Uganda, 6 percent in Bangladesh and 5 percent in Ghana. Remittance income is also associated with higher school attendance in the Philippines, improved health outcomes in Guatemala and increased investment in micro-enterprises in Mexico (World Bank, 2006).

Ethiopia is challenged by different migration patterns and dynamics, which have significant political and socio-economic ramifications for the country. The country has one of the highest African diaspora populations, which undoubtedly affects the government's sustainable development and poverty reduction programs. According to Dejene (2005), international migration has been increasing starting from the late 1970s, which is the result of the

political instability at that time. Nowadays, many Ethiopians, skilled and unskilled, cross border to different countries legally and illegally looking for better economic opportunities. The main destinations for Ethiopians are North America, Europe, and the Middle East (Dejene, 2005).

Acording to the National Bank of Ethiopia's reports , the inward private individual transfers have grown tenfold from a meager USD 177 million in 2000/01 to USD 1.8 billion in 2008/09 surpassing foreign exchange earnings from FDI and export. This suggests that immigrant remittances are an important part of the Ethiopian economy and well-being of Ethiopian households.

However, while migration originating from relatively poor to rich countries is well known, very little is known about the role of remittances they send back home on poverty reduction. The remittances the diaspora send to their home country constitute a large amount of foreign exchange used for poverty alleviation at the household level. It also adds to the stock of international foreign exchange reserve of the country leading to macroeconomic impact such as economic growth. The objective of this study is to see the livelihood consequences of these remittances on the welfare of households and the macroeconomic impact of inflows of international migrant remittances on poverty reduction.

The rest of this article paper is organized as follows. A review of migration patterns and international remittances will be made in the second section. We devoted two separate sections for our analysis of results. We do this because of the difference that impact remittances can have at the household level and on the economy at large. As a result, we employed two different data sets and methodological approaches. While the macroeconomic impact of international remittance on the Ethiopian economy is discussed in the third section, the fourth section deals with livelihood consequences of migration and its concomitant inflow of remittances on the welfare of households. The fifth section concludes the article.

Patterns of International Migration and Remittances

Generally, international migration flows from less developed to industrial countries. The number of migrants has continued to rise in recent years. However, the share of Africa has dropped from 12% in 1970 to 9% in 2000. This is not because the absolute number of African migrants has decreased, but because the share of most populous countries such as China, India and the Philippines has outnumbered Africa in recent years. International migration is concentrated in few countries. By the end of 2005, 12% of countries globally hold 75% of migrant stocks (WB, 2005).

The 2005 International Migration Report indicated that Australia, North America, Europe, Africa and Latin America host 18.7%, 12.9%, 7.7%, 2% and 1.4% of the world's migrant stock, respectively. The three top migrant receiving countries are United States, Russia and Germany accepting 35 million, 13.3 million and 7.3 million migrants, respectively. On the other hand, China, India and the Philippines are the three most migrant sending countries with 35 million, 20 million and 7 million people, respectively. While Mexico, India, the Philippines and Egypt received USD 11 billion, 8.4 billion, 7.4 billion and 2.8 billion, respectively, from remittance receipts, USA, Saudi Arabia, and Germany remit USD 28 billion, 15 billion and 8 billion, respectively.

Migration has a mixed effect on the sending and receiving countries. United States of America is the leading beneficiary of migration as it is populated by immigrants and their descendants. In addition to being a source of foreign exchange, migration might also have potential benefit to home countries as it may ease population pressure and reduce unemployment problem in developing countries.

This argument is, however, controversial as most of the emigrants from developing countries are qualified and potential entrepreneurs. Thus, migration may exacerbate the unemployment problem of the host country instead of lessening it. Furthermore, since most of the migrants are

economically active, it may jeopardize the long term development effort of sending countries by drawing out the economically active segment of the society. Migration is, therefore, a costly experience for sending countries as lots of their most valuable medical doctors, engineers, accountants etc. left their home countries after they invested lots of resources to educate them (Siliji, 2001).

Ethiopia's International Migration Patterns

Ethiopia is one of the countries with a large number of migrants in North America, Europe and the Middle East. According to Teferi and Beruk (2009), by the end of 2005, more than 1 million Ethiopians migrated to the rest of the world. Looking for a better education, employment opportunities, and political instability are considered to be major causes for migration. Political migration was intensified in Ethiopia during 1970-1990 due to political instability at the time. Although the stock of migrants has been decreasing since 1990, migration is still important and a hot issue in the today's Ethiopia.

The UN 2008 Revised Population Database shows that 546,000 Ethiopian migrants live in different parts of the world. This estimate is, however, understated vis-à-vis the Ministry of Foreign Affairs of Ethiopia estimate which sometimes reaches as high as 1.5 million (Teferi and Beruk, 2009). According to the Population and Housing Census conducted in 2007, Ethiopia's population grew by about 2 million people. At the same time, close to 120 thousand Ethiopian left their country every year.

Table 1. Ethiopia's migrant stock from 1970-2010 (in thousands)

Indicator	1970	1975	1980	1985	1990	1995	2000	2005	2010
Estimated number of international migrants at mid-year	395	392	404	584	1,155	795	662	554	548
Estimated number of refugees at mid-year	21	9	11	180	42	371	228	108	91
Population at mid-year (thousands)	30	34	37	43	48	57	66	75	85
Estimated number of female migrants at mid-year	171	175	184	268	548	376	312	261	258
Estimated number of male migrants at mid-year	223	217	220	315	607	419	351	293	290
International migrants as a percentage of the population	1.3	1.1	1.1	1.3	2.4	1.4	1	0.7	0.6
Female migrants as percentage of all international migrants	43.4	44.7	45.5	46	47.4	47.3	47.1	47.1	47.1
Refugees as a percentage of international migrants	5.2	2.2	2.7	30.9	64.2	46.7	34.4	19.6	16.6

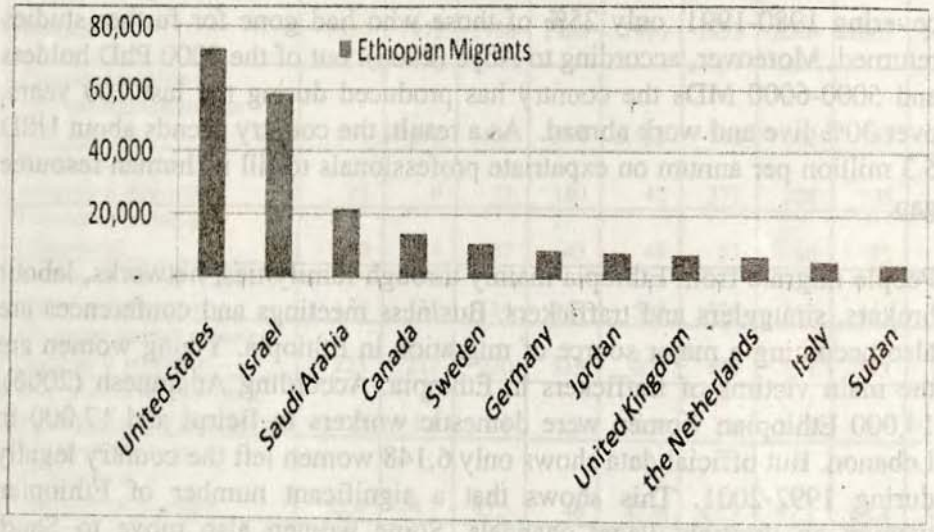
Source: UN, 2006

Political and economic reasons accounted for the increase of Ethiopian migrants since the 1970s. But, these are by no means the only reasons. According to Abye (2008), some migrants come from a well to do family who can afford the travel and living expenses abroad. Those who are facing hardship at home are not those who migrate because the poor can not afford to travel. Hence, it can be argued that although the initial reason for migration is political instability, the recent migration trend can be accounted for by the desire to acquire western culture and enjoy better standard of living. This, however, does not include those who migrate to the Middle East whose motivation is mostly economic. According to Adamnesh (2006), a survey on Ethiopian returnee shows a search for education in host country, political instability at home and better standard of living in host country accounted for 54%, 27% and 10%, respectively, of the respondents.

According to Bathsheba (2007), Ethiopia lost 74.6% of its skilled manpower during the period 1980-1991. By the end of 2002, Ethiopia lost more than one third of its medical doctors. However, during the period covering 1980-1991, only 25% of those who had gone for further studies returned. Moreover, according to Abye (2008), out of the 5000 PhD holders and 5000-6000 MDs the country has produced during the last 100 years, over 30% live and work abroad. As a result, the country spends about USD 5.3 million per annum on expatriate professionals to fill its human resource gap.

People migrate from Ethiopia mainly through family ties, networks, labour brokers, smugglers and traffickers. Business meetings and conferences are also becoming a major source of migration in Ethiopia. Young women are the main victims of traffickers in Ethiopia. According Adamnesh (2006), 14,000 Ethiopian women were domestic workers in Beirut and 17,000 in Lebanon. But official data shows only 6,148 women left the country legally during 1992-2001. This shows that a significant number of Ethiopian women go through illegal channels. Some women also move to Saudi Arabia and other Arab states through Oumra and Hajji. On the other hand, the major channel that people migrate to USA is via diversity visa (DV) lottery.

Figure 1. Number of Ethiopian Migrants by country of residence, circa 2000



Source: Migration Policy Institute quoted in Adamnesh ,2008

Figure 1 shows the top eleven destinations of Ethiopian migrants: United States, Israel, Saudi Arabia, Canada, Sweden, Germany, Jordan, UK, Netherlands, Italy and Sudan.

Recent data obtained from the Ministry of Foreign Affairs of Ethiopia indicated that Ethiopian migrants to the Gulf States are estimated to be 190 thousand. The Ministry of Labour and Social Affairs, on the other hand, estimated it to be 13.5 thousand only during 1992 – 2001 (see Table 2). The discrepancy may be due to the fact that the latter does not consider those who migrate through illegal channels. In the recent years, it is the young who are moving to the Gulf. A study conducted on women trafficking in Ethiopia confirmed that most women leaving for the Gulf are in the age of 20-30 years.

Table 2. Ethiopian legal migrants in the Gulf States since 1992-2001

Year	Men	Women	Total
1992	1,794	1,688	3,482
1993	2,112	1,020	3,132
1994	251	1	252
1995	397	298	695
1996	803	356	1,159
1997	1,186	728	1,914
1998	757	894	1,651
2000/2001	-	1,163	1,163
Total	7,300	6,148	13,448

Source: Ministry of Labour and Social Affairs quoted in Adamnesh, 2008

Remittance Transfers and Channels in Ethiopia

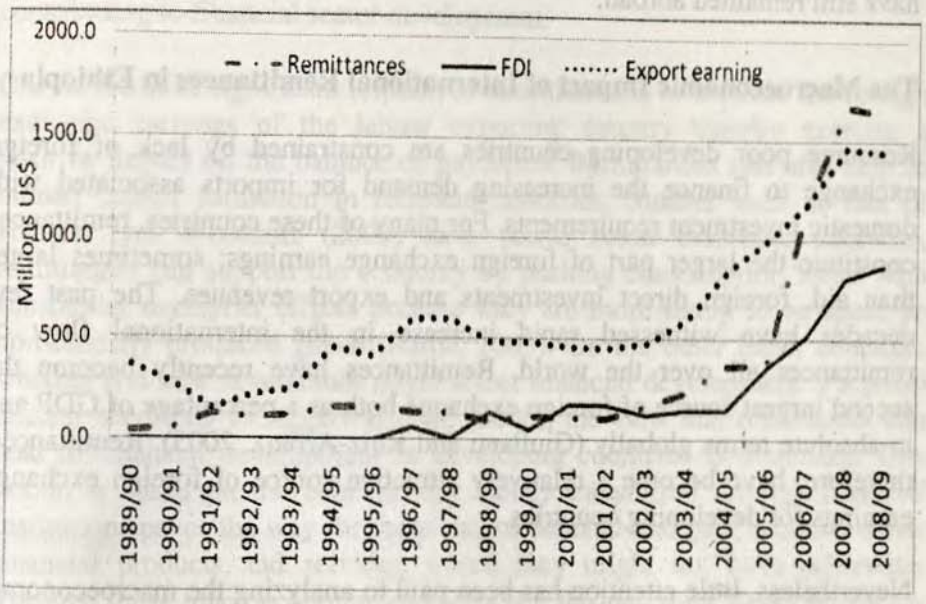
Ethiopian migrants are engaged in various occupations in different countries. For instance, in USA, according to the 2000 US Census, 30.6%, 26.6%, 20.5% and 19.3% of Ethiopian migrants were engaged in sales & office, management & professional, service occupation and production & transportation respectively. Similarly, as reported in Agnarson (2006), the share of Ethiopian migrants in Europe in paying jobs has increased in recent years. In contrast, most of the male migrants in the Gulf participated as drivers. Of course, some are employed as factory workers, mechanics, labourers, farmers, guards and waiters and in very few cases in such professions as engineers and accountants. Regarding women workers in the Gulf, they are often recruited to work as housemaids except in few cases where they are hired as waitresses.

The major channel that Ethiopian migrants could contribute to the country's development and poverty reduction is through remittance. Remittance is becoming a major source of foreign exchange in Ethiopia. According to the

National Bank of Ethiopia, USD 1.8 billion was received from private individuals in 2008/09 vis-à-vis Foreign Direct Investment (FDI) and export sector (see Fig. 2.2 and Fig 2.3.). USD 969 or 54% of this was channelled through the official system, the balance inflow via informal channels. The data shows that official individual international transfers had increased annually by 33 percent on average from US$ 41.3 million in early 1990s. Hence, remittance grew by a higher rate than the economic growth over the same period (which is 4.6 percent).

Assuming 1.5 million Ethiopian migrants live abroad, the per capita remittance inflow is estimated to be about 100 USD per month. This is very small relative to other countries. However, it may be because remittances which go through the informal system are underestimated. Cognizant of this problem, the National Bank of Ethiopia (the central bank) issued a directive (FXD/30/2006) to improve the operation of the formal remittance transfer system and to enhance incoming remittance transfers and regulating processes. Following this policy initiative, some positive developments have been seen from 2006 onwards (Figure 3).

Figure 2. Trends in remittances, FDI, and export earning in Ethiopia



Source: National Bank of Ethiopia, 1989-2009

Remittance is not the only means that Ethiopia could benefit out of its huge number of migrants abroad. Skilled Ethiopians contribute to the country's poverty reduction endeavour by filling the gaps in areas like education and health. In this regard, the International Organization of Migration (IOM) initiated two projects: Return and Reintegration of Qualified African Nationals (RQAN) and Migration for Development in Africa (MIDA). The United Nations Development Program (UNDP) participated in this effort by placing a National United Nations Volunteer Program.

The Ethiopian government established an office, the Ethiopian Expatriate Affairs, under the Ministry of Foreign Affairs in January 2002. The main duties and responsibilities of the office are to provide accurate information to Ethiopian migrants and to conduct research to participate the diaspora in the development of the country. In this regard, some positive results have

been observed although a huge number of skilled and unskilled labours have still remained abroad.

The Macroeconomic Impact of International Remittances in Ethiopia

Resource poor developing countries are constrained by lack of foreign exchange to finance the increasing demand for imports associated with domestic investment requirements. For many of these countries, remittances constitute the larger part of foreign exchange earnings; sometimes larger than aid, foreign direct investments and export revenues. The past few decades have witnessed rapid increase in the international flow of remittances all over the world. Remittances have recently become the second largest source of foreign exchange both as a percentage of GDP and in absolute terms globally (Giuliano and Ruiz-Arranz, 2005). Remittances, therefore, have become a relatively attractive source of foreign exchange earnings for developing countries.

Nevertheless, little attention has been paid to analyzing the macroeconomic impact of these financial transfers, especially on economic growth. There is also very little effort exerted in some of the developing countries with many migrants to collect as much foreign currency as possible through remittances as their effort through exports. Likewise, despite the gradual increase in the level of remittance inflows to Ethiopia, little attention was given to appreciate the impact of remittances on growth and hence poverty reduction. Thus, this particular section will contribute to the literature that links remittances to production and growth.

A Simple Accounting Framework for Remittance Flows

This section attempts to identify possible scenarios for the macroeconomic impact of remittance flows in a small open economy like Ethiopia. Hence, the main purpose of our effort is to clearly identify the channels by which remittance inflows can affect macroeconomic aggregates, and hence the macro economy. In the literature (Aggarwal, Demirgüç-Kunt, & Peria, 2006; Ratha, 2003; and Ratha & Mohapatra, 2007)), the macroeconomic

impact of remittances is largely through strengthening balance of payments position, building human capital, increasing domestic consumption, and contributing to financial sector development.

One of the most significant impacts of remittances is to increase the foreign exchange earnings of the labour exporting country thereby exerting a positive impact on the balance of payments. Remittances can also help in human capital formation in recipient countries. Studies such as that of Hanson and Woodruff (2003) have found some evidence. Likewise, remittances can support the economy by pushing consumption levels with substantial multiplier effects because they are more likely to be spent on domestically produced goods (Ratha, 2003). On the other hand, although, whether and how remittances might affect financial development is a priori unclear according to Aggarwal *et al.* (2006), the view that remittances can lead to financial development in developing countries is dominant. This notion is based on the concept that money transferred through financial institutions paves the way for recipients to demand and gain access to other financial products and services, which they might not have otherwise. Through those macroeconomic channels and through their direct effects on savings and investment (human and physical capital) and indirect effects through consumption, remittances are hoped to promote economic growth in home countries. To uncover the impacts, we follow the framework of Berg *et al.* (2006). They provided a full-fledged theoretical model on the macroeconomic impact of aid flows in an economy. However, in this paper, following the work of Hansen and Headey (2009), we rather adopt an accounting approach by using balance-of-payments and the national accounts system as an organizing framework. Unlike Berg *et al.* (2006), we have followed a simple macroeconomic framework to reveal the impacts of remittance inflow on macro variables (economy wide aggregates) in Ethiopia.

Remittance Flow from Private Individuals in the Ethiopian Balance of Payments

Transfers in Ethiopia are classified as official and private. Individual/private transfers are best termed as remittance. Hence, we can specify the following balance-of-payments identities for the Ethiopian economy by specifying it in a useful manner for our purpose:

$$CA_t = (X_t - M_t) + W_t - (i_t L_{t-1} + r_t D_{t-1}) + A_t^g \quad \ldots\ldots(3.1)$$

$$KA_t = \Delta L_t^o + (A_t^l - A_t^r) \quad \ldots\ldots(3.2)$$

The current account at a certain time (CA_t) is defined as the net export of goods and services (export, X, less import, M) plus net private transfers (W), mainly remittances and worker compensation less net interest payments to foreigners ($iL + rD$), with interest payments on market loans (iL) separated from interest payments on concessional aid loans (rD). The final term in the current accounts definition [1] is that of aid grants (A^g). In equation [2], the capital account (KA) is specified simply as the net change in non-aid foreign debt (L^o), which has both private and public elements, in addition to the foreign aid loan given within the year (A^l), less repayments of principal on the aid loans (amortizations).

Using the fact that the difference between the current account and the capital account equals the change in foreign reserves (ΔR), we have the following decomposition of the overall balance-of payments:

$$W = A_t^r - A_t^g - A_t^l + \Delta R_t + (M_t - X_t) + (i_t L_{t-1} + r_t D_{t-1}) - \Delta L_t^0 \quad \ldots\ldots$$

(3.3)

In the above identity, we have remittance (W) on the left hand side. The identity implies that from a purely accounting perspective, an increase in

the private remittance can influence the economy in five various ways. Remittances may: (i) increase foreign reserves; (ii) increase net imports of goods and services; (iii) finance interest payments on foreign debt (both aid and non-aid debt); (iv) finance a decrease in net aid inflows; and (v) decrease net external debt (or increase capital flight).

In countries with foreign exchange shortages such as Ethiopia, there must be some kind of optimal way of 'distributing' the remittance inflow across the balance of payments (BoPs) components shown above, as remittance increases are often observed under a variety of different circumstances (e.g. macroeconomic crises at home). The most common use of remittances is to fund for an increase in net imports. Therefore, we have defined the rate of absorption of an increase in remittance as the increase in net imports relative to the increase in remittance. Letting Δ denote change over time, absorption of remittance in a given period can be specified as:

$$Absorbtion = \frac{\Delta(M_t - X_t)}{\Delta W_t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

Equation [4] reveals that *absorption* can be seen as a measure of the direct, real resource transfer associated with an increase in the remittance inflow. Remittance inflow affects absorption through its impact on demand for private sector imports via aggregate demand.

Remittance Flow from Private Individuals in the Ethiopian National Accounts System

Remittances appear directly in the national accounts, specifically as part of disposable gross national income.

$$desp.GNI_t = Y_t + W_t - (i_t L_{t-1} + r_t D_{t-1}) + A_t^g$$

$$= (C_t + I_t + G_t) - (M_t - X_t) + W_t - (i_t L_{t-1} + rtD_{t-1}) + A_t^g \quad \ldots\ldots\ldots\ldots (3.5)$$

The notation given in equation [5] above follows the standard national income accounting representation: Y_t is GDP at time t, C_t is private consumption at time t, I_t is private sector investment (gross capital formation) at time t, G_t is government consumption at time t, and desp.GNI$_t$ is disposable national income. In the second line of the same equation, Y_t is treated as equal to $(C_t + I_t + G_t) - (M_t - X_t)$.

From the above identity, it is evidenced that subtracting net interest payments on foreign debt from GDP and then adding remittance and aid grants yields disposable GNI. Subtracting net interest payments on foreign debt from GDP and then adding remittance also yields GNI. Hence remittance has an impact on both GNI and disposable GNI. As can be seen from equation [5], an increase in private remittance/transfer has no direct impact on the main macroeconomic aggregates constituting GDP. However, in a very foreign exchange and resource scares country like Ethiopia, every additional hard currency can be viewed as 'a blessing from heaven' and will be used to finance net imports from abroad thereby affecting the components of GDP. Such type of characterizing remittance in Ethiopia can help in linking remittances with the macro economy, and hence see the change in total domestic demand (spending) due to change in remittance inflow:

$$Spending = \frac{\Delta(C_t + I_t + G_t)}{\Delta W_t} \quad \text{.....(3.6)}$$

From the above definition, the private sector may expand its consumption and investment due to private transfers coming into the economy.

Linking Absorption and Spending to Production

Once absorption and spending have been defined, the other exercise is attempting to see the change in GDP due to change in remittances. This can be represented by the following representation:

$$\text{Production} = \frac{\Delta Y_t}{\Delta W_t} = Spending - Absorbtion \ldots\ldots\ldots (3.7)$$

Based on this identity, we can discuss different short-run responses as combinations of the spending and absorption of increased inflows of remittances.

In an effort to trace the dynamic impact of remittance flows to highly aggregated macroeconomic variables such as absorption and spending, next, we will present a simple macro econometric model for private remittance flows using variables such as export and import.

A Simple Econometric Model of Remittance Inflow to Ethiopia

In this sub-section, our primary focus is on the macroeconomic impact of international remittances to Ethiopia. From the above preliminary discussion, we have learned the need for a dynamic way of modelling the macroeconomic impact of international remittance on a small open economy like Ethiopia. Accordingly, we have formulated and applied a simple dynamic econometric model that seeks to account for the country's net imports, GDP, and domestic demand following a sudden increase in international remittance. This method will help us link/infer the impact of remittance shocks on aggregate variables such as absorption, spending and output. For the purpose of modelling the dynamic relationship, we have chosen and used a vector autoregressive (VAR) model because it does not impose too much a priori structure. Our starting point for the econometric model is the national income accounts identity, measured in constant birr (local currency) units and given as:

$$Y_t = C_t + I_t + G_t - (M_t - X_t)$$
$$= D_t - NM_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.8)$$

In the second line of equation [8], GDP (Y_t) is specified as a domestic demand (D_t) less net imports (NM_t), the changes of which are directly linked to our definitions of absorption and spending.

Similarly, the remittance inflow is modelled as W_t. The national income accounts variables in equation (3.8) and the remittance variable W_t are used to specify a VAR model to investigate the dynamic macroeconomic impact of remittance in the Ethiopian economy. However, because equation (3.8) is an identity, the covariance matrix of disturbances is singular. As shown in Barten (1969) cited in Hansen and Headey (2009), the parameters of the model can be consistently estimated by omitting one of the variables from the system. In the present model, it does not matter which variable is omitted. We omit export from the model, meaning that the VAR is specified to include remittances, GDP, domestic demand, and import (a component of spending) [i.e., we consider a 4 x 1 vector $Z_t = \{W_t, Y_t, D_t, M_t\}'$]. The resulting estimable VAR model can be formulated as:

$$Z_t = \sum_{k=1}^{p} \Gamma_k Z_{t-k} + \eta_t \quad \text{.....(3.9)}$$

where k=1,....,p; and η_t is a zero mean innovation process with $E(\eta_t \eta_t') = \delta^2$ and $E(\eta_t \eta_s') = 0$ for $t \neq s$. All variables are deflated by CPI to take into account of the domestic price volatility.

Most macroeconomic variables tend to be non-stationary at level. If the variables included in Z happen to be non-stationary (as most of macroeconomic variables are) and if we suppose that they are stationary by differencing, then we can exploit the idea that there may exist co-movements of these variables and possibility that they will trend to move together towards a long-run equilibrium state (i.e. co-integrated). Hence, using the Granger representation theorem, we may posit the following testing relationships that constitute a vector error-correction (VEC) model

$$\Delta Z_t = c + \sum_{i=1}^{p-1} \Phi_i \Delta Z_{t-p} + \Pi Z_{t-p} + \mu_t$$

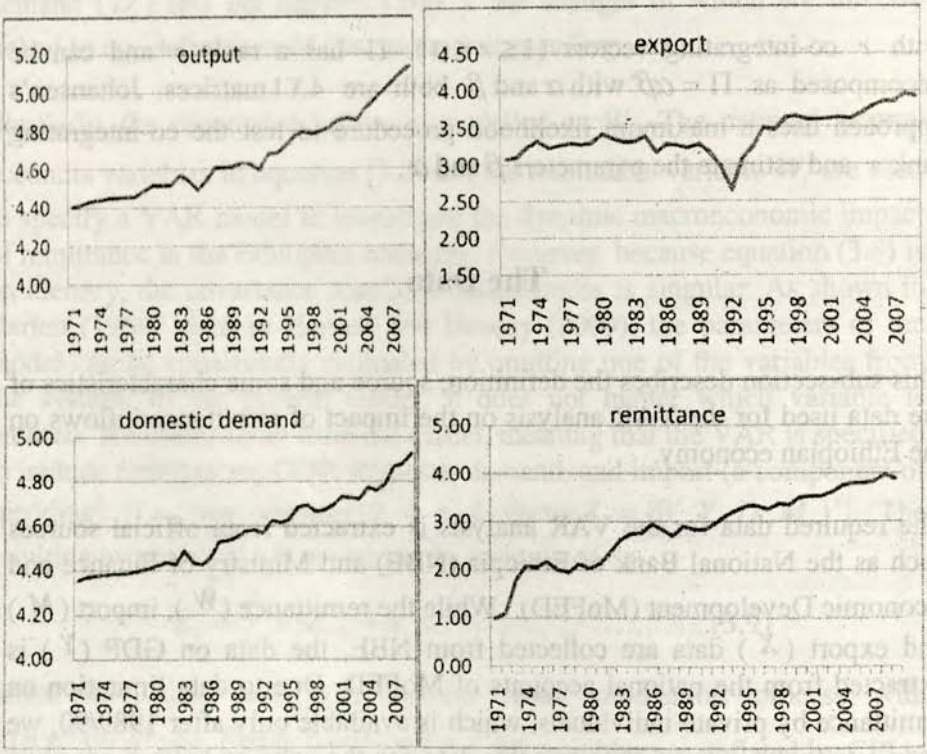
with r co-integrating vectors $(1 \le r \le 4)$, Π has a rank r and can be decomposed as $\Pi = \alpha\beta'$ with α and β both are $4X1$ matrices. Johansen's approach uses a maximum likelihood procedure to test the co-integrating rank r and estimate the parameters β and α.

The Data

This sub-section describes the definition, source and some characteristics of the data used for the VAR analysis on the impact of remittance inflows on the Ethiopian economy.

The required data for the VAR analysis is extracted from official sources such as the National Bank of Ethiopia (NBE) and Ministry of Finance and Economic Development (MoFED). While the remittance (W), import (M) and export (X) data are collected from NBE, the data on GDP (Y) is extracted from the national accounts of MoFED. Due to data limitation on remittance by private individuals, which is available only after 1989/90, we base our analysis on private transfer data for the sake of having adequate observations (since 1971). Domestic demand is derived from own computation using the identity. We have based our analysis on time series data on the above variables. The topology of the variables in log is given in Figure 3.

Figure 3. The topology of selected variables (real and in logs) (1971-2009)



Source: Figure based on NBE and MoFED data for the years 1971-2009

Variables are trending upward very steeply recently. We can also see that domestic absorption follows a closer trend to that of GDP. Export has been a very volatile series since the 1970s. On the other hand, remittances have been persistent in most of the periods despite new volatility in recent years.

Empirical Results

Univariate Characteristics

While the graphical presentation of the important variables in the preceding section provides the properties of Ethiopian time series data, it does not provide the complex dynamic pattern of the data. Hence, we have adopted a more rigorous method (VAR modelling) described above.

Before estimating the system that governs the relationship among our variables, we need to check for the order of integration of these variables. In analyzing the univariate characteristics of the variables, Augmented Dickey-Fuller (ADF) test was employed to decide the order of integration of the data series. The unit root test shows that our data series are not stationary in level, i.e. they are I (1) (See Annex 1, Panel (a)).Accordingly, we should test for the existence of co-integration. If the series are cointegrated, that means there is long run relationship between them.

In testing for the existence of cointegration, we have undertaken Akaike information criterion (AIC) and Schwartz criterion (SIC) for choosing the optimal lag length. The selection criterion decided (1 1) as the optimal lag length and the unrestricted VAR model is estimated using this optimal lag. See Panel (b) of the same annex.

The existence of cointegration is tested using the methodology developed by Johansen. Testing for trend stationarity, some of the included variables were found to be trend stationary. Hence, in checking for cointegration, we have assumed intercept and trend in the cointegraion equation. The test reveals the existence of one cointegrating vector. The cointegration test result is presented in Panel (c) of Annex 1.

Given our assumptions, we have found cointegrating relationship. We have verified the existence of cointegration among our non-stationary series and

can proceed to the VEC specification. An important application of interest to accomplish using the VEC approach is conducting the short-run impulse response analysis and variance decomposition to innovations. In the following section, we have analyzed the adjustment of important macroeconomic variables to remittance shocks using impulse response representation. The long-term relationship among the variables based on the unrestricted VAR is provided in Annex 2. The variables were estimated in logs.

Impulse Response Function

An impulse response function traces out the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. A shock to the i^{th} variable directly affects the i^{th} variable, and is also transmitted to all of the endogenous variables through the dynamic structure of the VEC.

Table 3 provides the response of all variables to a one standard deviation shock of remittance inflows. It shows how variables included in the model are responding to a one standard deviation (increment) in remittance flows at a certain point, given the dynamic relationship modeled. The impulse response function based on the VEC analysis reveals that remittance responds highly during the first year after its own shock. More specifically, the impact persists for the first year before it shows a quick decline during the succeeding two years. After reviving in the fifth period, it maintains its rate. The shock remained to have a positive impact all over the period considered. This implies that Ethiopia cannot assume a certain increment in remittance flow as smooth and permanent shock as it is fluctuating after the shock. On the other hand, domestic demand is not quickly reacting to a certain standard deviation in the remittance variable. However, through time, domestic demand reacted positively (but volatile) to the innovation in the remittance variable reaching its maximum in the third period (Annex 3).

Table 3. Effects of Cholesky (d.f. adjusted) on S.D. remittance innovation (real variables)

Period	Log remittance	Log domestic demand	Log GDP	Log import
1	0.243507	0.007351	0.013000	0.059218
2	0.266721	0.019420	0.028068	0.088395
3	0.243077	0.020769	0.031854	0.100770
4	0.235449	0.018473	0.029357	0.094428
5	0.241757	0.017320	0.027661	0.090016
6	0.246297	0.017621	0.027829	0.090218
7	0.246159	0.018035	0.028362	0.091568
8	0.244881	0.018088	0.028490	0.091941
9	0.244515	0.017991	0.028384	0.091693
10	0.244751	0.017944	0.028315	0.091508

Source: Authors' own construction based on NBE and MoFED data for the years 1971-2009

The impulse response of imports (the component of spending) to a one standard-deviation innovation to remittance shocks mirrors the response of domestic demand. Imports expanded in the second period after the shock and reached its maximum in the third period. The rate consistently declined up to the fifth period. The impact of a one standard-error shock maintained its level all through the period considered. Given the level of export, this implies that a surge in remittance flows increases the importing capacity (spending) of the foreign exchange scarce economy of Ethiopia. Like domestic demand and imports, GDP is volatile as a result of remittance shock in the first four years; taking an increasing rate up to the third year and then declining up to the fifth period. The response of output for any remittance innovation is owing to the impact on domestic demand and spending as a result of shocks in private remittance.

Variance Decomposition Results

Variance decomposition is another method of depicting the system dynamics. In contrast to impulse response function which depicts the effects of a shock to one endogenous variable on to the other variables in the VAR, variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR. It gives information about the relative importance of the random innovation to the variable in the VAR. More specifically, variance decomposition shows the proportion of shocks in the remittance innovation attributed to all endogenous variables included in the model.

The variance decomposition shows that a one-time shock in the remittance variable explains the larger part of movement in remittances. Remittance shocks explained about 88.6 percent of the variance in itself in just a year after the innovation (Table 4). The contribution on remittance of own shock declined only to 67 percent in five years time implying remittance shock persisted somehow during the period considered. On the other hand, remittance shocks explain close to 6.8 percent of the variation in the domestic demand in the tenth year from less than 0.1 percent just after the remittance shock. Surprisingly, the variance decomposition exposes that remittance shocks accounted for only 4.7 percent of the variation in imports (hence spending) over one-year horizon before it rose to around 22.8 percent at the end of the tenth year. The variance decomposition of a remittance shock to domestic demand and imports reveals an interesting observation. Remittance shocks affect imports more than domestic absorption implying the role of additional foreign exchange earned through remittances in increasing spending. Variation in output as a share of total variation as a result of remittance innovation increased from 6.6 percent in the second period to 8.6 percent in the third period.

Table 4. Variance decomposition (in %) of remittance shocks (variables are real)

Period	S.E.	Log remittance	Log domestic demand	Log GDP	Log import
1	0.243507	100.0000	0.000000	0.000000	0.000000
2	0.383690	88.60063	0.122999	6.660249	4.616120
3	0.495150	77.30137	1.303668	8.572304	12.82266
4	0.591597	69.99067	3.635418	8.358807	18.01510
5	0.673323	66.92302	5.097915	7.943828	20.03524
6	0.745003	65.59417	5.742464	7.769215	20.89415
7	0.810324	64.67329	6.082282	7.725747	21.51868
8	0.871031	63.87657	6.355942	7.698621	22.06887
9	0.927871	63.23473	6.594130	7.662477	22.50867
10	0.981388	62.74583	6.784964	7.628591	22.84062

Source: Authors' own construction based on NBE and MoFED data for the years 1971-2009

Livelihood Consequences of Migration on the Welfare of Households

As discussed in the preceding sections, migration has emerged as an important policy issue in developing countries, with supporters advocating the many opportunities it offers to the development of both the migrant sending and receiving economies. The transmission channels through which migration and remittances can have an impact on various living standards and human capital outcomes are numerous. The most obvious is the income channel, namely, that remittances directly contribute to the total income of a household.

Remittances lead to increased consumption and investment, implying a positive effect on poverty reduction and human capital (Sasin and McKenzie, 2007). Previous empirical findings show that international remittances have an important source of improvement in the welfare of households in Nepal (e.g. Subedi, 2009) and in Ghana (e.g. Quartey, 2006). Subedi (2009) showed that remittance income is an important source of

household income in Nepal. It accounts for about 11 percent of all households' income and more than two-thirds of the remittance recipient households' income. Moreover, Quartey (2006) found that migrant remittances improve household welfare and the flow of such remittances increases in times of economic shocks in Ghana, hence they are counter-cyclical. Thus, remittances help to minimize economic shocks that reduce household welfare, particularly for food crop farmers. A study by Gupta *et al* (2007) confirmed that a 10 percent rise in the remittances-to-GDP ratio is associated with a fall of a little more than 1 percent in the percentage of people living on less than USD 1 a day.

Remittances directly augment the income of recipient households by providing financial resources for poor households. They affect poverty and welfare through indirect multiplier effects. Remittances are associated with increased household investments in education, entrepreneurship and health—all of which have a high social return in most circumstances. The objective of this section is to find out if remittances from Ethiopian migrants abroad can improve the welfare status of Ethiopian households. In this study, poverty profile and binary outcome models were used.

Methods

Whether remittances improve the welfare of households can be achieved by constructing a poverty profile using consumption as a welfare indicator (See for e.g. Couduel *et al.*, 2002; Ravallion, 1994; Tassew *et al.*, 2008; Bigsten *et al.*, 2005). This way of analysis allows us to make poverty comparison and provides us with information on the welfare status of households receiving international remittances and those that do not get such remittances.

The choice of consumption as a welfare indicator is that it gives a better indicator of living standards. Consumption is believed to vary more smoothly than income both within a given year and across the life cycle (Duclos and Araar, 2006; Couduel *et al.*, 2002). Moreover, income is more

erratic than consumption. Consumption is not equal to consumption expenditures because the value of consumption equals the sum of expenditures on goods and services purchased and consumed in a given period plus the value of goods and services consumed but not purchased such as gifts and those produced by the household itself plus the consumption of durable goods and services owned (Thorbecke, 2005; Douclos and Araar, 2006).

The poverty line estimated by the government of Ethiopia was taken as given in this study. This estimate was based on the cost of 2,200 kcal per day per adult food consumption with an allowance for essential non-food items. The levels of real total per adult household consumption expenditure was estimated to be ETB 1075.0 per annum per adult equivalent at 1995/96 national average constant prices.

A group of poverty indices called the Foster-Greer-Thorbecke (FGT) class were used to construct poverty profile. Given the variable of interest $\mathbf{y_i}$ (i.e. consumption) ordered in an ascending order where z is an exogenously given poverty line below which an individual is classified as poor, we can have the following ratio,

$$P_{\alpha} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^{\alpha} \qquad (4.1)$$

where q is the number of poor people below the poverty line, n is the total number of people in the population, z is the poverty line and y is consumption level. Alpha (α) is an ethical parameter which is considered to be greater than or equal to zero. For $\alpha = 0$, it is the head count ratio, for $\alpha = 1$, it is the poverty gap and for $\alpha = 2$, it is the squared poverty gap.

Another important analytical tool for determining the impact of remittances on welfare is binary outcome model. Given the following functional relation,

$$Y_i=F(rem_i, X_i, \varepsilon_i).....(4.2)$$

where y_i represents consumption, rem_i is a remittance, χ_i other explanatory variables and ε_i is the error term, an increasingly common approach is to construct a regression model of welfare measure against a variety of household and community characteristics (See for e.g. Ravallion, 1996; Couduel *et al.*, 2002; Bigsten *et al.*, 2002; Bigsten *et al.*, 2005). The general binary outcome models can be written as the conditional probability to be poor, i.e. $p(w_i = 1/x_i)$, as

$$p(w_i = 1/rem, x_i) = E(w_i/rem, x_i) = F(rem, \chi_i, \beta).$$

If we define the logistic function $\Lambda(z)=\frac{\exp(z)}{1+\exp(z)}$, we can get the following logit model,

$$F(rem_i, \chi_i, \beta) = \Lambda((rem_i, \chi_i)'\beta).....(4.3)$$

A maximum likelihood estimation (MLE) is applied to estimate the model.

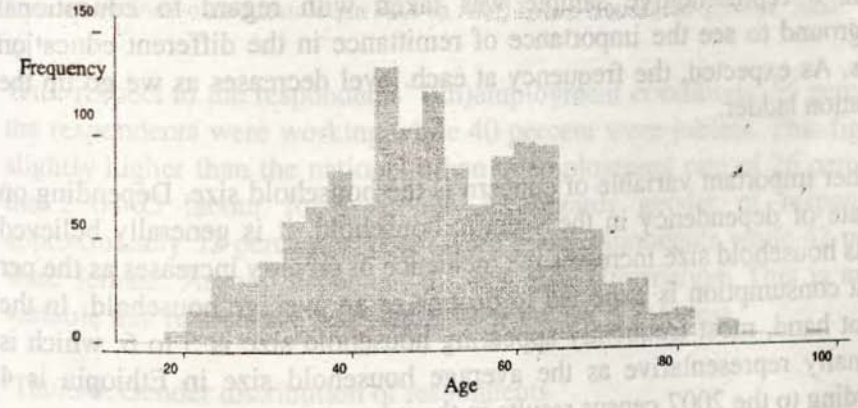
The data used in this study came from a household survey undertaken by the department of economics of Addis Ababa University. The sample size stands at 1500 urban households in seven major towns. The survey data included data on the demographic characteristics of households, their educational and health status, ownership of assets, employment and income, credit availability, consumption, remittance, expenditure and a host of other household variables.

Discussion of Results

Descriptive Analysis

Some of the variables included in the study are described in this sub-section. The age distribution of the households covered in the study has a normal distribution. Approximately 85 percent of the respondents were within the age range of 15-65. The age distribution of 1490 respondents is presented in the following histogram. The most frequently appearing age group is 45 to 47 with a frequency of 140 respondents. Since the issue of remittance involves different age ranges, it is important to have respondents with a normally distributed age profile.

Figure 4. Age distribution of respondents



Source: Authors' own construction base on AAU Urban Household Surveys, 2004

Regarding the educational status of respondents, close to 55 percent of the respondents are literate which means they can at least read and write while 27 percent are illiterate.

Table 5. Educational attainment of respondents

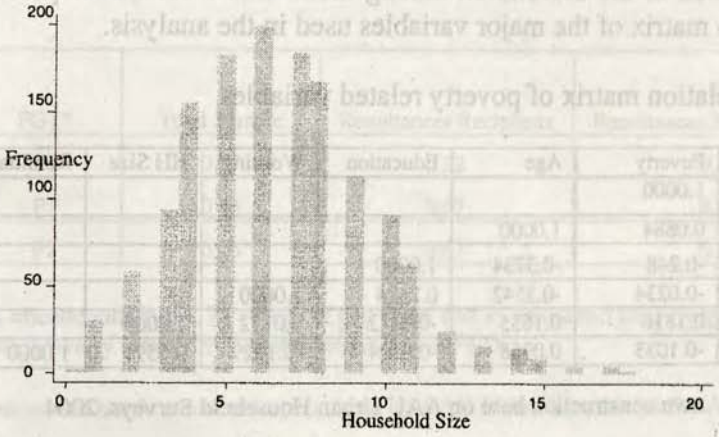
Education Accomplishment	Freq.	Percent
Illiterate	404	27.11
Literate	91	6.11
Primary	338	22.68
Secondary	252	16.91
Tertiary	19	1.28
Technical and Vocational	118	7.92
Total	1,490	100.00

Source: Authors' own construction base on AAU Urban Household Surveys, 2004

Again, a representative sample was taken with regard to educational background to see the importance of remittance in the different education levels. As expected, the frequency at each level decreases as we go up the education ladder.

Another important variable of concern is the household size. Depending on the rate of dependency in the specific household, it is generally believed that as household size increases the incidence of poverty increases as the per capita consumption is expected to decline in an average household. In the data at hand, most frequently appearing household size is 5 to 6, which is nationally representative as the average household size in Ethiopia is 4 according to the 2007 census results in the urban areas.

Figure 5. Household size distribution of respondent households



Source: Authors' own construction base on AAU Urban Household Surveys, 2004

With respect to the respondents' (un)employment conditions, 55 percent of the respondents were working while 40 percent were jobless. This figure is slightly higher than the national urban unemployment rate of 26 percent in the 2004/05 labour force survey. As regards gender of respondents, approximately 52 percent of them were male respondents while 42 percent were female. Around 6 percent did not give information. This is another variable that reflects the real gender distribution in Ethiopia.

Table 6. Gender distribution of respondents

	Freq.	Percent	Cum.
Female	624	41.88	41.88
Male	782	52.48	94.36
Missing	84	5.64	100
Total	1,490	100	

Source: Authors' own construction base on AAU Urban Household Surveys, 2004

Apart from individually looking at the household characteristics, it is also important to look at the correlation among them. The table below presents the correlation matrix of the major variables used in the analysis.

Table 7. Correlation matrix of poverty related variables

	Poverty	Age	Education	Working	HH Size	Remittance
Poverty	1.0000					
Age	0.0884	1.0000				
Education	-0.248	-0.3734	1.0000			
Working	-0.0234	-0.3542	0.2424	1.0000		
Household Size	0.1816	0.1635	-0.0012	0.0172	1.0000	
Remittance	-0.1033	0.0968	-0.0124	-0.1029	0.0591	1.0000

Source: Authors' own construction base on AAU Urban Household Surveys, 2004

Poverty seems to co-relate better with education and household size negatively and positively, respectively, as expected. The focus of this study, remittance, has a negative correlation with poverty as expected although with a weak coefficient.

Regression Results

One way of observing the effects of remittances on poverty is to compare the incidence of poverty of those who get these remittances and those who do not. We need to construct a poverty index on each group. To construct poverty profile using our data, we made use of the Foster-Greer-Thorbeke (FGT) measure of the incidence, depth and severity of poverty. The FGT index was calculated on 1373 household observations after making adjustments. Out of these, only 162 got remittances from abroad and the rest did not. The analysis was done by calculating the FGT index on those who get remittances and those who do not. The following table summarizes the results obtained from the calculations. The head count index of the total sample was 0.37 (i.e. 37 percent of the sample households were below poverty line. This figure is a little bit greater than the estimate made by MoFED, i.e. 0.35 percent, for urban households with samples greater than that used for this study. However, the difference failed to be statistically significant.

Table 8 Head count, poverty gap and squared poverty gap of poverty of the sample households

FGT*	Total Sample	Remittances Recipients	Remittances Non-recipients
P0	0.37	0.22	0.39
P1	0.13	0.07	0.14
P2	0.06	0.03	0.07

*P_1 =headcount index, P_2 =Poverty gap index and P_3 =Squared poverty gap.
Note: Poverty line=Birr1075 (estimated by MoFED).

Source: Authors' own construction base on AAU Urban Household Surveys, 2004

With respect to the headcount index for those households who received remittances, only 22 percent of them were below poverty line, much below the index for the total sample. On the other hand, the index for households who did not receive remittances (i.e. 39 percent) was the highest of the three groups of households. This index was much higher than the index for households who received remittances (22 percent) showing a big difference in the incidence of poverty between the two groups. We can say that the proportion of people in poverty is close to half for those who get remittances from abroad compared to those who do not get these remittances. This difference was found to be statistically significant. This result suggests that these remittances do really contribute in reducing poverty and improving the welfare of households in the sample.

The above analysis is a univariate one and does not hold the ceteris paribus assumption. We focused on the effects of remittances on the probability of being poor in a typical urban household in Ethiopia. We hypothesized that the probability of being poor is inversely related with the fact that the household receives remittances. Other covariates included in our model were the age of the head of the household, household size, education accomplishments of the head of the household such as reading and writing

(literacy), completion of primary school, completion of secondary school, graduating in technical and vocational and university graduate. The gender of the head of the household and the interaction term between gender and remittance were used to capture the gender disparity on effective utilization of remittance to reduce poverty. Dummy for employment (whether the household members were working or unemployed) were also included in the model. Since we were interested in the effect of international remittances on household poverty, we treated the effect of international and domestic remittance separately.

Based on the household survey, we estimated the logistic equation and obtained the marginal effects. The regression statistics showed that the model generally fits the data well. We rejected the null hypothesis that all variables jointly have no significant impact on poverty probabilities using Wald Test at alpha =0.01%. The specification test showed that there was not significant information to reject the model implying that the model was correctly specified. The marginal effects of regression result showed that all the predictors had the correct signs and almost all were significantly different from zero at conventional levels of significance.

As can be seen in Annex 4, the marginal effect of remittance was negative and significant at 1% level. It indicates that international remittance has a significant effect on the probability of a household's being non-poor suggesting that the probability of a household being poor decreases by 25 percent when a household receives remittances. Furthermore, it was also noted that the marginal effect of receiving an international remittance is relatively the second largest factor following higher education attainments (secondary and technical & vocational and university) on poverty incidence in Ethiopian urban households.

On the other hand, the marginal effect of remittances from domestic sources shows it has no significant impact on the probability of a household being poor. This is presumably due to the fact that a significant proportion of the urban dwellers are themselves poor and hence they send a small amount of

remittances to other urban areas. The marginal effects of gender were negative but statistically insignificant suggesting that differences in gender do not have any effect on the poverty status of households in the sample. To find out whether the association between poverty and remittance is gender dependent, we used the gender and remittance interaction term (i.e. remittance & gender). The marginal effect of remittance & gender was significant at 5% suggesting the gender of recipient of the international remittance has significant impact on poverty incidence among Ethiopian urban households, all other things being equal. The sign of this variable suggests that if the receiver is a male headed household, the probability of being poor increases by 0.265 compared to that of female-headed households.

The marginal effect of education suggests that if the head of the household attend primary, secondary, and vocational and university schools, the probability of being poor will drop significantly at common levels of significance. On the other hand, the marginal effect of literacy had the expected sign but was slightly significant only at 10%. Overall, the probability of a household being poor decreased with education at all levels. The marginal effect of age of the household had the expected sign but was not significant. The marginal effect of workers, household size was positive and significant at 1 percent. These effects suggest that the probability that the household falls into poverty increases with the size of the household and the number of workers in the household.

Conclusions and Policy Implications

Migration with its concomitant remittance has diverse socio-economic impacts: increasing better opportunities for the migrant, improving the livelihood of sending households and contributing to economic growth and posing an important policy issue in developing countries. Ethiopia, being one of the highest African diaspora populations, is challenged by different migration patterns and dynamics, which have significant political and socio-economic ramifications for the country and undoubtedly affect the government's sustainable development and poverty reduction programs. Ethiopia, as in any other resource poor developing countries, is constrained by foreign exchange availability to finance the increasing demand for imports associated with domestic investment requirements. Remittances constitute a larger part of foreign exchange earnings sometimes larger than foreign direct investments and export revenues. Another transmission channel is through increasing income where an inflow of remittances impacts various living standards and human capital outcomes.

The objective of this study was to find out the macroeconomic impact of inflows of international migrant remittances and the livelihood consequences of these remittances on the welfare of households and on poverty reduction. A simple vector error correction model was adopted to describe the macroeconomic impact of remittance shock on the Ethiopian economy. Furthermore, a poverty profile and binary outcome model were used to see the consequences of remittances on the welfare of households.

Using vector error correction model, the present study produced some important surprising results. It has helped us know that while remittance shocks positively affect macroeconomic variables, the effect remained to be volatile in the very first periods after the shock. However, the impacts tend to sustain in the years after the fifth period. We also analytically saw that through the positive (but inelastic) relationship between growth and poverty, private remittance inflows have important implications for poverty in Ethiopia.

The microeconomic approach has also revealed similar evidence. It was found that, using poverty profile and binary outcome models, international remittances significantly reduced the poverty incidence among the urban households in Ethiopia. We found that women are more likely to use remittance more effectively than their male counterparts. Thus, the policy implication of these findings is that policy makers in Ethiopia should encourage diaspora citizens to increase remittance inflow via different incentive packages. The gender difference on the effectiveness of international remittance also implies that Ethiopians in the diaspora sending remittance to their households should channel more of the remittance via female members of their households if their objective is to reduce poverty in their households. Further, the banking system in Ethiopia needs to minimize the transaction costs to channel the remittance via the legal channel to reduce urban poverty.

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Annexes

Annex 1. Univariate Characteristics of Variables and Co-integration Test

Panel (a): Unit root test (1971-2009)

Series	Level	1st Difference	Critical Value		Order
			1 %	5%	
LRW	-1.3056	-6.9118	-3.6210	-2.9434	I(1)
LRY	1.9631	-5.0211	-3.6210	-2.9434	I(1)
LRD	1.3105	-5.8646	-3.6210	-2.9434	I(1)
LRX	-0.9855	-4.1518	-3.6210	-2.9434	I(1)
LRM	0.7108	-4.4767	-3.6210	-2.9434	I(1)

*The ADF tests were carried out with intercept; variables are real and in their logs.

Panel (b): Choice of optimal lag

Lag length	Akaike	Schwartz
(1 1)	-7.71	-6.85
(1 2)	-7.69	-6.12
(1 3)	-7.33	-5.04

Panel (c): Unrestricted Co-integration Rank Test (Trace)
Sample (adjusted): 1973 2009
Included observations: 37 after adjustments
Series: LRW LRD LRY LRM
Lags interval (in first differences): 1 to 1
Unrestricted Co-integration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.544223	66.96163	63.87610	0.0269
At most 1	0.486670	37.88885	42.91525	0.1454
At most 2	0.225047	13.21593	25.87211	0.7212
At most 3	0.097182	3.782656	12.51798	0.7733

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors' own calculation based on NBE and MoFED data for the years 1971-2009Authors' own construction

Annex 2. Vector Auto regression Estimates (Long-run relationship)

Vector Auto regression Estimates
Sample (adjusted): 1972 2009
Included observations: 38 after adjustments
Standard errors in ( ) & t-statistics in [ ]

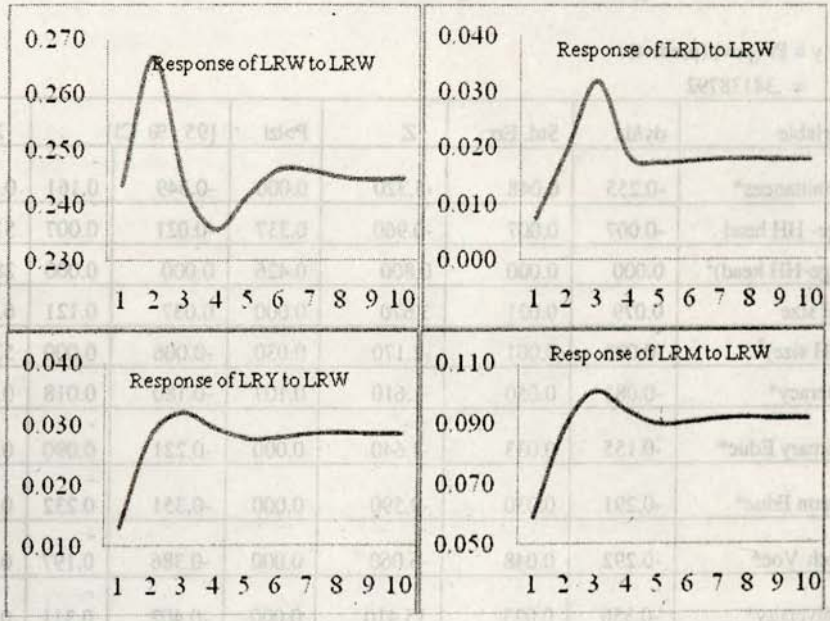
	LRW	LRD	LRY	LRM
LRW(-1)	0.500138	0.014596	0.009763	0.025894
	(0.05576)	(0.01291)	(0.01260)	(0.03943)
	[8.96897]	[1.13073]	[0.77470]	[0.65668]
LRD(-1)	4.865985	0.484273	-0.307719	-0.883188
	(1.55814)	(0.36070)	(0.35213)	(1.10181)
	[3.12294]	[1.34258]	[-0.87387]	[-0.80158]
LRY(-1)	-4.093437	0.492160	1.393743	1.674266

	(1.83683)	(0.42522)	(0.41511)	(1.29887)
	[-2.22853]	[1.15743]	[3.35750]	[1.28901]
LRM(-1)	0.869810	-0.054676	-0.071927	0.489450
	(0.39363)	(0.09112)	(0.08896)	(0.27835)
	[2.20972]	[-0.60002]	[-0.80855]	[1.75842]
C	-11.27437	0.551268	-0.387843	-4.346732
	(3.29613)	(0.76304)	(0.74491)	(2.33078)
	[-3.42049]	[0.72246]	[-0.52066]	[-1.86492]
R-squared	0.974022	0.974097	0.984213	0.960790
Adj. R-squared	0.970873	0.970958	0.982300	0.956037
Sum sq. resids	2.521710	0.135138	0.128792	1.260928
S.E. equation	0.276433	0.063993	0.062472	0.195474
F-statistic	309.3286	310.2496	514.3423	202.1547
Log likelihood	-2.379331	53.22213	54.13602	10.78936
Akaike AIC	0.388386	-2.538007	-2.586106	-0.304703
Schwarz SC	0.603858	-2.322535	-2.370635	-0.089231
Mean dependent	6.678315	10.54086	10.77488	8.745371
S.D. dependent	1.619740	0.375505	0.469568	0.932277

Determinant resid covariance (dof adj.)	3.23E-09
Determinant resid covariance	1.84E-09
Log likelihood	166.4996
Akaike information criterion	-7.710503
Schwarz criterion	-6.848616

Source: Authors' own construction based on NBE and MoFED data for the years 1971-2009Authors' own construction

Annex 3. Impulse Response Function



Source: Authors' own construction based on NBE and MoFED data for the years 1971-2009

Annex 4. The marginal effects logistic regression

y = Pr (pov) (predict)
= .34138792

Variable	dy/dx	Std. Err	Z	P>|z|	[95 % CI]		X
Remittances*	-0.255	0.048	-5.320	0.000	-0.349	-0.161	0.120
Age- HH head	-0.007	0.007	-0.960	0.337	-0.021	0.007	51.421
(Age-HH head)^2	0.000	0.000	0.800	0.426	0.000	0.000	2827.470
HH size	0.079	0.021	3.670	0.000	0.037	0.121	6.728
(HH size)^2	-0.003	0.001	-2.170	0.030	-0.006	0.000	53.941
Literacy*	-0.081	0.050	-1.610	0.107	-0.180	0.018	0.074
Primary Educ*	-0.155	0.033	-4.640	0.000	-0.221	-0.090	0.273
Secon Educ*	-0.291	0.030	-9.590	0.000	-0.351	-0.232	0.205
Tech-Voc*	-0.292	0.048	-6.060	0.000	-0.386	-0.197	0.016
University*	-0.356	0.023	15.410	0.000	-0.402	-0.311	0.099
Male*	-0.026	0.036	-0.730	0.465	-0.096	0.044	0.575
Working*	0.025	0.034	0.730	0.468	-0.042	0.091	0.576
Rem-Gender*	0.265	0.119	2.230	0.026	0.032	0.499	0.067
Remittance(Dom)	0.000	0.000	-0.570	0.567	0.000	0.000	140.152

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Source: Authors' own construction based on AAU Urban Household Survey, 2004

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