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The Dynamics of Poverty and Vulnerability in Rural Ethiopia

*Degye Goshu*¹

Abstract

This paper uses the Ethiopian Rural Household Survey (ERHS) panel data of a pool of 2495 households sampled from sedentary farming systems of the country. It investigates the dynamics and determinants of poverty and vulnerability and generates new empirical information on the national dynamics, determinants, and regional distribution of rural poverty and vulnerability. The poverty indices show that depth and severity of poverty were reduced, respectively, from 88.9% and 3.6% in 2004 to 39.2% and 0.7% in 2009, but with increasing poverty incidence. The estimation results from the random effects probit model suggest that determinants of poverty status in rural Ethiopia between 2004 and 2009 were household size, livestock holding, farming occupation, life status, social network, regional dummies, and other exogenous shocks. The marginal effects of these factors on poverty status point out that there were considerable differences in poverty situation among regional states, suggesting that poverty reduction was relatively more enhanced in Oromia followed by Amhara and SNNP regions. The likelihood of households to be poor was about 45.4%. Assuming a threshold of 50%, vulnerability of households in rural Ethiopia was about 43.4%, suggesting that households' vulnerable to poverty as recued between 2004 and 2009. While many households were escaping from poverty, others were descending into the poverty trap, indicating reduction of relative poverty among the poor and the nonpoor. In order to reduce overall poverty in rural Ethiopia, integrated poverty reduction efforts should be enhanced and spatial differences in welfare effects need to be accounted for.

Key words: Poverty, vulnerability, panel probit, Ethiopia.

¹ School of Agricultural Economics and Agribusiness,
Email: degyeabgos@yhao.com,

1. Introduction

Ethiopia has been implementing different poverty reduction and food security policies, strategies and programs in the last two decades (FDRE, 2004; MoFED, 2006). The empirical literature on the effectiveness of these initiatives is, however, suffocated by a number of diverging arguments. The first view is that there are positive developments of poverty reduction in Ethiopia (MEDAC, 1999; Dercon, 2004; Naschold, 2005). A large majority of scholars argue that these positive developments are the effects of methodological and sampling problems arising from less representative data, resulting in incorrect implications. The divergences are created for the fact that the appropriate methods and the data requirements for poverty measurements are not met by most developing countries (Devereux and Sharp, 2003; Kitaw and Woldemichael, 2008; Krishna, 2007).

In 1999, 50% of the Ethiopian population were living below the food poverty line and could not meet their daily minimum nutritional requirement of 2200 calories (MEDAC, 1999). However, there is evidence on substantial consumption growth in 1989–1997 with diverse experiences across villages and individuals (Dercon, 2004). Other pieces of evidence fully supporting this scenario verify that households in rural Ethiopia do not face asset poverty traps, but instead would be expected to gravitate towards longrun equilibrium (Naschold, 2005).

There are arguments against the belief that poverty in rural Ethiopia has fallen since the early 1990s mainly due to problems related to methodological limitations, the measures of welfare used, and counter arguments attributed to other qualitative studies (Devereux and Sharp, 2003). It is also reported that households in rural Ethiopia move frequently in and out of poverty but the difficulty of exiting poverty increases with the time spent under the poverty trap (Bigsten and Shimeles, 2007)]. This nature of poverty in Ethiopia is supported by other pieces of evidence verifying that poverty is inherently dynamic whereby large numbers of people were

escaping from poverty at any given time, while equally large numbers were also falling into poverty simultaneously (Krishna, 2007; Awel, 2007). In relative terms, while the number of households in persistent poverty was relatively low, a very high majority in rural areas were poor at least once during the period (Kitaw and Woldemichael, 2008). However, the assertion that shocks have different and more durable effects on the less well-off households is partially disproved since drought shocks were less significant in determining the dynamics of poverty status in the last decade (Carter et al., 2007). There was also high risk aversion with implications for long-term poverty and links between risk aversion and poverty traps in the highlands of Ethiopia (Yesuf and Bluffstone, 2009).

To address these diverging arguments, it is important to define the concepts of both poverty and vulnerability addressed in this study. Poverty can be defined as the human condition characterized by the sustained deprivation of resources, capabilities, choices, power, and security necessary for an adequate standard of living, and other rights. Extreme poverty refers to people who live on or less than US \$1 a day, whereas poverty is living on or less than \$2 a day (WB, 2001). Absolute poverty refers to subsistence below minimum, socially acceptable living conditions. Poverty analysis can be approached from objective or subjective perspectives. The objective perspective involves normative judgments as to what constitutes poverty and what is required to move people out of their impoverished state. The subjective approach places a premium on peoples' preferences, on how much they value goods and services. This paper uses the objective approach for its relative advantage of objectivity (Philip and Rayhna, 2004). Similarly, vulnerability can be defined as the human conditions determined by physical, social, economic, and environmental factors and processes, which increase the susceptibility or the likelihood of a community to the impact of hazards (UN/ISDR, 2004; UNDP, 2004). What distinguishes poverty and vulnerability is the presence of risk or uncertainty about the future well-being of households (Chaudhuri, 2003).

As evidenced, all the above arguments on the analysis of poverty dynamics and vulnerability in rural Ethiopia are generally associated with methodological approach and data coverage. Although several measurements and techniques of analyzing dynamics of poverty and vulnerability have recently been proposed, empirical studies are still rare in Ethiopia. This departure of views would be converged if more relevant estimation techniques and representative data coverage are used. Thus, this paper was designed to estimate the dynamics of poverty and vulnerability and to identify their determinants and correlates by employing panel data estimators.

2. Methodology

2.1 Dataset and variables

The paper uses the Ethiopian Rural Household Survey (ERHS) panel data, which is a multi-topic national representative survey on rural households conducted for seven rounds from 1989 to 2009. It covers the four major regional states (Amhara, Oromia, Tigray, and Southern Nations, Nationalities and Peoples regional state or SNNP)) and more than 1346 households (Dercon and Hoddinott, 2009). In this paper, poverty status was determined by the level of households' real consumption per capita in 1994 prices in reference to the poverty line of Ethiopian Birr (ETB) 50. Households with real consumption per capita below ETB 50 were considered poor and those above this threshold as nonpoor. To examine the predictors of poverty and vulnerability, standard univariate panel probit model was employed.

The hypothesized determinants of poverty and correlates of vulnerability include age, educational level, household size, marital status, livestock holding, and primary occupation of farming, occurrence of drought shocks, different levels of living status, regional dummies, and social network. Welfare effects of time, household characteristics, and other variables were captured by testing all the variables for the presence of significant mean

difference between survey years and poverty status (Table 1). The mean/proportion-comparison test results show that mean real per capita consumption of households was reduced over time, possibly verifying the negative impact of production, market and other economic shocks between 2004 and 2009. Except for household size and the three ladders of life status, the mean values/proportions of all other variables were significantly different between 2004 and 2009. Again, with the exception of age and farming occupation, the mean values of all other variables were considerably different between the poor and the nonpoor.

Table 1: Definition of variables and mean/proportion comparison tests by survey year and poverty status

Variable definition	Measurement level	Survey year			Poverty status		
		2004	2009	t-(z) value	Non-poor	Poor	t-(z) value
Age of the household head	Continuous (years)	50.54	52.63	-3.444***	51.91	51.38	0.877
Education level of the household head	Continuous (years of schooling)	3.82	5.29	-5.329***	5.18	3.97	4.394***
Household size	Continuous	5.72	5.70	0.239	5.27	6.23	-9.520***
Livestock holding (TLU)	Continuous	2.89	4.89	-10.770***	4.68	3.14	8.233***
Real per capita consumption	Continuous, ETB	87.43	59.15	10.372***	107.32	30.60	33.002***
Marital status	Dummy (1 if married, 0 otherwise)	0.69	0.66	2.042**	0.65	0.70	-2.658***
Farming occupation	Dummy (1 if primary, 0 otherwise)	0.74	0.71	1.349*	0.72	0.72	0.219
Drought	Dummy (1 if drought occurred, 0 otherwise)	0.59	0.40	9.350***	0.42	0.57	-7.7256***
Worse-off living status	Dummy (1 if worse-off, 0 otherwise)	0.31	0.32	-0.546	0.25	0.39	-7.738***
Middle-level living status	Dummy (1 if middle-level, 0 otherwise)	0.63	0.61	0.708	0.66	0.57	4.490***
Better-off living status	Dummy (1 if better-off, 0 otherwise)	0.06	0.06	-0.406	0.09	0.03	6.135***
Tigray	Dummy (1 if Tigray, 0 otherwise)	0.09	0.11	-1.628**	0.05	0.16	-9.275***
Oromia	Dummy (1 if Oromia, 0 otherwise)	0.22	0.27	-3.245***	0.30	0.18	6.938***
Amhara	Dummy (1 if Amhara, 0 otherwise)	0.35	0.31	2.107**	0.42	0.21	11.062***
SNNP	Dummy (1 if SNNP, 0 otherwise)	0.34	0.31	1.931**	0.23	0.44	-11.492***
Social network	Dummy (1 if Socially networked, 0 otherwise)	0.57	0.73	-7.974***	0.72	0.59	6.803***

Notes: ***, ** and * is significant at 1%, 5%, and 10% level, respectively.

2.2 Estimation methods

A popular model for binary outcomes with panel data, poor or nonpoor in this case, is the unobserved effects probit model. The specification of unobserved effects (or panel) probit model is (Maddala, 1987; Bertschek and Lechner, 1998; Wooldridge, 2002; Greene, 2012)

$$\Pr(y_{it} = 1 | \mathbf{x}_{it}, \gamma_i) = \Phi(\mathbf{x}'_{it} \boldsymbol{\beta} + \gamma_i), \quad t = 1, \dots, T \quad (1)$$

$$y_{it} = \begin{cases} 1 & \text{if } \text{poor}, y_{it} > 0 \\ 0 & \text{otherwise}, y_{it} \leq 0 \end{cases} \quad (2)$$

where \Pr is the probability of a household to be poor, y_{it} is poverty status of household i in year t , \mathbf{x}_i is a vector of explanatory variables (\mathbf{x}_i contains \mathbf{x}_{it} for all t), Φ is the standard normal (probit) distribution function, $\boldsymbol{\beta}$ is a vector of parameters, and γ_i is the unobserved effect.

The expected consumption dynamics was predicted by a linear panel data estimator (RE model) and household's expected poverty status was determined from this estimate. Accordingly, vulnerability as expected poverty (V) and its correlates were identified as (Dutta et al., 2010; Pritchett et al., 2000; Philip and Rayhna, 2004)

$$V_{it} = \Pr(c_{i,t+1} = c(\mathbf{x}_t, \gamma_i, v_{it}) \leq z | \mathbf{x}_i, \gamma_i, v_{it}) \quad (3)$$

where $c_{i,t+1}$ is the household's real consumption per capita at time $t + 1$, z is the poverty line, γ_i and v_{it} , respectively, are unobservable time-invariant household-level effects and idiosyncratic factors that contribute to differential welfare outcomes, and other notations as explained before.

A household is then considered as vulnerable to poverty if its expected vulnerability is larger than a probability threshold level assumed, p :

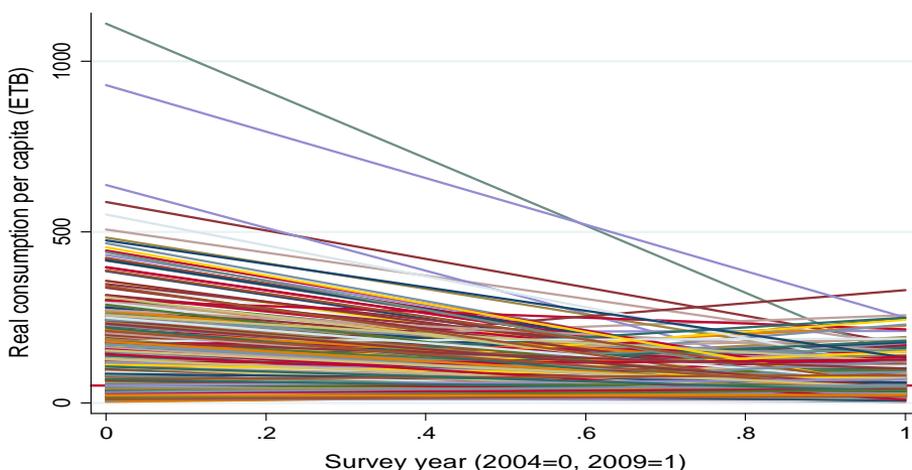
$$V_i = \begin{cases} 1 & \text{if } V_i > p \\ 0 & \text{if } V_i \leq 0. \end{cases} \quad (4)$$

3. Results and Discussion

3.1 Consumption Patterns

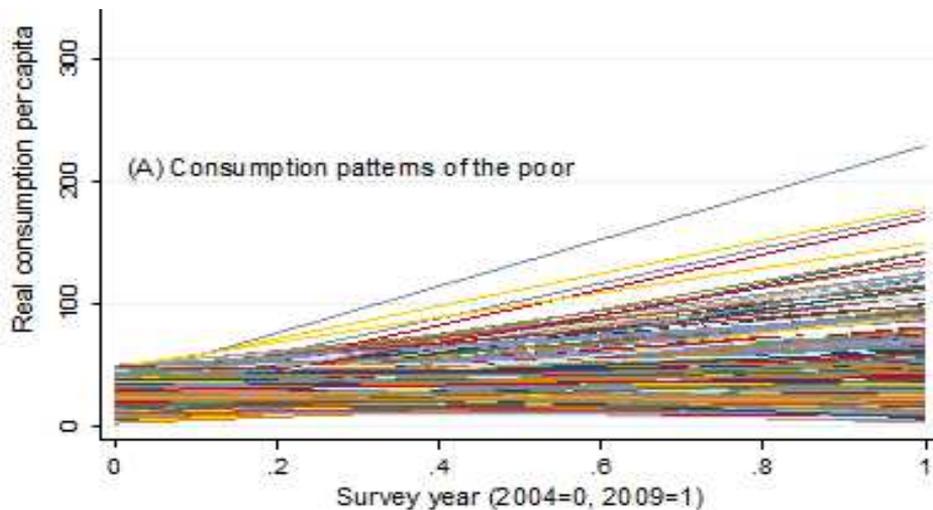
Descriptive and econometric analyses can explain the expected dynamics of poverty and vulnerability at an aggregate level. However, because these measures are highly aggregated, it is hard to distinguish whether consumption is decreasing or increasing between 2004 and 2009. Figure 1 demonstrates the patterns of real consumption per capita which enables to easily visualize overall consumption trends in rural Ethiopia between 2004 and 2009. As illustrated, the pattern of real consumption was clearly declining until 2007 but trendless thereafter. According to this consumption pattern, is poverty really decreasing in rural Ethiopia?

Figure 1: Panel plot of patterns of real consumption per capita in rural Ethiopia (2004-2009)



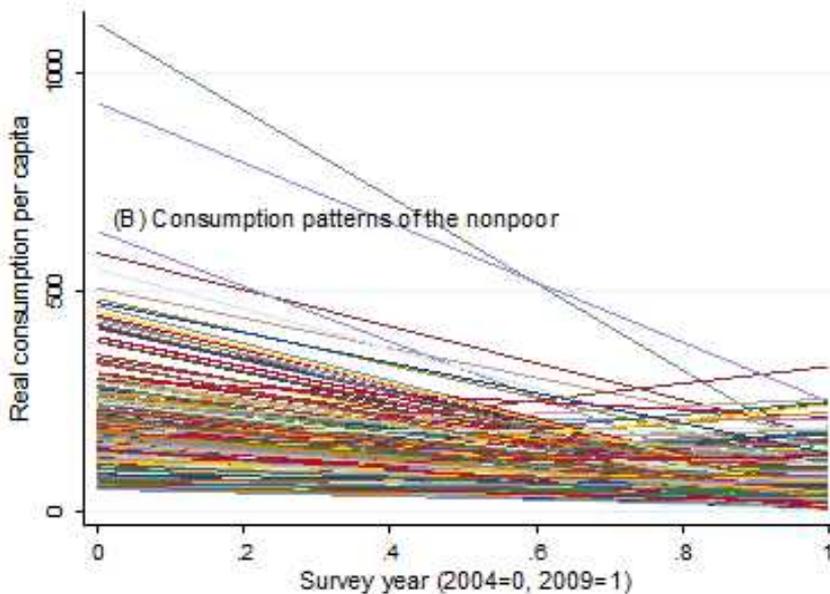
To illuminate the grey areas of the overall trends, patterns of real consumption per capita of the poor and the nonpoor in 2004 were illustrated. Figure 2 decomposes the overall consumption trend depicted in Figure 1 into consumption patterns of different groups of sample households: the poor and the nonpoor in 2004. Their consumption patterns were separately plotted to visualize the dynamic nature of absolute and relative poverty between 2004 and 2009. The panel data line plots of real consumption per capita for the poor indicated in panel A of the figure clearly depict the observed positive consumption trends of the absolutely poor households. A general upward trend is observed though the majority of the poor are still under persistent poverty trap. These results are partly in line with some previous studies like Naschold (2005) in that households would be expected to gravitate towards one longrun equilibrium. However, a great majority of the poor households didn't exhibit an upward trend to escape from poverty.

Figure 2: Panel plots of the dynamics of absolute and relative poverty between 2004 and 2009



Unlike the general positive trends of consumption by the poor households, the pattern of real consumption per capita by the nonpoor was generally declining until 2007 (Panel B of the figure). Many households have descended while the

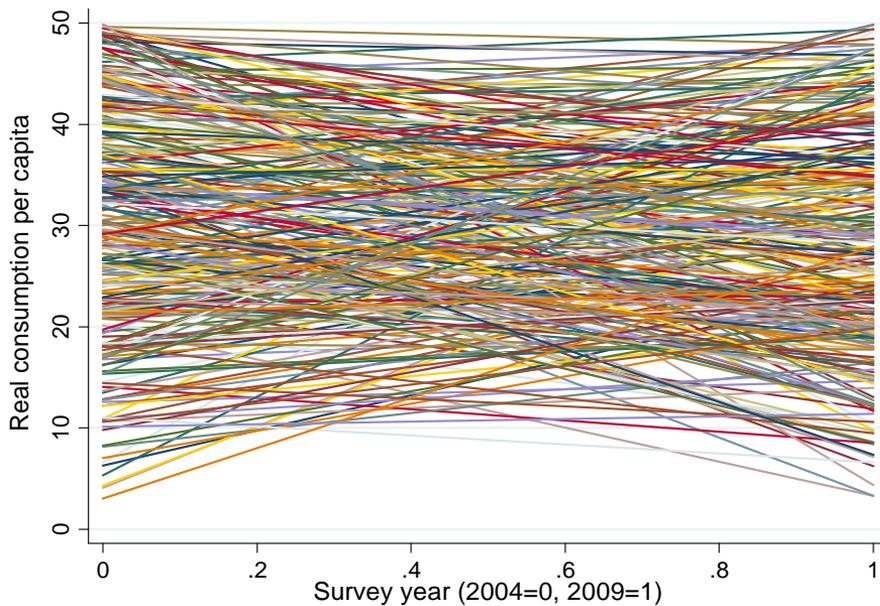
absolutely poor households have started to escape from poverty. In other words, many nonpoor households have descended while the poor escaped from poverty. This leads to increased incidences of overall poverty but reduced absolute and relative poverty. It is also the critical source of various arguments on whether poverty is really decreasing in rural Ethiopia. The general rise in real consumption per capita after 2007 is an indication of reduced depth and severity of poverty while the increased number of descents before 2007 is an evidence of increased poverty incidence.



However, achieving faster poverty reduction requires speeding up the pace of escapes while concurrently slowing down the rate of descents into poverty as supported by Krishna (2007). The symmetry of descents into and escapes from poverty is illustrated in Figure 3. The symmetry is demonstrated by selecting poor households in the two survey years and plotting their real consumption dynamics under the poverty trap between 2004 and 2009. If the speed at which households are descending into poverty is greater than the speed of households escaping from poverty, most households generally

remain trapped into poverty. This evidence is supported by the results from previous studies by Bigsten and Shimeles (2007), and Kitaw and Woldemichael (2008). The majority of poor households in 2004 had slowly moved upward to reduce their poverty gap and eventually to escape from the poverty trap. On the other hand, households identified as poor in 2009 had been descending into the poverty trap since 2004 or before.

Figure 3: Patterns of poverty incidence in rural Ethiopia (2004-2009)



As depicted by the figure, the concept that escaping from poverty in rural Ethiopia is a longrun phenomenon while descending into poverty was a shortrun event is partly supported. Many households descend to poverty while many others are escaping; ultimately leading to diluted net welfare effects of poverty reduction efforts. These mixed patterns of poverty dynamics for the poor and the nonpoor are the major sources of differentiated conclusions and recommendations on the effects of poverty reduction policies in rural Ethiopia.

3.2 Regional Distribution of Poverty

Table 2 reports the regional mean consumption levels of households between 2004 and 2009. With the exception of Oromia regional state, the regional mean household real consumption per capita had exhibited deteriorating trends in all other regions within the five-year period. The decline was more severe in Tigray and Amhara regional states. This is an evidence to demonstrate as to how regional differences are relevant to capture spatial distribution of poverty dynamics. However, it would be misleading to interpret the regional welfare effects as indicators of efficiency of regional policy implementation because regions are considerably different in terms of their resource endowments or livelihoods (physical, natural, social, and even human and financial capital) in the base year.

Table 2: Regional trends of real consumption per capita between 2004 and 2009

Regional state	Survey year			Changes in real consumption per capita
	2004	2009	Both	
Tigray	66.9	27.5	43.8	-39.4
Amhara	119.8	64.7	91.7	-55.1
Oromia	78.0	85.4	82.4	7.4
SNNP	66.3	41.58	53.7	-24.7
Country level	87.4	59.2	72.2	-28.3

Table 3 reports the regional distribution of incidence of rural poverty. Incidence of poverty was considerably reduced in Oromia and SNNP regions whereas it was rather aggravated in Tigray and Amhara. At national level, poverty incidence was raised by about 15.4%. This is in line with the rising real consumption per capita observed in Oromia region.

Table 3: Regional distribution of poverty incidence between 2004 and 2009

Survey year and poverty status	Tigray	Amhara	Oromia	SNNP	Total
2004					
Poor	46	73	105	207	431
Nonpoor	58	325	145	190	718
Total	104	398	250	397	1149
Poverty incidence (%)	44.2	18.3	42.0	52.1	37.5
2009					
Poor	139	170	104	299	712
Nonpoor	9	244	265	116	634
Total	148	414	369	415	1346
Poverty incidence (%)	48.4	29.1	22.0	41.9	52.9
Changes in poverty incidence (%)	4.2	10.8	-20.0	-10.2	15.4

Table 4 combines and reports the poverty indices: the head count index, the poverty gap index, and the squared poverty gap index (Foster et al., 1984). As explained by the poverty indices, incidence of rural poverty was increased from 37.5% in 2004 to 52.9% in 2009, which is considerably higher than the 30.4% incidence of poverty estimated by the government in 2010/11(FDRE, 2012). However, the poverty gap index was reduced from 88.8% in 2004 to 39.2% in 2009, suggesting the presence of accelerated reduction of depth or intensity of poverty. Severity of poverty was also reduced from 3.6% in 2004 to 0.7% in 2009. The results generally point out that the depth and severity of poverty were reduced; supporting the results of previous studies by Dercon (2004), Naschold (2005) and FDRE (2012) and the implications of the consumption patterns depicted by the graphic illustrations in this paper.

Table 4: Incidence, intensity, and severity of poverty in rural Ethiopia

Measures of poverty	Survey year		Changes in poverty measures
	2004	2009	
Head count index (%)	37.5	52.9	15.4
Mean poverty gap (ETB)	44.4	19.6	-24.8
Poverty gap index (%)	88.8	39.2	-49.6
Squared poverty gap (%)	3.56	0.7	-2.86

3.3 Sources of Poverty and Vulnerability

The panel probit model estimation results of poverty and vulnerability status are reported in Table 5. The parameter estimation results are consistent in terms of signs and levels of significance. Out of the hypothesized determinants of poverty in rural Ethiopia, ten of them were significant.

The determinants of poverty dynamics and status contributing to poverty reduction in rural Ethiopia were livestock holding, farming occupation (weakly), social capital (the ability of a household to get an emergency financial access as a proxy for social network or capital), regional state, and other exogenous shocks, most of which are supported by previous studies including Devereux and Sharp (2003), Carter et al. (2007) and Woolard and Klasen (2004). With different effects in magnitude, regions (not just states) had their own role on poverty reduction. Household size, marital status (weakly) and the lower levels of living status can be considered as sources of poverty aggravating the likelihood of households to be poor by reinforcing poverty. As expected, households living at the lower level of the ladder of life were more vulnerable to poverty. The results suggest that the likelihood of households to be poor between 2004 and 2009 was 45.4%.

Table 5: Determinants and correlates of poverty and vulnerability in rural Ethiopia

Variables	Coefficients (poverty)	Marginal effects	
		Poverty	Vulnerability
Age	0.000	0.054	-0.001*
Educational level	-0.001	-0.001	-0.006***
Household size	0.135***	0.054***	0.083***
Marital status	0.126*	0.050*	0.040
Livestock holding	-0.027***	-0.011***	-0.028***
Farming occupation	-0.140*	-0.055*	-0.008
Drought	0.028	-0.008	0.038**
Worse-off living status	0.780***	0.303***	0.364***
Middle-level living status	0.464***	0.180***	0.185***
Oromia	-0.998***	-0.358***	-0.415***
Amhara	-0.865***	-0.323***	-0.352***
SNNP	-0.297**	-0.116**	-0.136***
Social network	-0.233***	0.093***	-0.214***
Constant	-0.508**		
Poverty index	0.454		
Vulnerability index	0.434		
Observations	2408		

Note: ***, ** and * is significant at 1% , 5% , and 10% level, respectively.

This study has shown that, for a unit change in household size across time and between households, the probability of a household to be poor increases by about 5.4%, showing the effort required to enhance poverty reduction through promotion of family planning. The same unit change in livestock holding results in a decreasing probability of 1.1%, emphasizing the need to enhance livestock production and productivity as an entry to poverty reduction. As compared to Tigray, the probability of poverty by decreases by about 35.8% in Oromia, 32.3% in Amhara, and 11.6% in SNNP region. This clearly shows that poverty reduction was relatively more enhanced in Oromia followed by Amhara and SNNP regions. This might be the result of differences in natural capital (land, agroecology and other resource bases)

endowed to the regions, or regionally differentiated poverty reduction policies and strategies, or a combination of both. Social network of households had a role to reduce the probability to be poor by about 9.3%. For the same discrete change in marital status, worse-off living status, and middle-level living status, the likelihood of households to be poor increases, respectively, by about 5.0%, 30.3%, and 18.0%.

Unlike the results in poverty analysis, the estimation results of correlates of vulnerability to poverty had three different implications. Educational level was identified to be a strong correlate of reducing vulnerability of households, suggesting the need to produce educated farmers in the country. Occurrence of drought shock was also relevant correlate of vulnerability to poverty. Marital status and primary occupation of farming were uncorrelated variables with vulnerability. Compared to the results in poverty analysis, there were also improvements in the marginal effects of many correlates. Assuming vulnerability threshold of 50%, the estimated vulnerability index of 43.4% verifies that vulnerability of households in rural Ethiopia was fairly reduced. They are expected to escape from poverty and gravitate to better wellbeing, which supports the results of some previous studies by Dercon (2004) and Naschold (2005).

4. Conclusion and Recommendation

This study investigates the dynamics of poverty and vulnerability and identifies the sources of poverty and correlates of vulnerability to poverty in rural Ethiopia. The results clearly point out that depth and severity of poverty were considerably reduced between 2004 and 2009, leading to reduction of relative poverty between the poor and the nonpoor. The likelihood of households to be poor was reduced suggesting that they were escaping from poverty. Determinants of poverty status in rural Ethiopia between 2004 and 2009 were household size, marital status, livestock holding, farming occupation, life status, social network, regional dummies, and other omitted idiosyncratic and covariate shocks. The estimated

marginal effects show that there were considerable divergences among regional states in terms of poverty reduction effects.

In their desire to bring about accelerated poverty reduction effects, policy makers need to design relevant policies accounting for the shortrun and longrun dynamics of poverty and vulnerability in rural Ethiopia. The regional differences in poverty reduction effects could be optimized by adopting area-specific poverty reduction strategies so that more households would escape out of the poverty trap and move to long-term welfare effects. Some sources of poverty associated with the positive effects of idiosyncratic features of households, like family size, on poverty should be reversed by relevant policy interventions including family planning. Further study is important to empirically verify the sources of regional differences in terms of poverty reduction which will assist in designing and implementing area-specific poverty reduction intervention to bring about overall development in rural Ethiopia.

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Financing Ethiopia's Development: Confronting the Gap between Ambition and Means

Derk Bienen, Dan Ciuriak, and Tadele Ferede

Abstract

Ethiopia set out – and in large measure achieved – a very ambitious program of economic and social development under its Growth and Transformation Plan (GTP-I). The scale of public sector involvement was very large: for the five-year Plan period, it called for budgetary government spending and public enterprise off-budget spending of 41% of GDP, more than half of which was to come from budgetary resources. As Ethiopia prepares for the second version of its GTP (GTP-II), it must confront a fiscal numbers problem: Ethiopia's tax share of GDP under GTP-I reached only the 12%-13% level, and revenue flows from official international assistance are shrinking. This paper dissects the financing challenge that Ethiopia must meet to achieve its goal of becoming a middle income country. It concludes that only export-led manufacturing in a context of a major expansion of the number of active formal enterprises coupled with best practice performance in all other areas related to revenue generation will square the circle of Ethiopia's development financing challenge.

Keywords: Ethiopia, development financing, resource mobilization, tax, private sector development

JEL Codes: O16, O55

1. Introduction

Ethiopia has set out very ambitious goals to achieve economic, social and environmental transformation. Specific targets include to meet the socioeconomic Millennium Development Goals (MDGs) for 2015, and to achieve middle-income status by 2025. Economic goals include raising productivity in agriculture, improving social services, promoting industrial development, and filling significant remaining gaps in power, transportation (both road and rail) and telecommunications infrastructure.

The main planning instrument is the first generation Growth and Transformation Plan (GTP-I) (MoFED, 2010). Most of the measures mandated under the GTP-I require public sector fiscal resources (either in terms of spending requirements or the foregoing of revenue in the case of incentives).²In addition, in response to the growing risk resulting from climate change, the Government of Ethiopia adopted a Climate Resilient Green Economy (CRGE) strategy in 2011 (FDRE, 2011). The goal of the CRGE strategy is to transform the economy from low to middle income status, following a rapid economic growth path that reduces greenhouse gas emissions and improves resilience to climate change. The strategy focuses on improving agricultural productivity, developing the industrial sector, expanding and improving electricity generation and distribution, reforestation, and introduction of clean production technologies. Like the GTP-I, measures under the CRGE require significant Government spending.

² Framed in terms of the developmental state model, the GTP-I draws on a wide range of tools requiring Government spending, including: targeted financial support (subsidies, bank loans, and equity participation); tariff exemptions for production inputs; tax incentives, including tax holidays, partial profit exemptions, and free trade zones to attract FDI and to promote priority sectors, particularly those facing handicaps such as inadequate specific infrastructure; strategic government procurement (e.g., assured profit margins for domestic pharmaceutical manufacturers in government health-care procurement); publicly financed infrastructure, particularly power, telecommunications and transportation, both internal expansion of the road and rail network and improving the trade corridors; and the creation of public corporations.

The Government's financing requirements for these two programmes are daunting: for the five-year GTP-I period, budgetary government spending and public enterprise off-budget spending was projected to reach 41% of GDP; this amounted to ETB 1.33 trillion (MoFED, 2010: 40-41), or close to USD 80 billion. Of this, 57% was slated to come from budgetary resources (both domestic and external borrowing) and 43% was to be covered by state-owned enterprises (SOEs). The CRGE was budgeted at around USD 150 billion over its 20-year plan period, of which USD 30 billion was earmarked for the period until 2015 (FDRE, 2011: 38-43). Although the CRGE strategy targets international climate finance for generating some of the financial resources (Bass *et al.*, 2013), domestic resources are also required. Taken together, average domestic resources required for the two programmes were in the range of USD 20 billion per year until 2015, and are unlikely to be lower under GTP-II and the continuation of the CRGE.³

To meet the GTP-I and CRGE goals, the fiscal revenue share of GDP needs to rise—and quite significantly. However, Ethiopia's overall revenue generation performance has been weak. Tax revenue has risen marginally as a share of GDP during the GTP-I period, but this has been offset by declines in other sources of revenue. Aid flows in particular have declined⁴ and are likely to remain under pressure as donors continue to address severe budget deficits that emerged as a consequence of the great recession of 2008-2009 and the ensuing slow recovery in the member countries of the Organization for Economic Cooperation and Development (OECD). A surge in private transfers, which have averaged close to 8% of GDP since 2011/12 (IMF, 2014), has been the main source of financing that has helped to ease further deterioration in Ethiopia's balance of payments.

³ The follow-up to the GTP-I, the GTP-II, is yet to be finalized and therefore resource requirements are not yet known.

⁴ Grants as a share of GDP declined from 3.3% in 2010/11 to 1.5% in 2012/13 and are estimated to have remained at about that level in 2013/14 – 2014/15 (IMF, 2014).

In sum, Ethiopia requires a significant boost to its domestic resource mobilization program to maintain the pace of development achieved in recent years, to meet the ambitious GTP and CRGE goals, and to achieve the longer-term aim of reaching middle-income status.

The literature has addressed issues related to resource requirements for development in Ethiopia from various angles: policy papers (such as MoFED, 2010 or FDRE, 2011) provide estimates of resource requirements for the specific policies being defined, updated by progress reports (MoFED, 2013; 2014a; 2014b), while macroeconomic reviews (such as the IMF Article IV reports; see IMF, 2012, 2013 and 2014) provide descriptive overviews and projections. Also, considerable research has been undertaken on specific issues related to domestic resource mobilization, such as administrative issues (e.g., Aizenman/Jinjarak, 2008; Yesekat, 2008; Biber, 2010; African Development Bank Group, 2011a; and Kloeden, 2012); taxation in general (e.g. Bolnick and Haughton, 1998; Bird, 2008; Bräutigam et al., 2008; Lencho, 2012; Fjeldstad, 2013); grants (Mogues *et al.*, 2011); and innovative financing mechanisms (e.g., Badu *et al.*, 2012). There is as well a body of work on comparative research (e.g., Keen and Mansour, 2010; IMF, 2011). However, only limited research has been undertaken to comprehensively and holistically analyze the factors that contribute to, and the constraints that limit, the mobilization of non-debt creating domestic resources in Ethiopia.⁵

The present paper aims at filling this gap. Its main purpose is to identify reforms to encourage the contributing factors and to address the limiting factors, and to suggest priorities for the sequence of reforms. The methodology applied in the paper is guided by this purpose—it is based on an analysis of descriptive statistics, and a mostly qualitative assessment of regulatory and administrative conditions impacting on the mobilization of domestic resources in Ethiopia.

⁵Abay (2010) and Engida *et al.* (2011) are exceptions to some extent.

The scope of the analysis encompasses the following: First, we analyze the macroeconomic factors that impact on the development financing strategy. Second, we analyze tax performance by tax category and taxpayer groups. Third, we examine the scope to mobilize private sector financial resources by deepening the financial sector.

The paper is organized as follows. Section 2 reviews the macroeconomic context, in particular the scope to reduce the dependence on external debt financing. Section 3 reviews the main instrument of revenue mobilization – taxation. Section 4 reviews the scope to mobilize domestic resources through improved financial depth. Section 5 discusses and draws policy conclusions.

2. Macroeconomic Factors

Ethiopia has been among the top performing economies in Africa – and indeed worldwide – since 2003, with increasingly broad-based growth, a very substantial increase in the volume of two-way international trade, a steady increase in the stock of inward FDI, increased sectoral diversification in its export base (i.e., diversification of exports across product lines), increased regional diversification in the destinations of Ethiopia’s exports, and convergence in governance indicators broadly consistent with regional peers (Assefa *et al.*, 2013). However, from a revenue mobilization perspective, the macroeconomic context is problematic in some respects.

2.1 Growth Accounting and Domestic Resource Mobilization

First, there has been some question about the actual level of growth that Ethiopia has achieved during the period of accelerated growth since 2003. This may be important for forensic analysis of domestic resource mobilization since mis-estimation of income growth can compromise effective analysis of revenue generation performance. For example, over-estimation of nominal income growth can create the perception that tax revenues are under-performing, leading to possibly counter-productive

enforcement measures and/or tax rate increases; conversely, underestimation of inflation (which then results in higher reported real growth for a given amount of price increase) distorts the analysis of the incentives for savings required to finance investment.

The IMF's decomposition of the high measured growth rates during Ethiopia's recent era of double-digit growth indicates that Ethiopia's rate of capital accumulation in the public sector (10.8%) exceeded even the comparable figure for East Asian economies in the 1980s (8.9%).⁶ Official sources indicate – not inconsistently – that Ethiopia's growth has been driven by physical capital accumulation, mainly public-led investment in infrastructure (MoFED, 2014b). However, the IMF's growth accounting exercise also concludes that the official statistics imply implausibly high productivity growth between 2006/07 and 2010/11, with productivity growth contributions of 2.6% from labor and 3.2% from the capital, implying total factor productivity (TFP) growth of 5.2%. These figures are high in historical cross-country comparison, especially in view of the fact that a number of factors that normally support high TFP growth were not present in Ethiopia. These factors include favorable initial human and physical capital conditions, favorable terms of trade and a high degree of openness, low inflation, a competitive real exchange rate, low government consumption, high international reserve coverage, and low external debt.⁷ Since 2011/12, official growth rates and the IMF's have converged.

If nominal income growth has indeed been over-estimated in Ethiopia in recent years, actual performance on domestic resource mobilization relative to nominal income growth has been stronger than official statistics currently suggest. In turn, this would guide the revenue mobilization effort to give greater weight to factors other than the tax system. If inflation has been higher than officially recorded, real interest rates are deeper under water than currently thought. Accordingly, resolving the issues about macroeconomic

⁶ See IMF (2012), Box 1. Ethiopia: Growth Accounting.

⁷ Ibid.

performance is important for sound formulation of revenue generation policies.

2.2 The monetary policy framework: Implications for real exchange rates and interest rates

A second key macroeconomic concern is Ethiopia's lack of a credible monetary policy anchor (Durevall and Sjö, 2012). Inflation remains one of the major macroeconomic concerns for Ethiopia. The hopeful assessment by the IMF is that, with appropriate monetary policies (especially maintaining positive real interest rates), Ethiopia is in a position to maintain moderate and stable inflation (IMF, 2012). Ethiopia has managed to keep overall inflation to single digit levels since 2013, notwithstanding negative interest rates; however, this has partly been achieved by an undesirable monetary policy mix.

In the absence of a solid domestic anchor, Ethiopian authorities have relied on the external anchor provided by exchange rate pegs. In a small open economy with a high trade share of GDP, this can be a successful strategy (e.g., the Caribbean islands typically peg their currencies to the US dollar and have generally done quite well with that arrangement both in terms of price stability and growth). In Ethiopia's circumstances—with a low trade share of GDP, heavy reliance on commodities with volatile prices, and fiscal reliance on central bank financing—this approach has resulted in repeated bouts of high inflation. In turn, these bouts of high inflation hinder the establishment of a stable framework for longer-run revenue mobilization in at least two key ways.

First, bouts of high inflation in the context of a pegged nominal exchange rate result in real appreciation of the currency. Ethiopia has had two recent bouts of rapid real appreciation of the Birr; the first, which peaked in 2009, resulted in an overvaluation approaching 30%; the second, since 2012, has

resulted in a more modest degree of overvaluation in the 10-14% range (IMF, 2014:39).

These bouts of real appreciation have undermined the competitiveness of Ethiopian industry and exacerbated Ethiopia's structural savings-investment imbalance. Ethiopia's resource gap (the difference between domestic saving and domestic investment) was 17.8% of GDP in 2013/14 (National Bank of Ethiopia); recent IMF estimates suggest a still higher gap in the 18% range in 2014/15 (IMF, 2014). Put another way, Ethiopia has been relying heavily on international savings to finance its investment.

To date, this has been manageable but only because Ethiopia has had access to international assistance. Reliance on international assistance is problematic in a structural sense, since grant revenue comes with its own problems. First, it tends to be fragmented: in addition to fourteen multilateral sources, there are some thirty bilateral programs in Ethiopia, which raises coordination issues and places administrative demands on Ethiopia's public service. Second, it often comes with strings attached (e.g., tied to procurement requirements). And third, it tends to be volatile and pro-cyclical, reflecting cyclical fiscal pressures in donor countries. In any event, grant revenue has been shrinking due to budget constraints in donor countries.

Foreign private capital has also been an important factor in filling the resource gap. However, generally high real effective exchange rates have tended to over-price Ethiopian assets and thus weakened the incentives for foreign direct investment (FDI) inflows. As well, for a number of reasons, FDI is an imperfect substitute for domestic sources of saving:

- a potentially narrow sectoral focus (e.g., on the extractive industries which may have limited spillover benefits in terms of local industrial development);
- a risk of distortion of incentives for government in the recipient country to develop sustainable fiscal structures;

- the requirement for fiscal incentives in the face of locational competition from third countries; and
- in many cases, the need for supporting specific infrastructure which represents a demand on public financing.

Moreover, empirical evidence indicates that sustained success in development is generally accompanied by strong sustained *domestic* resource mobilization. This is consistent with arguments from the political science literature that taxation is a fundamental part of the social contract between a state and its citizens. Taxes enable the provision of public goods, which are an essential part of the mix of a prosperous society.⁸

The bouts of high inflation have also had adverse impacts on domestic savings due to the reality and risk of negative real interest rates. Negative real interest rates remove the incentive to save. Further, for producers (at least those with access to capital), they create incentives to use more capital-intensive methods of production than otherwise would be the case, weakening job creation, which in turn reduces the savings-capable share of the population.

Accordingly, reducing reliance on foreign savings—through all types of instruments, not just those that create debt—should be an important feature of Ethiopia’s domestic resource mobilization strategy. In turn, this requires re-engineering the monetary policy framework towards a combination of lower real effective exchange rates and higher real interest rates. As this issue is

⁸ See in this regard Bräutigam *et al.* (2008) who argue that “taxation may play the *central* role in building and sustaining the power of states, and shaping their ties to society” (at 1). In addition, Moss *et al.* (2006) argue that in some instances aid has served as a subsidy that has “discouraged revenue collection, distorted expenditure decision-making, and undermined the incentives to build state capacity” (at 6). A similar reduction of incentives for local revenue generation from grants has been identified in Ghana (see Moguees *et al.*, 2011). As well, there is the “aid as source of Dutch Disease” argument: Rajan and Subramanian (2011) find that aid inflows systematically reduce a country’s competitiveness, which is reflected in a lower relative growth rate of exportable industries.

well understood and the subject of much commentary (e.g., it has been a consistent theme of IMF Article IV reviews and is agreed by Ethiopian authorities, who see low nominal interest rates as necessary to finance public investment but accept that real interest rates should be positive or at least near zero), we simply mention it here, although it should be emphasized that we consider this an absolutely essential element of a sound framework.

This should support labor-intensive industrial exports, a development that should be encouraged through microeconomic reforms targeted at expanding the formal production sector and by developing the agricultural sector to trigger sustained development of manufacturing industries that depend on domestic resources, thereby generating a self-reinforcing growth path (AfDB, forthcoming).

2.3 Risks to the Fiscal Framework

A third key concern for Ethiopia in its efforts to mobilize domestic financial resources relates to its overall fiscal situation. While on paper, the budgetary situation appears to be sound, both in terms of the size of the deficit and the debt as a percent of GDP; this in part reflects the fact that spending pressures have been absorbed on the monetary side.

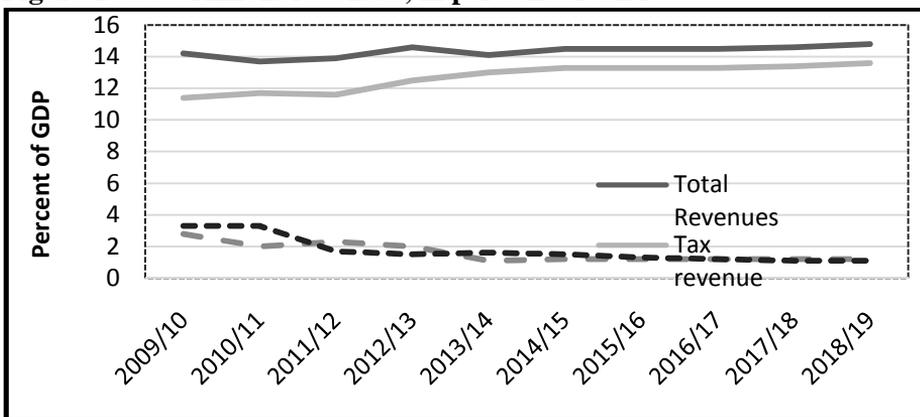
One such escape valve has been National Bank financing; however, as noted, this has led to outbreaks of rapid inflation, which in turn has driven real appreciation of the currency and created problems of maintaining positive real interest rates. Accordingly, Ethiopia has limited scope to expand Central Bank financing. Moreover, these considerations indicate that supply side constraints must be eased in conjunction with the expansion of fiscal revenue. A self-sustaining domestic resource mobilization (DRM) program necessarily involves spending that has powerful multiplier effects on incomes and thus on income-driven tax revenues.

As well, debt service costs have been held down by the low nominal (and negative real) interest rates; however, these have had negative effects on the mobilization of private savings. Accordingly, moves to more firmly anchor inflation expectations and to restore positive real interest rates in order to incentivize and mobilize private savings would by the same token squeeze back some of these pressures onto fiscal policy, including by substantially increasing debt service costs.

3. Mobilizing Budgetary Resources

Ethiopia's budgetary resources are dominated by tax revenues (which we treat as inclusive of social security contributions, consistent with IMF practice). Ethiopia's tax system has been modestly buoyant, with taxes rising as a share of GDP. Non-tax revenues—the main sources of which are resource rents, profits remitted by state-owned enterprises, and miscellaneous charges such as motor vehicle license fees—constitute a minor and shrinking share of Ethiopian fiscal revenues. As noted, grants have also been declining as a share of GDP and are projected to fall to about 1% of GDP, down from over 3% of GDP at the start of the GTP-I period. As a result of these trends, overall government revenues trended sideways as a share of GDP over the GTP-I period, and are projected by the IMF to continue to do so over the coming GTP-II period under current planning assumptions (Figure 1).

Figure 1: Government revenues, in per cent of GDP



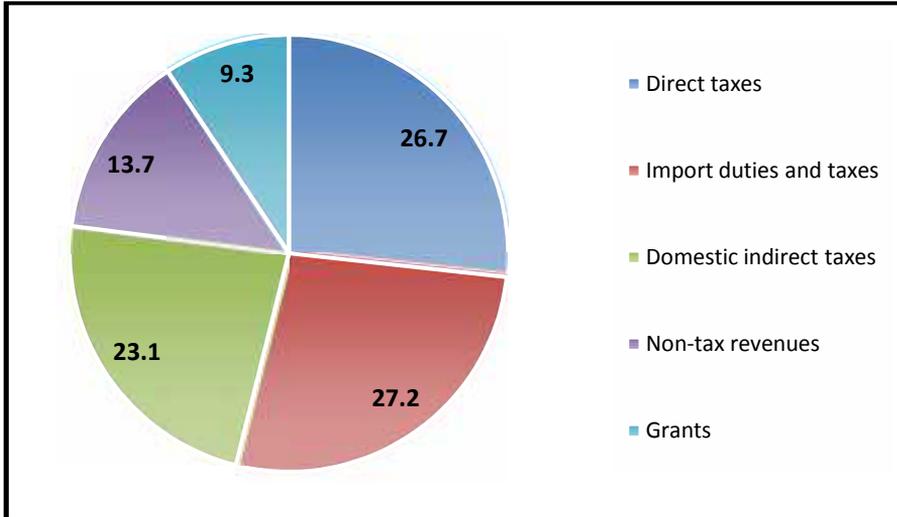
Source: IMF (2013 and 2014), Table 3b.

In terms of performance against the GTP-I targets (which set a goal of a total revenue share of GDP of 20.4% by 2014/15, including a tax-to-GDP ratio of 15-17%, approaching the Sub-Saharan Africa average of 17%), Ethiopia has fallen well short, despite the fact that non-tax revenue (which in Ethiopia is predominantly investment income/dividends from state corporate holdings) substantially exceeded planned levels in the first part of the GTP-I period. The main reason for the shortfall was the failure of the tax share of GDP to grow in line with expectations (the aggregate tax elasticity to GDP over the first two years of the GTP-I period was only 1.04).

To put Ethiopia's situation into a broad perspective, given its per-capita GDP, Ethiopia's tax system appears to be about average in terms of overall performance: in a cross-country study based on 2007/08 data, Ethiopia was marginally above a trend line on tax revenue as a percent of GDP (von Haldenwang/Ivanyna, 2010).⁹ In a similar study of 43 Sub-Saharan African countries covering the period 1980 to 2010, Ethiopia was also found to have performed in line with trend; in terms of the share of taxes in GDP, however, Ethiopia ranked low, with only eight other countries having lower shares (Mansour, 2014: 19).

In terms of the current revenue structure (Figure 2), Ethiopia derives its revenues from diversified sources. Imports shoulder the single largest tax burden; indirect tax on imports has also been the fastest growing tax source in recent years.

⁹ Ethiopia was 0.14 above the trend line, just ahead of Kenya at 0.10. However, Ghana, for example, was 7.28 percentage points above the trend.

Figure 2: Government revenue structure, 2012/2013

Source: Computed based on fiscal data obtained from MoFED

In the following subsections we organize the discussion of Ethiopia's tax performance in terms of type of tax, highlighting particular dimensions. We also comment specifically on tax administration and the general issues of allocative efficiency and fairness. The final subsection comments on non-tax revenues.

3.1 Direct Taxes

Personal income tax (PIT) generally makes a weak contribution to total tax revenue in low income countries. Ethiopia's experience is broadly consistent with this: PIT comprised a little over 11% of total tax revenue in 2012/13 (MoFED, 2014b), which is relatively high for a low income country.¹⁰

¹⁰ Keen (2012, 10A) summarized as follows: "The personal income tax commonly accounts for less than 10 percent of all tax revenue in low-income countries—compared to an average of more than 25 percent in OECD countries".

As a summary judgment, PIT in lower-income countries is effectively a tax on labor income of those working in the public sector or in large private enterprises. This reflects: (a) the use of wage deductions at source to collect the tax in large and public enterprises; (b) the difficulties of addressing the problem of tax avoidance by high-income individuals and firms through tax planning, an issue that even large, sophisticated tax administrations in the wealthiest countries struggle with; and (c) the efficiency considerations which argue against lowering the threshold to catch small tax filers.

Ethiopia's corporate income tax (CIT) is set at a statutory 30% and accounted for 16.5% of total tax revenue in 2009/10. Since it is typical in developing countries that a small number of firms pay the large bulk of taxes, the main administrative measure to ensure revenue is to create a Large Taxpayer Office (LTO) dedicated to large corporations. Ethiopia already has such an office in place. According to the Ethiopian Customs and Revenue Authority (ERCA), almost 78% of Ethiopia's tax revenue came from fewer than 1,000 filers in 2012.¹¹

Since considerations of administrative costs weigh against seeking to expand the direct tax base by lowering thresholds, the main area where there is at least some promise for significant progress is in respect of middle-income taxpayers who are either: (a) not registering for tax (so-called "ghosts"), which points to identification and registration of taxpayers as the required remedy; or (b) underpaying (so-called "icebergs") or not paying (so-called "deadbeats"), which points to increased audit and enforcement as the remedy.¹² While the literature cautions against unrealistic expectations, suggestions to enhance revenue mobilization include the following:

- Reduce the cost of paying taxes; notably Ethiopia went in the opposite direction with its most recent reforms which sharply expanded the time

¹¹ Reported in "Britain offers Dar, Ethiopia tax scheme," *The East African*, 11 May 2013, available at <http://www.theeastafrican.co.ke/news/Britain-offers-Dar-Ethiopia-tax-scheme-/-/2558/1849510/-/pgbui3/-/index.html> (accessed 13 June 2014).

¹² See Keen (2012: 16) and Bird/Wallace (2004).

required for tax compliance according to the World Bank's Doing Business 2013 benchmarking exercise through the introduction of a social security contribution for businesses. Based on the World Bank's Doing Business assessment for 2015, there would be some scope to reduce taxes through consolidation of marginal taxes and reducing frequency of payments (implicitly, this would go hand in hand with the development of treasury bill market to address short-term financing needs for the government);

- Eliminate tax incentives, largely on grounds they are likely to be redundant—firms that are likely to invest would do so in the absence of the incentive (see e.g., Bird, 2008, at 9); this has the added advantage of simplifying compliance monitoring;
- Establish an office dedicated to medium-sized taxpayers, building on the evident successes of LTOs;
- Increase the use of withholding and advance collection schemes; and
- Reduce the cost of entry into the formal sector, thus enabling an expansion of medium-sized taxpayers; while some of this would come at the expense of growth and profit of the more easily taxed large corporations, filling in what has been termed the “missing middle”¹³ is an essential start to the process of diversification and expansion of the supply capacity of the economy.

The latter idea may be combined with a simplified presumptive tax for small, informal businesses, in part to drive activity into formal enterprise.¹⁴

Also, a number of approaches have been suggested to chip away at the problem of tax avoidance by high-income individuals and corporations. These include the following:

¹³Tybout. (2000). The “missing middle” is explained by disincentives to growth to avoid attracting enforcement of taxes.

¹⁴ On presumptive taxation, see Thuronyi (2003). On dynamic effects of such initiatives, see Auriola and Warlters (2005).

- Dedicate units within the tax administration to high-income/wealth individuals; this can provide a focus for enforcement efforts (IMF, 2011);
- Strengthen audit powers, including the possibility to use indirect methods to assess tax liabilities, such as enabling revenue agencies to use third party information, particularly related to assets and flow of investments, to estimate the taxpayer's income (Biber, 2010);
- Participate in multilateral action on tax havens through fora such as the Global Forum on Transparency and Exchange of Information for Tax Purposes; and
- Adopt best practices for addressing abusive transfer pricing.

Experience indicates that there is no single solution to expanding direct taxes. Admittedly, what is indeed feasible in Ethiopia's often sensitive political economy setting would have to be carefully considered.

3.2 Social Security Reforms

Ethiopia instituted social security reforms in 2011 through two regulations governing public service and private organizations' pension and other social security contributions.¹⁵ These provide for contributions from employees and employers. Under both regulations, which were phased in over four years, the employee contribution rose from an initial 5% to 7% of earnings, to be complemented by employer contributions which rose from 7% to 11% (for military and police the employer contribution is greater, rising from 18% to 25%). With the scheme now fully in place, domestic savings should increase and thus help close the overall savings-investment gap. Commentators on the rise of pension funds in Africa note that these are a natural source of funding for infrastructure investment (Pence, 2003).

¹⁵ Private Organizations Employees Social Security Agency Establishment, Council of Ministers Regulation Number 202/2011; and Public Servants Social Security Agency Establishment, Council of Ministers Regulation No. 203/2011.

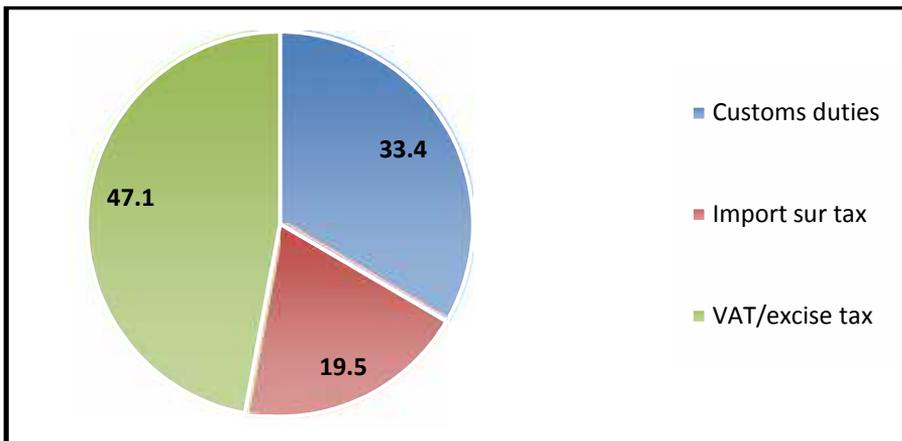
From a standpoint of financing the GTP-I investment requirements, the increase in savings and investment should have a balance sheet effect, expanding government borrowing from the pension funds and increasing government debt service costs which will flow back to the pension funds. This institutional development will support the restoration of positive real interest rates and the expansion of domestic savings. Importantly, this initiative provides a vehicle to lengthen the term-to-maturity of savings and investment instruments in Ethiopia.

From a business cost perspective, the documentation requirements of social security reforms impose compliance costs, a factor which has increased the difficulty of doing business in Ethiopia.

3.3 Indirect Taxes: Tariffs

The most easily collected tariffs in developing countries are typically border taxes. Consistent with this general experience, trade taxes, including duties, excise taxes, VAT and import surtaxes applied to imports represent the strongest and most rapidly growing tax base for Ethiopia (Figure 3).

Figure 3: Structure of Trade Taxes, Ethiopia, 2012/13



Source: Computed based on fiscal data obtained from MoFED

Notably, approximately half the “trade” tax collected in Ethiopia is generated by domestic taxes collected at the border. These are not subject to erosion through trade liberalization. However, reliance on border taxes does raise non-trivial issues in terms of loss of tariff revenue for Ethiopia in advancing its trade agenda:

- accession to the World Trade Organization;¹⁶
- with extra-regional partners, e.g., the Economic Partnership Agreement (EPA) with the EU; and
- with regional partners, through the Tripartite Free Trade Area (TFTA) talks which combine the members of the Common Market of Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC).

One way to minimize the erosion of trade taxes through trade liberalization commitments is to reduce tariff exemptions. For example, Brenton *et al.* (2009) calculated that the revenue cost to Ethiopia of implementing an EPA with the European Union amounted to 32.6% of its tariff revenue when assessed at statutory rates, 17.2% when assessed at applied rates, and only 4.6% if all tariff preferences were eliminated. Abay (2010; Table 6) highlights the very large size of the revenue losses from exemptions.

A second way is to address the issue of “missing trade” between Ethiopia and its immediate neighbors. One estimate suggests that such missing formal trade between Ethiopia, Kenya, Uganda, Sudan, Djibouti and Somalia amounts to about 3.4% of Ethiopia’s global two-way trade (Ciuriak, 2010). Some of this trade is undoubtedly taking place but is not being recorded and is thus not subject to duty collection. Much of this trade is however genuine “missing”, in the sense that it currently does not take place because of the

¹⁶ Note that WTO accession does not necessarily imply loss of government revenue bound tariff rates are typically substantially higher than the applied rates. However, often at least for some products, such as those covered by sectoral agreements, many acceding countries do commit to reductions of applied tariffs during accession negotiations.

absence of supportive border infrastructure and trade facilitating arrangements. Since the most intensive trade is normally between immediate neighbors,¹⁷ boosting formal trade relations with immediate neighbors would be one way to increase efficiency of taxes that can be collected at the border.

At one point there was much optimism that VAT could be used to replace lost tariff revenues in developing economies. While the actual experience has been inconsistent, the experience in Sub-Saharan Africa has been quite encouraging about the possibilities in this regard. However, Ethiopia already has implemented its VAT and it is unlikely it would realize a further substantial gain sufficient to replace the still-large tariff revenues where the latter to be reduced through trade agreements. However, this option is not entirely to be discounted (see Keen and Mansour, 2010). Options for increased revenue generation through the VAT are discussed below.

3.4 Indirect Taxes: VAT

The total amount of indirect tax collected in Ethiopia amounts to only about 10% of the value of nominal consumption. As a rough comparison, this may be compared to a statutory VAT rate of 15%.¹⁸ Ethiopia's implied 'C-efficiency'¹⁹ is not unreasonably low in international comparison: an IMF estimate places it at 42.9, above the average for low-income countries of 38.0 (IMF, 2011:69). However, the general policy literature warns that VAT effectiveness is likely to be less in economies with large agricultural sectors, low urbanization rates, and large informal sectors, all of which characterize Ethiopia (see Aizenman and Jinjark, 2008).

¹⁷ Contiguity typically is found to expand trade between two countries by a significant amount, reflecting opportunities for cross-border in goods that are not typically traded across large distances (See, e.g., Shepherd, 2012).

¹⁸ This is a rough comparison since total indirect taxes also include import tariffs and the national accounts definition of consumption is not the definition of consumption for purposes of VAT tax base.

¹⁹ C-efficiency is defined as the level of VAT collected compared to the level implied by the full statutory rate applied to the level of taxable consumption as a ratio to the statutory rate (See, e.g., Aizenman and Jinjark, 2008).

For analytical purposes, the C-efficiency can be decomposed into a “policy gap”, which reflects the extent of zero-rated or exempt products; and a “compliance” gap reflecting imperfect implementation (Keen, 2013). As regards the policy gap, there are important trade-offs between the revenue efficiency of the VAT and the delivery of specific policies (e.g., support for particular social objectives) by applying zero or reduced rates. For example, exempting sensitive items imposes administrative complications on VAT-registered vendors in terms of additional record-keeping and on the tax authorities for verification, not to mention questions related to definitions.²⁰ An impact analysis study conducted at the time of introduction of the VAT in Ethiopia suggested that, within urban areas, the VAT would be regressive since exempt goods and services were consumed disproportionately by the higher-income groups; these exemptions could not, therefore, be justified on equity grounds. As well, the study concluded that the overall progressivity of the VAT was due to the low incidence of VAT on rural households, but this reflected the high proportion of home-produced goods consumption which shielded these households from VAT (Muñoz and Cho, 2003). Accordingly, there appear to be grounds on which to review Ethiopia’s VAT from the perspective of reducing the number of zero-rated or reduced-rate items, thereby boosting VAT revenues, without compromising social policy objectives.

There are also trade-offs in VAT implementation in terms of the sales threshold for mandatory registration of vendors. Generally, a relatively small number of large firms will typically account for a large proportion of potential VAT revenue. Accordingly, setting a high threshold in terms of turnover for registration of vendors can be effective in terms of revenue generation, while minimizing demands for administrative resources and compliance costs on a large number of small vendors. At the same time, a

²⁰ This does not appear at first blush to be a major problem in Ethiopia’s system since the list of exempt goods and services is quite narrow. However, it is an empirical question to be addressed regarding the complications this poses for Ethiopian VAT-registered vendors.

sometimes overlooked benefit of incurring the costs of compliance is the promotion of a culture of record-keeping, which is part and parcel of the transition towards an economy based on formal enterprise.²¹

Related issues concern the use of techniques to enhance compliance. We note, for example, that Ethiopia, which was an early user of VAT withholding for state enterprises to improve compliance, has also established a Large Taxpayers Office and introduced reforms (such as enforcing use of sales registers) to the administrative system in 2008 to improve compliance. Accordingly, there is now established experience to allow Ethiopia's performance to be evaluated against best practice elsewhere.

The effect of varying tax rates also raises complex questions. On the one hand, raising a tax rate tends to elicit a response that reduces the tax base, while providing tax incentives also provides room for tax planning – indeed, it has been the experience of many countries that the revenues lost in this fashion outweighed the benefits garnered from the incentives. Conversely, Keen (2013: 5) reports that “the trend increase in average VAT revenues in sub-Saharan Africa—and even more strikingly for low income countries as a group—has gone along with a trend reduction in the average standard rate.” In comparing Ethiopia's experience against comparator economies, one has to take into account that fiscal systems tend to be quite idiosyncratic across economies: what works as regards approaches to taxation varies by country due to unevenness in many dimensions, including: institutional strengths and weaknesses; availability of skilled workers; the extent of the supporting infrastructure to enable widespread use of electronic systems; socioeconomic conditions; and the unique features of each country's overall division of powers across levels of government.

The division of powers across levels of government is of particular importance in Ethiopia's case, given the effort to decentralize fiscal revenue generation and service delivery. While there are significant benefits from

²¹ See in this regard, the International Tax Dialogue (2005: 12).

success in such an endeavor, bottom-line performance depends on the efficiency of local governments (Kiwauka, 2012), the effectiveness of tax sharing arrangements (which in Ethiopia are critical given that the constitution assigns the more buoyant forms of tax to the federal level, resulting in the need for block grants to balance revenue with spending obligations (Yilmaz and Venugopal, 2008)), and the effectiveness of public expenditure management to ensure that decentralized service delivery ultimately generates coherent national structures (see Tanzi, 1996). In previous benchmarking exercises it has been noted that Ethiopia's regional governments, which in principle are responsible for supporting the local-level *woreda* governments, are themselves heavily dependent on federal government grant support and thus have a limited ability to support the *woredas*, notwithstanding their Constitutional responsibility for this (see Oyugi, 2008: iv). The dependence on the central government has thus worked to limit effective delegation of authority and responsibility. The importance of including civil society engagement as part of private sector development strategies has been emphasized by the African Development Bank (2012:3).

3.5 Turnover Tax

For enterprises below the registration threshold for VAT, Ethiopia applies a turnover tax of 2% payable on revenues from supplying goods to the local market as well as on a range of services, namely construction contractors, grain mills, and tractor and combines harvesters. A 10% turnover tax is payable on other sectors. The turnover tax base is gross receipts in respect of goods supplied or services rendered. Vendors collect and remit the tax. The exempt list of goods and services follows the VAT list. Vendors are classified into three categories. "A" category vendors, with turnover above 500,000 birr must register for VAT, keep records and remit on a monthly basis; "B" category vendors, with turnover above 100,000 birr must keep records, apply the turnover tax, and remit on a quarterly basis; and "C" category vendors with sales of less than 100,000 birr annually are not

required to keep records and apply and remit turnover tax on an annual basis. In respect of the latter group, the tax is formally a presumptive tax. The tax is administered and collected by the regional governments.

The effectiveness of the turnover tax administration in Ethiopia is unclear. The thresholds have been subject to rapid “bracket creep” due to the high rates of inflation, which tends to induce tax resistance. At the same time, the construction of the system (e.g., VAT is shared by the regional authorities with the federal government on a 50-50 basis, whereas turnover tax flows 100% to regional coffers) may result in differing levels of effort at enforcement, given the extent of discretion in application by regional authorities. There may accordingly be room to improve overall tax system performance based on audits such as have been conducted in connection with funded aid programs.²²

3.6 Excise Taxes

Excise taxes are sales taxes applied to specific goods and services for specific reasons, including simple revenue generation (when applied to price inelastic goods or services), income redistribution (when applied to luxuries, with revenues generated spent on basic services for the poor), to address negative externalities (taxes on ozone-depleting substances), to impose the user-pay principle (e.g., linking gasoline taxes to road maintenance), or to discourage consumption (e.g., “sin” taxes, including alcohol and tobacco). Excise taxes contribute about 12% of total government revenues in OECD countries (Hines, 2009). Ethiopia currently levies excise tax on nineteen products, with rates ranging from 10% to 100%.

From a revenue generation perspective, there are two main issues: setting the level, and preventing leakage across borders through smuggling. Generally

²²See, e.g., the various Public Expenditure and Financial Accountability (PEFA) Reports undertaken in Ethiopia – e.g., the Southern Nations & Nationalities Peoples’ (SNNPRG) Regional Government PEFA Assessment Report, 17 October 2010.

speaking, the wide variation from country to country as regards the level of excise taxes suggests that there is room to consider varying rates to achieve optimal revenue flows (see Bolnick and Haughton, 1998). This is one area where there appears to have been little attention paid²³ and which merits closer examination, including considering the optimality of current rates. As well, the application of excise tax to cell phones has raised issues (see GSM Association, 2007).

3.7 Tax Administration

There is extensive experience with tax administration reform for resource mobilization in Sub-Saharan Africa in general and in Ethiopia, with both the multilateral institutions²⁴ and donors such as the United Kingdom providing extensive support. A capacity building program for Ethiopian Revenues and Customs Authority (ERCA) funded by the UK government has been underway since 2010.²⁵

Consistent with reforms aimed at creating Autonomous Revenue Authorities (ARAs) elsewhere in the region (Kloeden, 2012; Fjeldstadt, 2013), ERCA came into being on 14 July 2008 through an amalgamation of the Ministry of Revenues, the Ethiopian Customs Authority, and the Federal Inland Revenues Department.

The establishment of ERCA was based on a prior “business process re-engineering” study; performance reviews suggest that ERCA’s efficiency has increased. Consistent with practice in a number of other donor-assisted tax administration reforms stimulated by research on determinants of tax

²³ A recent exception is Bird and Wallace (2010). This study examines revenue-maximizing excise tax rates on alcoholic beverages in a number of African countries.

²⁴ For a good summary of this experience, see IMF (2011) and, for East Africa, African Development Bank Group (2011a).

²⁵ See African Development Bank Group (2011); see also “UK government to assist Tanzania and Ethiopia in tax collection.” *News Story*. UK Government, 7 May 2013.

compliance, ERCA has implemented a number of service features to make tax compliance more user-friendly and, in its public communications, has linked paying taxes with the benefits of the public goods and services that taxes support such as clean water and roads. ERCA has largely automated the administration of domestic taxes through a Standard Integrated Government Tax Administration System (SIGTAS), including registration, assessment, remittance, and auditing. The system is presently operational both at the head office and branch offices level.

At the same time, some problem areas have been identified in Ethiopia's tax administration:

- The African Development Bank's Strategy for Ethiopia identifies tax administration as a point of friction with the business community, which considers Ethiopia's tax administration and enforcement procedures as burdensome—and more burdensome on private enterprise than on public and politically-affiliated enterprises.
- Other sources also identify a lack of community trust towards administrators (Yesegat, 2008:161), especially as these work on behalf of unrepresentative administrative agencies, with blanket exemption powers and under little oversight as to how their powers are executed (Lencho, 2012: 379).
- The lack of public tax awareness and accessibility of legislation to taxpayers seems also to be an issue: some of Ethiopia's tax laws are not available in official publications and, though many are online, there is still a vast portion of the population that does not have access to the Internet (Lencho, 2012: 379).
- The proliferation of tax directives has made it difficult to stay abreast of tax law.

Also of note is the recent extensive report on addressing corruption in Ethiopia developed by the World Bank (Plummer, 2012), which reviews various issues related to tax administration, and a second corruption probe by the Ethiopian authorities, which identified 47.9 million birr lost to ERCA

due to tax fraud.²⁶ There is accordingly some scope to improve tax revenues by tightening controls.

Areas identified in benchmarking exercises where there are possibilities to improve the efficiency of tax administration include the following:

- Simplifying tax procedure codes and regulations;
- Improving public communication of tax rules;
- Simplifying taxpayer registration, filing, and payment, e.g., integrating commercial and tax registration, since both use the same TIN (Ciuriak *et al.*, 2012);
- Restructuring basic processes and automation of routine tasks;
- Improving coordination between tax and customs, including by improving information technology applications;
- Improving ex post controls (audit, enforcement, appeals), including systematic random audits, which have proved to be effective elsewhere;
- Reviewing the nominal thresholds for application of particular taxes, such as the VAT and Turnover Tax, to address bracket creep in the context of Ethiopia's still significant level of inflation; and
- Increasing efficiency of the regional tax administration authorities.

Improvements in this area would have some immediate benefit in raising revenue but, more importantly, would have a positive longer-term impact in building social acceptance of taxation.

Finally, the issues of allocative efficiency and fairness need to be considered when undertaking tax reforms. A true evaluation of efficiency and fairness requires a netting out of all taxes *and* subsidies; this is impractical even in the most informationally rich economy. Accordingly, these objectives can only be pursued by applying broad principles, subject to the major constraints of practicality and, in an increasingly globalized world, the tax

²⁶ See, "Corruption prone areas: What the numbers reveal," *The Reporter*, 18 May 2013.

levels applied abroad. Reforms should be evaluated in terms of the extent to which they move in the following directions:

- Fewer rather than more taxes;
- As broad a base, as few exceptions, and as low a rate as feasible;
- Horizontal equity across comparable groups (e.g., rural vs. urban poor);
- Increasing the overall progressivity in the sharing of burdens; and
- A demonstrable reduction in favoritism in application (e.g., less discretion).

4. Mobilizing Private Sector Resources

Mobilizing private sector resources is a critical complement to improved public sector revenue generation. The main instrument for mobilizing private sector financial resources is a well-functioning financial system: mobilizing financial resources is, after all, what financial systems do. Ethiopia's financial system is still relatively under-developed. At present, nineteen banks are registered to do business in Ethiopia. The banks are complemented by seventeen insurance companies, which also have a limited number of branches, and thirty-one microfinance institutions (National Bank of Ethiopia, 2014). Capital markets are in a nascent stage.

4.1 Banks

Altogether the commercial banking system has a total of 2,015 branches in December 2013, which implies about one branch per 42,978 population (National Bank of Ethiopia, 2014); given that banks are clustered in urban centers, this works out to about one bank outlet per 7,820 urban population.²⁷ By comparison, in the United States in 1910, there was one bank per 3,000 population (Ciuriak, 2013). That being said, the degree of coverage has improved considerably in Ethiopia since 2008.

²⁷ CSA's medium variant population projection has been used; in 2012/13, total urban population was 15.2 million, accounting for about 18.2% of total population.

One possible way to increase financial intermediation capacity is to reduce restrictions on foreign bank entry. However, the evidence in this area suggests that foreign banks tend to lend mainly to large firms (domestic or multinationals) and to the government rather than to smaller firms, for which local knowledge is required to evaluate risk. Detragiache *et al.* (2008) conclude that foreign bank entry can even be detrimental by “skimming” the quality clients and thus constraining the expansion of local banks that serve “informationally opaque” clients, such as smaller local firms.

Given policy efforts to promote financial deepening, the thinness of Ethiopia’s banking sector suggests structural issues constraining demand for banking services. For example, Allen *et al.* (2012) argue that the minimum viable bank scale is most likely to be achieved only in major cities where there is sufficient population density. They also comment that “most established commercial banks view the sectors targeted by [microfinance institutions] as ‘unbankable’.”

At the same time, Allen *et al.* (2012) conclude, based on a study of the growth of banking in Kenya using a new dataset on bank branch penetration at the district-level matched with household surveys of financial usage, that significant gains can be made with suitable bank strategies and that technological advances, such as mobile telephone banking, could facilitate Ethiopia’s financial development on the savings side.

4.2 Insurance Sector

Insurance companies have longer-term liabilities than banks and thus can safely invest in longer-term instruments and projects. Accordingly, in addition to providing risk mitigation for clients, they fill an important niche in a financial system.

Ethiopia’s insurance industry, like its banking sector, features relatively few companies with a very small number of branches given the size of the population. At the end of 2013, seventeen insurance companies existed with 293 branches, more than half of which were in Addis Ababa.

Some recent analysis on the determinants of insurance sector performance may shed light on how policy may be adjusted to promote more extensive financial deepening in this sector. In particular, Mehari and Aemiro (2013) report that large, highly-leveraged, low-risk and high-fixed-asset insurance companies perform better financially, while firm age, liquidity and growth in written premiums have no statistically significant relationship with performance. Again, this points to structural factors which may explain the overall low level of penetration of insurance services in Ethiopia.

4.3 Microfinance Institutions (MFIs)

The story with MFIs in Ethiopia is similar to that of banks and insurance companies: rapid growth from a small base that still leaves large parts of Ethiopia's economy under-served. Deribie *et al.* (2013) provide a relatively up-to-date perspective on the growth of the industry (which reached 2.5 million borrowers and 6.9 billion birr in loans in 2011).

Doocy *et al.* (2005) provide an in-depth report on the impact of a successful MFI project and comment on the role of microfinance in building both human and productive capacity. Certain MFIs also run projects aimed at women, who tend to be at a higher economic disadvantage than men, especially in the informal economy. However, Bekele and Worku (2008) show that micro, small, and medium enterprises (MSMEs) run by women had a higher likelihood of failure than those run by men (Deribie *et al.*, 2013).

MFIs have great potential to deepen the financial sector in Ethiopia. In contrast to banks and insurance companies, which might be constrained by the structural factors in Ethiopia, it would appear that Ethiopia is ideally suited for MFI expansion. Accordingly, it may be that regulatory factors are important constraints.

4.4 Capital Markets

Ethiopia has successfully established a commodities exchange but does not have a securities exchange. The lack of an organized secondary market means that securities may be traded openly, but investors face problems of liquidation when the need arises. Nonetheless, the government bond market has expanded significantly as a share of GDP and its depth is in line with a number of comparator economies. Ethiopia's nascent corporate bond market is also advanced beyond the Sub-Saharan African average, although not as much as Ghana, for example (Table 1). Accordingly, Ethiopia has in place the base for an expanded role for capital markets to mediate the flow of savings to investments.

Table 6: Market Capitalization of bond markets in Ethiopia and selected SSA countries

	Government Securities Market Capitalization (% of GDP)		Corporate Bond Market Capitalization (% of GDP)	
	1990–2000	2001–2010	1990–2000	2001–2010
	Ethiopia	21.78	28.42	0.00
Gambia	26.78	29.84	0.00	0.00
Ghana	13.74	28.17	0.04	3.47
Kenya	15.02	20.84	0.03	0.46
Mauritius	22.76	32.39	0.23	0.20
Uganda	39.99	40.30	0.04	0.20
Sub-Saharan Africa average	17.30	18.83	0.65	1.12

Source: Yibin et al. (2013: Table 6).

One constraining factor for rapid development of Ethiopia's capital markets is the lack of suitable investment opportunities domestically. This structural factor tends to lead to what is generically described as "capital flight". In this regard, compliance with record-keeping requirements from enforcement of tax payment may have a positive side-effect of increasing financial

sophistication of private enterprises. This would not only pave their access to capital markets, but it would provide domestic investment opportunities.

5. Conclusion and Recommendations

We reach a mixed verdict in our review of Ethiopia's progress to date in mobilizing financial resources to underwrite its ambitious program of economic and social development under the GTP-I and its likely successor in GTP-II.

Ethiopia has made significant progress in developing its economy and in meeting its social policy objectives as set out in its MDG commitments. It has done so despite confronting numerous complicating factors in addressing its revenue generation problem. These include large and complex challenges in the following areas: establishing a stable macroeconomic framework; relaxing microeconomic structural constraints flowing from the under-developed private sector and the country's reliance on rain-fed agriculture; and nurturing a transformation of the socio-economic fabric of the nation, which is characterized by shallow financial depth, a high degree of informality of economic activity, and a weak social contract between state and individual taxpayers.

Moreover, Ethiopia managed to realize these economic and social gains despite relatively slow progress in improving the basic conditions for a private sector economy – at least if we take at face value the persistently low rankings on international benchmarks such as the World Bank's *Doing Business* and *Logistics Performance Index*. Focusing more narrowly on revenue generation, Ethiopia achieved this progress in the face of challenges in terms investment capacity and policy implementation effectiveness (Badu et al., 2012).

In terms of policy reforms, Ethiopia has formally played by the book in the two basic areas of taxation and financial sector regulation, but the recommended reforms in these areas these have not come together to

generate the domestic savings needed to support the investment required going forward. Notably, Ethiopia, although growing faster than many of its Sub-Saharan African peers, has failed to substantially raise the fiscal revenue share of GDP, whereas other comparator economies have.

There are of course ways in which governments can address economic development objectives without directly tapping budgetary resources. For example, states can establish state-owned enterprises (SOEs), which benefit from the implicit or explicit guarantee of the state in their access to capital markets. SOEs can be assigned developmental objectives, to be financed from revenues generated by the commercial activity undertaken. The SOE route is likely to face headwinds in the future however.

Where there are significant positive externalities associated with the mandated activity, profit may not be the most important consideration from an economic welfare perspective and private sector engagement therefore may be lacking or even result in inferior outcomes. Accordingly, establishing SOEs can make sense on economic theory grounds. East Asian development which featured financial suppression engineered by the state through state-directed lending of private sector banks had much the same effect—albeit with different financial “wiring”. Moreover, the formerly highly polarized debate on SOEs is giving way to a discussion of the conditions under which they can help address development objectives (e.g., see Musacchio and Lazzarini, 2012).

Ethiopia received its first sovereign debt credit ratings in May 2014 from Moody's, Standard & Poor's and Fitch (B to B+ in each case, below investment grade²⁸); accordingly, its capacity to contemplate some initiatives in this direction has improved.

At the same time, the SOE route would not be a general solution to the development puzzle for Ethiopia. Moreover, it would carry distinct dangers.

²⁸ “Ethiopia receives first sovereign rating,” *Financial Times*, 12 May 2014.

First, while investors hungry for yield pickup in the era of quantitative easing may very well snap up high yield bond issues (African bonds have been over-subscribed in the recent “bond rush”²⁹), the debt created would place Ethiopia at great risk in the not too distant future when Western Central Banks restore positive real interest rates. Second, the WTO+ rules framework for international commerce that is under discussion in the Trans-Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP) negotiations is likely to constrain the role of SOEs in the future. The focus of this paper on the development of long-term sustainable domestic resources to finance Ethiopia’s development ambitions is thus relevant for policy.

With its newfound international credit rating, Ethiopia could also conceivably fill a greater share of its financing needs by tapping into the demand for higher-yielding bonds from investors in advanced countries. However, debt-generating financing carries significant risks as bouts of emerging market crises following monetary corrections in the advanced countries have shown.

All considerations lead, accordingly, to the conclusion that Ethiopia needs to mobilize significant additional amounts of domestic resources, on a sustainable basis, to sustain its nascent economic miracle. Our review does not identify a simple solution, but it does identify a significant number of areas that should be explored– these are summarized in the table below. Ethiopia has followed convention in basic areas of taxation and private sector resource mobilization; in these areas, the scope to improve is at the margin. The basic principles that should guide reforms are as follows:

- Fewer rather than more taxes;
- As broad a base, as few exceptions, and as low a rate as feasible;
- Horizontal equity across comparable groups (e.g., rural vs. urban poor);
- Increasing the overall progressivity in the sharing of burdens; and

²⁹ For a description and discussion of the bond rush in Africa, see Sulaiman (2014).

- A demonstrable reduction in favoritism in application (e.g., less discretion).

Ethiopia has also eclectically adopted the developmental state model in its industrial policy; and it has muddled through using conventionally inappropriate macroeconomic policies (e.g., negative real interest rates and central bank financing of government expenditures). These worked to sustain Ethiopia's high growth through the GTP-I period. However, there is scant evidence that Ethiopia can move to the next level of development, which we anticipate will be the stated goal of GTP-II, without formally resolving the basic contradictions in its current policy approach that impact on productivity and savings:

- raising domestic savings while maintaining negative real interest rates;
- achieving sustained growth without a large and growing formal business sector; and
- achieving rapid growth based on convergence to the international technology frontier without a highly open trade and investment policy.

In conclusion, Ethiopia faces a “chicken and egg” situation: financing drives development and development generates financing. Supportive macroeconomic and structural economic reforms will endogenously drive revenue mobilization through the revenue-generating institutions that Ethiopia has already put in place. Optimizing the efficiency of these institutions will allow Ethiopia to make the most of the new opportunities for revenue mobilization. Only export-led manufacturing, in part driving off the agricultural base, in a context of a major expansion of formal enterprises, coupled with best practice performance in revenue generation will square the circle of Ethiopia's development financing challenge. GTP-I generally succeeded in the absence of these conditions; GTP-II will not likely be able to follow the same recipes and will have to progressively move Ethiopia through structural change to resemble in its institutional makeup the middle income economy that it seeks to become.

Summary of measures/reforms to improve domestic resource mobilization in Ethiopia

Macroeconomic
1. Reform the monetary policy mix to correct the exchange rate misalignment and restore positive real interest rates
2. Deepen institutional savings by developing social security; use social security revenues to fund longer-term investments and to provide debt finance to government, at positive real yields, to replace central bank financing
Microeconomic and Trade
1. Develop the formal private sector by reducing the cost of business start-ups to generate industrial exports to expand resources available for domestic investment
2. Prioritize institutional savings by developing social security funds which support infrastructure investments and public finance at positive real rates of return
3. Reduce the administrative cost of filing social security returns
4. Improve border administration with neighbors to increase formal trade and generate trade tax revenue
Taxation and Tax Administration
1. Reduce the cost of paying taxes by consolidating marginal taxes and reducing the frequency of payments
2. Reduce the use of tax incentives
3. Establish an office dedicated to medium-sized taxpayers, building on the evident successes of LTOs
4. Increase the use of withholding and advance collection schemes as the formal business sector expands
5. Review the administration of the presumptive tax on small business
6. Dedicate units within the tax administration to high-income/wealth individuals
7. Strengthen audit powers, including the possibility to use indirect methods to assess tax liabilities and systematic random audits, risk-based audits, to reduce incidence of tax fraud
8. Participate in multilateral action on tax havens
9. Adopt best practices for addressing abusive transfer pricing
10. Reduce the number of zero-rated and reduced-rate items under the VAT, to reduce regressive characteristics

11. Continue to expand the use of cash registers and to inculcate a culture of record-keeping in private sector business
12. Review the thresholds for transition from VAT to Turnover Tax and within the Turnover Tax structure to ensure efficient administration in the face of bracket creep due to rapid inflation in the past
13. Review federal-regional sharing of VAT/Turnover Tax revenues and the use of block grants to ensure that the system is not creating disincentives to effective administration of the tax system as a whole
14. Review the excise tax structure to optimize rates, taking into account both price elasticities of consumption and the incentives for smuggling due to differentials with neighboring countries
15. Review the administration of ERCA to address points of friction that have emerged with the business community
16. Ensure appeal procedures are robust to promote fairness and willingness to comply with tax obligations
17. Ensure public (including especially online) information on taxes and tax compliance obligations is comprehensive and consolidated to facilitate compliance
18. Simplify taxpayer registration, filing, and payment, including by integrating commercial and tax registration, since both use the same TIN
19. Review the tax procedure codes and regulations with a view to simplification
20. Improve coordination between tax and customs, including by use of information technology applications
21. Review basic processes with a view to automating routine tasks to increase efficiency and reduce compliance costs for private business and individuals
Private Sector Resource Mobilization
1. Support the development of mobile telephone banking to deepen Ethiopia's financial sector in the face of constraints to growth in banking due to low initial scale of operations outside of major urban centres
2. Review structural factors that may be inhibiting the growth of the insurance sector
3. Expand resources for promotion of microfinance institutions to exploit under-utilized potential
4. Accelerate plans to develop government and private sector bond/bill exchanges and an equity exchange

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The Impact of International Remittance on Poverty, Household Consumption and Investment in Urban Ethiopia: Evidence from Cross-Sectional Measures*

Kokeb G. Giorgis¹ and Meseret Molla²

Abstract

International remittance is an essential source of foreign exchange for Ethiopia, perhaps larger than the export earning of the country in its foreign exchange generation capacity. In the year 2013; total international remittance in Ethiopia reached 557 million USD from 387 million USD in 2010 according to World Bank Report. To assess the impact of international remittances on poverty, household consumption and investment in urban Ethiopia, this study used primary household survey data collected from four major urban areas of the country namely Addis Ababa, Gonder, Hawassa and Mekelle. The study applies both descriptive and empirical analysis; using Heckman two stage selection model the study finds that international remittances substantially reduce the level, depth and severity of poverty. For the sub sample of households which receive remittances poverty head count index, poverty gap and squared poverty gap declined by 64 percent, 67 percent and 70 percent respectively. Similarly the study found that all remittance receiving households spend part of their remittance income mainly on food and non durable goods. Yet, a good number of households are also used part of it for investment such as health, education and housing. Nevertheless; relatively insignificant number of households save part of remittance income and none of them used it to invest in entrepreneurial or other income generating activities.

Key words: International remittance, poverty and household consumption and Investment

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¹ PhD Candidate at School of Economics, Addis Ababa University

Email: kokeb96@yahoo.com

² PhD Candidate at College of Development Studies, Addis Ababa University

Email: mesenana_03@yahoo.com

1. Introduction

From the standpoint of economic development, the impact of international migration and remittances thereof on poverty in the developing countries is tremendous. These remittances which are spent or used by households in recipient countries seem central to any attempt made to evaluate the overall effect of migration and remittances in developing countries including Sub-Saharan Africa (SSA).

According to the UN report, international migration is one of the vital factors influencing economic relations between developed and developing economies in the 21st century. At the beginning of the century, it was projected that around 175 million people - nearly 3 percent of the world population lived and worked outside the country of their origin (UN 2002).

Based on the 2013 World Bank Report, total stocks of emigrants in SSA reached 22 million; of these more than 620 thousands are Ethiopian migrants; which is equivalent to 0.7 percent of the 82.8 million population of the country in year 2010. Of the total stocks of Ethiopian migrants around 61 percent reside in Sudan, the United States of America and Israel. This implies that these countries are the three major destinations for Ethiopian migrants. Moreover, Ethiopians in Western Europe amount to 11.2 percent of the total stock of migrants in the same period. Ethiopian serving housemaids in Saudi Arabia amount for 4.6 percent of the total Ethiopians living abroad. This number is growing at a higher rate since then. It is also becoming a common practice for young women to go to the Middle East to work mainly as housemaids due to the regions geographic proximity and nature of the labor market.

Ethiopia, with a population of about 84.5 million is the second-most populous country in Africa next to Nigeria. Though one of the world's oldest civilization, Ethiopia is currently one of the world's poorest nations. At US\$

380, Ethiopia's per capita income is much lower than the SSA average of US\$ 1,165 in FY 2010 (World Bank 2011).

According to the recent Interim Report on Poverty Analysis Study (2010/11) of Ministry of Finance and Economic Development of Ethiopia, in 1994/95 the total population under the poverty line was close to 49.5 percent. Since then, it continuously kept on declining to 38.7 and 29.6 percent in 2004/05 and 2010/11 respectively. As per the report, this is mainly due to the implementation of the comprehensive poverty reduction strategy (MoFED 2012).

Thus it is important to know how poverty is affected by remittances and how remittances are spent by households to design policies that reinforce use of remittances in a way to alleviate poverty and enhance household investment. As poverty reduction is a top priority to developing countries including Ethiopia.

We have two rationales for this study. First, studies on the impact of international remittance on poverty, household consumption and investment in developing countries and particularly in Ethiopia have been quite limited and inadequate even though remittance inflow to these countries is tremendously increasing. For instance, as discussed in the background section of this paper, international remittances to Ethiopia has been increased by more than nine folds to reach 524 million USD in 2012 from a mere 53 Million USD in 2000. Despite this fact a little attention has been paid to examining the economic impacts of these transfers on households in the country, hence studies of this nature in Ethiopia are scant. The only paper worth mentioning is a study conducted by (Berhe 2012); it investigates the effect of remittances on poverty and inequality in Ethiopia. It has used household survey data collected by Addis Ababa University school of Economics in collaboration with Gutenberg University in 2004. The two major limitations of the study are first it has used old data sets, data collected before Eight years; in 2004, secondly the data sets used has incomplete

information about migration experience and remittances of households; as the data had been primarily collected to study urban poverty in the country than how international remittances affect poverty. Therefore our study is justified by the fact that the above two major limitations are accounted as it uses newly collected primary data sets on international migration and remittances. It is also further justified by the fact that it tried to shed light on how remittances are spent by recipient households in Ethiopia which is totally missing in the literature.

Second, the impact of remittance on household consumption pattern and investment is controversial. Castaldo and Reilly (2007) find that households that receive international remittance in Albania spend more on durables and spend less on food, on average *ceteris paribus*, compared to households which do not receive any form of remittances. However, households in Ghana treat remittances like any other source of income and their marginal spending pattern does not depend on remittance income (Adams et al., 2008). Poorer households in Indonesia tend to spend their remittances at margin more on consumption rather than investment goods. While Airola (2007) observed that households which receive remittances in Mexico spend more of their total income on investment goods like housing, healthcare and durable goods. Thus there are mixed views on how international remittances are spent by households which differ from one country to another. But so far no empirical research had been conducted on how international remittances are spent by households in Ethiopia. For this reason conducting this research is helpful to fill this research gap.

Thus the key research question is: to what extent do international remittances affect poverty, and how are remittances spent by urban households in Ethiopia? Specifically, what is the difference in poverty level as measured by poverty index and poverty gap index between households that receive cash and non cash international remittances and those who do not? Do the poor benefit from remittances more significantly than the non poor? What are the factors that determine how remittances are spent or used by households in

urban Ethiopia? Does the expenditure pattern of households vary from those do not receive remittances?

2. Theoretical and Empirical Review of Literature

Remittance implies the transfer of money and/ or goods to households by migrants working outside of their origin either in urban areas or abroad. At the start of the 21st century, both internal & international migration has been at high level and hence remittances have been intensified. These resources represent one of the key issues in economic development to the recipient countries.

Since 1980's there are extensive studies on the economic impact of international remittance on poverty, income inequality and how remittances are spent by households in the recipient developing countries with mixed findings, different methodology and data.

Vast majority of results from empirical studies indicated that remittances have played a positive role in reducing poverty and increasing welfare of households and communities even if there is a possibility for worsening income inequality ((Adams 2006), (Adams & Cuecuecha 2010), (Lisa 2012)). There are also empirical studies which proved the other way (Wouterse 2008), however, this remains to be investigated in Ethiopia.

Studies such as Adams (2005) tried to see the impact of international remittances on poverty and income inequality in Guatemala and deduced that the overall remittances did not significantly reduce poverty in the country as the head count ratio fell from 0.56 to 0.55. Although another paper by the same author Adams (2006) inferred that the level, severity and depth of poverty was considerably reduced in Ghana, as a result of international remittance, where the severity of poverty has declined by 34.5%. However both studies applied counterfactual estimation procedures. But such difference may occur as a result of how poverty is being calculated.

Adams & Cuecuecha (2010), using household panel data, conclude that international remittances have a large statistical effect on reducing poverty in Indonesia. Whereas a study in Burkina Faso conclude that remittance had a limited impact on social welfare but aggravates income inequality as significant numbers of households with international migrants were found to be in the high income groups (Wouterse 2008). However, if some of the remittance receiving households comes from the lower income spectrum, remittances can decrease poverty and inequality (Adams 2006 & Berhe 2012).

The only paper studied on the impact of international remittance on poverty and inequality in Ethiopia was by (Berhe 2012) using urban household survey data collected in 2004. It concluded that poverty considerably reduce, where the head count ratio fell from 30 percent to 25 percent. Similarly both the poverty gap and squared poverty gap ratios also decreased from 6.6 percent to 5.2 percent & from 2.2 percent to 1.7 percent respectively. Likewise a paper by (Lisa 2012) with broader scope compared to the above study used propensity score matching to see the impact of remittances on welfare of urban & rural households using primary data and conclude that remittances positively affect household's welfare. Our study, however; differs from the aforementioned studies primarily because it not only shades light on the impact of international remittances on poverty but also on how international remittances are spent by households.

There is no strong evidence in the empirical literature that answers questions like: how international remittances received are spent at household level? However, there are different arguments on the literature on how remittances are spent by recipient households and its implication to economic development of the origin country. These arguments are summarized into three dominant views as follow:

The first and perhaps the most dominant view is that remittances are spent like any other source of income and are considered as fungible. In other

words, a dollar of remittance income is considered just similar to a dollar of salary/wage income and hence there is no difference on how households spent this remittance. The second view argues that as remittances create behavioral change at the level of households, then, it is more likely to be spent on consumption than investment goods. The third and more recent argument is that households spend higher proportion of their income from remittances on investment goods such as human & physical capital than on consumption goods since income from remittances are temporary. This argument emerges from the perspective of permanent income hypothesis.

According to (Adams, Cuecuecha & Page 2008), using a cross sectional data and multinomial logit selection model, both internal and international remittances received by households in Ghana treat remittances just like any other source of income, and there are no changes in marginal spending pattern for households.

Chami et al. (2003) find that remittances are spent on consumption, with a smaller fraction going to savings and investments. However, more recent literature stresses the importance of remittances on economic development, through spending on investments. For example a study by (Adams and Cuecuecha 2010) showed that remittance recipients in Guatemala marginally spend more on one investment good, education. They state that this is consistent with the permanent income theory which finds that a higher marginal propensity to invest is found with transitory income or remittances than with permanent income.

Using data from the Mexican income and expenditure survey for 1989 (Hoyos 2000), found that remittance receiving households devote a higher proportion of current expenditures to investment and perhaps even to savings than non-remittance receiving households. Similarly the finding of (Ahmed 2000), suggested that remittances in postwar Somaliland have contributed to the rapid growth of a vibrant private sector. According to Adams (2006), households receiving international remittances spend less at margin on

consumption goods like food and more on investment goods like housing and education and invest more in entrepreneurial activities. However, there are no empirical research outputs on how international remittances are spent by households in Ethiopia. For this reason conducting this research is helpful to fill this gap.

3. Methodology

3.1 Data Collection Methodology

The unit of analysis is remittance and non-remittance receiving urban households selected from four major cities of the country namely: Addis Ababa, which is the capital city of Ethiopia, and three regional cities Gonder, Hawassa and Mekelle. All these are covered by the rich primary data collected by the researchers. What we mean by a household in this survey follows from the definition previously used in other migration surveys, where it is extended to not only include members who live together and have communal arrangements concerning subsistence and other necessities of life but also those members who presently reside abroad but whose obligations are to that household and hence a person living abroad can in this way still be considered as member of the household.

A total 700 urban households were randomly selected. Of these 304 households, which are around 43 percent of the total sample, are from Addis Ababa. The other three cities namely Gonder, Hawassa and Mekelle each have a sample of 132 households since the population size of these cities is more or less similar. However, out of the total 700 households randomly selected, 636 households were interviewed between January and March 2013 with 9 percent non response rate. Households with a returnee migrant and that may have received remittances in the past might differ from the other households in the sample, and to avoid any bias in the results, households with returned migrant are excluded from the sample.

3.2 Methods of Data Analysis

3.2.1 Descriptive Analysis

Descriptive statistics such as mean, standard deviation, frequency and percentile were computed for the variables following the completion of data processing, and also run a t-test for continuous variables and chi-square test for dummy variables to detect the statistically significant differences between households which received and that did not received international remittances.

3.2.2 Econometric model

There are a number of methodological issues to look at in examining the impact of international remittances on poverty reduction. As discussed in the literature review, remittances can be considered as exogenous or endogenous. Whichever way you select, the economic question and the methodology you apply will vary. If remittances are treated as exogenous transfer then the objective will be to see how remittances affect the observed level of poverty where as if remittances are considered as a substitute for home or domestic earnings the economic question will be to compare & contrast the observed (actual) level of poverty with counterfactual scenario without migration and remittances which includes an imputation of the home earnings of migrants had those people stayed and worked at home (Adams 2006). This latter treatment is our objective and we adopted econometric techniques suitable for this analysis.

There are two different strands of literature on migration and hence remittance receiving households are self selected or randomly selected. Majority of the literature on migration assumes that there is selection bias which can be observable or unobservable (skills, motivation and ability). For instance the findings by (Adams 2006) which assesses the impact of remittances on poverty in Ghana and another paper by (Barham and Boucher 1998) in their examination of selection bias among migrant

households in Nicaragua found out that there is “no selection bias” while the majority of the research output on migration and remittances conclude that there are both observable and unobservable selection biases. Therefore, this research output applied Heckman two stage selection model to solve selection bias which result due to both observable and non-observable.

In econometric terminology, households with international migrants and receive remittance are considered as treatment groups while those households without international migrant and do not receive remittances as control group. Our outcome of interest as clearly stated in our objective is to see the impact of international remittances on poverty. Our interest is in making inference on those households with international remittances. This is the average treatment effect on the treated (ATT). ATT estimates on average how remittances affect the level of poverty in those households who receive this remittance had those households not received remittance.

In this approach the focus is on determining whether poverty levels are lower in the actual scenario, with migration and remittances. The core of the methodology consists of estimating what the migrants’ income would be if migrant members had decided to stay, that is a counterfactual household’s income needs to remove both the direct effects of migration on the earnings of the remaining household members.

This counterfactual approach was initially developed by (Adams 1989) in his study of the effects of remittances on poverty and inequality on rural Egypt taking three sample villages. In order to estimate the counterfactual household income, he estimated a mean regression of income of non-migrant households and used the resulting parameters remittance to predict the incomes of migrant households. These predicted incomes of migrant households were then used to estimate poverty and inequality in a counterfactual scenario of non migration. But here the key problem is an attempt to use income/consumption expenditure of non-migrant households to proxy for counterfactual income/consumption expenditure in estimating

treatment effects selection bias arises when the proxy is not close to the counterfactual which is proxied for. Hence, we use the following framework to demonstrate bias in estimating ATT. Hence the following equations can be used:

$$T_i = \mu_1 + \beta_1 Z_i + \omega_1 H_i + \varepsilon_{1i} \quad (1)$$

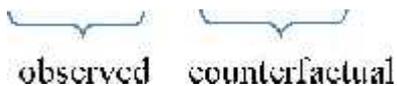
$$Y_{0i} = \mu_2 + \beta_2 X_i + \omega_2 H_i + \varepsilon_{2i} \quad (2)$$

$$Y_{1i} = \mu_3 + \beta_3 X_i + \omega_3 H_i + \varepsilon_{3i} \quad (3)$$

Where the first equation (1) models the treatment decision, whether a household receives remittances or not which depends not only on observable factors such as 'Z_i' and 'H_i' but there are also unobservable factors which affects the probability of migration and hence remittance. The second equation (2) models the outcome (Y) of non-treatment (with subscript 0) and Equation (3) models the outcome of treatment (with subscript 1). Where T_i represents the probability of migrating abroad and hence receives international remittance, Y_i is an outcome which is per capital household consumption expenditure, X_i is household level variables such as human capital, demographic and location variables; H_i is household head characteristics and 'Z_i' are observable and others () are not. Which means all Z_i includes all X_i and other observable variables as well.

The average treatment effect on the treated (ATT) can be given by

$$ATT(x) = E[Y_{1i}|T_i=1] - E[Y_{0i}|T_i=0] \quad (4)$$



The ready candidate to proxy for the counterfactual is to use consumption expenditure/income of households without international remittance. Hence

this bias is referred to as the “selection bias” in econometric which is given by:

$$\text{Selection bias} = \text{ATT} - \widehat{\text{ATT}} = E \underbrace{[Y_{0i} | T_i=1]}_{\text{Counterfactual}} - E \underbrace{[Y_{0i} | T_i=0]}_{\text{proxy}} \quad (5)$$

Heckman two stage selection model is based on two equations: first, a choice equation which captures migration and the receipt of remittances; and second, household per capital consumption expenditure equation which measures the determination of household consumption expenditure on the receipt of international remittances.

To construct the counterfactual scenario of no migration and no remittance the first-stage choice function is the probability that a household has no migrant member abroad and hence receive no international remittances, therefore, modifying equation (1) above by splitting Z_i in to X_i and θ_i the type of selection equation which can be estimated as:

$$T_i^* = \mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa \theta_i + \varepsilon_{1i} \quad (6)$$

Where T_i represents the probability for no migration and, hence, receives no international remittance, X_i is a vector of household level variables such as human capital, demographic and location variables; H_i is household head characteristics and θ_i is age of household head that is a variable which affects the probability of migration and hence remittance but not household consumption function and ε_{1i} is a disturbance term.

The rationale for including these variables in the first -stage probit function follows the standard literature on migration and remittances. As to Todaro (1970) basic human capital model it is highly probable that human capital variables are more likely to affect migration because more educated people

enjoy greater employment and expected income-earning possibilities in destination areas (Adams 2006).

In the second stage counterfactual consumption function is estimated for those households who do not receive remittance, the following function is estimated for the subsample of households which do not receive remittances modifying equation (2) by taking logarithm of the outcome equation we get:

$$\log C_i = \mu_2 + \beta_2 X_i + \omega_2 H_i + \varepsilon_{2i} \quad (7)$$

Where the dependent variable $\log C_i$ is logarithm of per capital household consumption expenditure than household income. Since the aim of this paper is to evaluate impact of remittance on poverty and most research outputs in developing countries like Ethiopia uses expenditure than income data for poverty analysis as expenditure is easier and more accurate to measure the income, though people tend to hide their income for fear of taxes and hence understate their income and poverty line which separates the poor from the non-poor is based on expenditure rather than income data.

X_i and H_i are defined the same way as in equation (6) and ε_{2i} is a disturbance term.

Since there is evidence from migration literature that households which receive remittances are not randomly drawn from the whole population. Using OLS method to estimate the consumption function will make the result biased as there is self selection, hence, Heckman (1979) two stage selection is applied where in the first stage the probability of having not an emigrant member abroad and hence not receive remittance is estimated using the probit function. Then, the information from the probability regression will be used in the second stage of consumption function.

In the first equation (6) T^* is not observed, what is observed is only the sign of T^* , i.e, weather the household receives remittance or not, i.e.

$$T_i = \begin{cases} 1 & \text{if } T^* > 0 \\ 0 & \text{if } T^* \leq 0 \end{cases} \quad (8)$$

We observe the dependent variable Y_i in the objective function only for those households which do not receive remittances or $T_i = 1$.

As discussed above, problems arise when estimating the objective function if ε_{1i} and ε_{2i} are correlated. We make the following assumptions about the distribution and relationship between the error term and selection and outcome equation:

$$\begin{aligned} \varepsilon_{1i} &\sim N(0, \sigma^2_1) \\ \varepsilon_{2i} &\sim N(0, \sigma^2_2) \\ \text{corr}(\varepsilon_{1i}, \varepsilon_{2i}) &= \rho \end{aligned} \quad (9)$$

This implies that the error terms in equation (6) and (7) are assumed to be jointly normally distributed with mean zero and correlation ρ . Since the sign of ε_{1i} is only observed, then, we have normalization $\sigma^2_1 = 1$.

Under the above normality assumption about the error terms and using equation (6) and (7):

$$\begin{aligned} (\log C / X_i, H_i, T_i = 1) &= E(\log C / T^*_i > 0) \\ &= E(\mu_2 + \beta_2 X_i + \omega_2 H_i + \varepsilon_{2i} / \mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i + \varepsilon_{1i} > 0) \\ &= \mu_2 + \beta_2 X_i + \omega_2 H_i + E(\varepsilon_{2i} / \mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i + \varepsilon_{1i} > 0) \\ &= \mu_2 + \beta_2 X_i + \omega_2 H_i + E(\varepsilon_{2i} / \varepsilon_{1i} > -\mu_1 - \beta_1 X_i - \omega_1 H_i - \kappa\theta_i) \end{aligned}$$

Hence we have to obtain the value of $E(\varepsilon_{2i} / \varepsilon_{1i} > -\mu_1 - \beta_1 X_i - \omega_1 H_i - \kappa\theta_i)$, when ε_{1i} and ε_{2i} are correlated according to Green (2003), it is given by:

$$E(\varepsilon_{2i} / \varepsilon_{1i} > -\mu_1 - \beta_1 X_i - \omega_1 H_i - \kappa\theta_i) = \rho\lambda i \left(\frac{\phi\left(\frac{\mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i}{(\sigma_{\varepsilon_{1i}})}\right)}{\Phi\left(\frac{\mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i}{(\sigma_{\varepsilon_{1i}})}\right)} \right)$$

Where ϕ and Φ are respectively the density and cumulative normal functions. When we substitute it in the above equation it becomes:

$$E(\log^c X_i, H_i, T_i = 1) = \mu_2 + \beta_2 X_i + \omega_2 H_i + \rho\lambda i (\mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i) \tag{10}$$

Where the inverse Mills ratio is given by $i = \frac{(\mu_1 + \beta_1 X_i + \omega_1 H_i + \kappa\theta_i)}{(\sigma_{\varepsilon_{1i}})}$ (11)

Hence, to include the selection term in the consumption function above, we estimated lambda from the probit function of no migration and no remittances from equation (11). Then the estimated value of $\hat{\lambda}_i$ has been included in the consumption function. Hence, the function to be estimated in the second stage is:

$$\log C = \mu_2 + \beta_2 X_i + \omega_2 H_i + \rho\hat{\lambda}_i + \delta_i \tag{12}$$

Where the $E(\delta_i / X_i, H_i, \hat{\lambda}_i) = 0$

Once the selection term is included in the consumption function Ordinary Least Square (OLS) can be used to estimate equation (12). If the coefficient of lambda ρ is different from zero and statistically significant, then, there is correlation between the error terms of the two equations. Hence OLS on the outcome function will lead to bias and inconsistent estimates because $\rho\lambda i$ (.) is omitted.

Before implementing the two stage procedure, model identification is not only at the heart of it but also it remains to be the most difficult task to do. A model is identified if the number of explanatory variables in the first stage equation i.e selection equation exceeds that of outcome equation in our case the consumption function by at least one variable. But this is not as simple as that. The key econometric problem lies in choosing the variable that should go into the first and second stage equations since more or less the variables which affect probit function affect the consumption function. Here we need to select a variable which does not affect consumption function but that affects the probability of migration and hence remittances. For example (Adams 2005) used age of household head in his study in Ghana while ethnicity and religion were used by (Nnaemeka & et al 2012) for the study in Nigeria. Similarly (Berhe 2012) used religion as source of identification in his study in Ethiopia.

As a source of identification, in this study, similar to (Adams 2005) the age of the household head is used, other things remain constant. Older household heads will have more household members as adults in the age 15 to 30 category which creates higher possibility for migration and hence remittance as well. However, it is believed that age of household head has no direct impact on consumption after controlling all other variables such as demographic, human capital, ethnicity and location variables.

Once identifying the Heckman selection model, the two stage procedure was implemented. To predict counterfactual consumption for households which receive remittances, the following procedures are applied. Primarily, from equation (12) the parameters predicting per capital consumption expenditures are estimated in households that have not sent migrant abroad. Then these parameters are applied to migrant households to predict counterfactual per capital consumption expenditure.

To construct actual per capital consumption with remittances for those households with international migrants equation (12) is revised to include

migration dummy to account for its effect on household consumption and hence welfare. Hence the equation can be rewritten as:

$$\log C = \mu_3 + \beta_3 X_i + \omega_3 H_i + \pi M_i + v_i \quad (13)$$

Where M_i is a dummy variable for households with migrants abroad and hence receive remittances, it takes the value one if households do not receive remittances and zero otherwise. v_i is an error term X_i & H_i are defined as before.

In calculating counterfactual consumption and probit regression for remittance receiving households the vector of household level variables are revised so as to include migrants.

Once equation (13) is estimated, we can predict actual consumption for both remittance receiving and non receiving households. And to construct counterfactual consumption function for remittance receiving households, the values for remittance receivers are replaced by the estimated values from the selection controlled regression equation.

For the variables used in the Estimation of Model see Appendix Table 1.

4. Results and Discussion

4.1 Data and Summary of Descriptive Statistics

Comparing households who receive and do not receive international remittances city wise, the above table indicates the highest per capita remittance per annum is obtained by households from Addis Ababa and is more than twice when compared to households from Hawassa; where the lowest per capita remittance is generated. This may be due to the fact that households in Addis Ababa have higher probability of sending migrants abroad and hence receive remittance than other urban areas since cost of migration is relatively lower compared with other urban areas. Average remittance as a percentage of total household consumption in urban Ethiopia

is highly significant. For example, households from Gonder cover more than three fourth of their consumption expenditure through income from international remittances which is highest compared to households of Hawassa which covers 39 percent. These relatively big figures indicate that, international remittances have a significant share for those households who earn them compared with other sources of household income.

Table 1: Annual remittance per capita and remittance as a percentage of total household consumption expenditure

City	Remittance Receiving households		All households		Consumption expenditure	Consumption expenditure per capita
	PC Remit.	Remit. exped	Remit. as %	Remit. As %		
.Gonder	70	4,648(4581)	79%	119	2,734(4189)	47%
Mekelle	79	5,840(12236)	65%	157	2,938(9135)	33%
Addis Ababa	143	7,795(13349)	73%	284	3,925(10230)	37%
Hawassa	36	2,850(3744)	39%	76	1,350(2931)	18%
		(328)		(636)		

Source: Computed from own survey data, 2013

Table 2: Summary of Annual international remittances for Urban Households in Ethiopia in 2013 in birr

	All remittance receiving hhs	All households
Average remittance (HH level)	20,000.12	10,360
Average per capita remittance	6109.95	3151.05
Remittances % of total consumption expenditure	68.09 %	35.2 %
Remittance % of total income	44.39%	22.93%
Number of households (as a percentage of total sample)	330 (52%)	308(48%)

Note: 1 dollar is approximately 18 Ethiopian birr

Source: Computed from own survey data, 2013

Average per capita remittance for the sub-sample of households who had received remittance indicates more than 6,100 Birr per annum. When we compare this figure with GDP per capita income of around 9,900 Birr during the same period it is almost more than 60 percent of it, which shows on average the inflow of international remittance is so big. Similarly, it may also substantiate the argument that international remittance figures of Ethiopia are underreported as it only includes remittances received through formal channels which ignores the informal channel.

Similarly, around 68 percent of the total household consumption expenditure is covered by incomes obtained from international remittance for households which receive remittances while on the other hand, for the whole sample including both remittance and non-remittance receiving households, it is around 32 percent. But this does not have to be taken into account to conclude as a national average figure since this only represents for major urban households which excludes the rural one. And it is obvious that urban households have a higher chance for sending migrants abroad compared to rural households. Nevertheless, the current high rate of migration from rural areas of the country to Middle East and South Africa seems to reduce this gap.

Table 3: Summary of Annual household consumption expenditure for remittance receiving and non receiving households

Variable Households	Remittance receiving	Non-Remittance Receiving Household	All Households
Annual household consumption expenditure (in birr)	40,402 (53450)	30,207 (25914)	35,480 (42722)
Annual per capital household consumption expenditure (in birr)	10,401 (10970)	8,388 (7603)	9,434 (9541)

Note: Standard Deviations are in brackets

Source: Computed from own survey data, 2013

The above table summarizes annual and per capita consumption expenditure for remittance receiving, non receiving and all sampled households. The result confirmed that annual consumption expenditure is higher by about 31 percent for remittance receiving households compared to non remittance receiving and around 12 percent for all households. Similarly, per capita annual household consumption expenditure is higher for remittance receiving households compared to both non-remittance and all sampled households. But the key question here is whether this gap is created due to the additional income they generated from international remittance or the remittance receiving households were better-off even before sending a household member abroad. This will be discussed in the last section of the paper.

4.1.2 Summary & Descriptive Statistics for Explanatory Variables

In this section we describe those variables used for estimating consumption function and selection corrected equations. Here we have four categories of explanatory variables namely: household level human capital & demographics, household head characteristics, location and ethnicity. Where 'age of household head' the variable only included in the selection equation.

Household level human capital variables such as number of educated household members and number of adults in the household are expected to have positive contribution for household income and hence consumption per capita. This is due to the fact that households with more adults are more likely to generate higher income and hence higher per capita consumption expenditure given that those adult household members are engaged in income generating activity compared to households with less number of adults. Whereas the impact of household size on income is hard to determine a prior since it depends on the proportion of children in the household below and above 14 years of age. Likewise, household head characteristics such as age, education, gender and marital status are important variables in this model.

The level of household head's education has a direct impact on income and hence consumption per capita while the opposite is true if household head is single headed and /or female headed. Conversely the effects of marital status and age of household is unknown a priori, similarly differences on ethnicity may have an implication on household wellbeing and the variable location will capture the differences in cost of living and type of economic activity the household head engaged and hence income and per capita consumption of the household.

Our first equation, probit function which shows the probability that a household has no migrant member abroad and hence does not receive remittances; among others are determined by human capital and demographic variables.

Among others there are two major opposing views on how number of adults and their level of education can affect the probability of producing migrants and hence receive remittance. According to the basic human capital model as stated by Todaro (1970) as discussed in our methodology, households with more educated members and more adults, have higher probability of sending migrants abroad and hence receive remittances as more educated people can have higher opportunity for employment and hence earn higher income abroad. Nonetheless, one can also argue the other way; where households with more educated members and more adults are comparatively well to do families; hence, these households have less appetite to send their families abroad for the purpose of receiving remittances. But it is hard to say that household size has a positive impact on the probability of migration and hence remittances. Similarly, location which is associated with economic opportunities and economic migration is very important. It is expected that compared to other urban areas cost of migration less in Addis Ababa than elsewhere in the country.

The last variable which affects the propensity of migration and hence remittances but not our objective function per capita consumption

expenditure is age of household head. According to our survey, older household heads will identify our model. According to the literature, the households with older heads are more likely to produce more migrants because they have more household members in the category of adults (15 to 30 years). However, households with older ages are not expected to receive more income even though expenditure (income) generally increases with the level of education, older household heads in Ethiopia are tend to be less educated based on our survey.

Table 2A in the appendix section, shows summary statistics of explanatory variables for actual and counterfactual for remittance receiving, non receiving and all sampled households. The explanatory variables for the counterfactual columns five and six take into account the migrant members as part of the household and hence these variables are used in the first stage selection regression and in calculating counterfactual consumption function for remittance receiving households. Similarly, the explanatory variables in the actual case scenario are used for actual consumption function.

Proportionately, remittance receiving households have more kids/children below the age of 5 & 15, less number of adults, and lower education level on average and have larger household size compared to non remittance receiving households in the actual scenario. While for the counterfactual case which takes into account migrant members, remittance receiving households have larger household size, more adults and have relatively higher level of education. Nevertheless, the number of children between the age of 5 & 15 in relation to the number of adults is more or less the same for both groups of households.

Households with female heads are larger for recipient groups and also have older heads on average though the level of education for the household head is similar in both groups. This similarity supports our previous argument that older heads are not necessarily expected to be educated. In the case of ethnic groups, around half of the remittance receiving households from the sample

survey is *Amharas* and the second largest share goes to *Tigrinan*. Both constitute more than three-quarter of the recipient group.

Addis Ababa and Mekelle account for more than 46 percent and 25 percent of all remittance receiving households respectively, while the smallest share only 13 percent goes to Hawassa. It is anticipated that the lion's share of households who receive remittances comes from Addis Ababa this is due to the reason discussed above where as migration is a risky and costly activity, households from this city tend to send more migrants abroad compared to others.

4.2 Regression Results

As discussed in our methodology unit, the two stage Heckman Selection model is applied to construct the counterfactual consumption function for remittance receiving households. Hence the regression results which are used for constructing the counterfactual consumption function are presented first.

In the first stage probit function, the probability that a household does not have a migrant a broad and, hence, does not receive remittances (selection equation of no migration and hence no remittance) is applied for all households. In the second stage selection corrected counterfactual consumption function, the household human capital and demographic variables for the remittance receiving households are adjusted so that they will include the migrant members.

Hence, the results of the first stage probit function will be discussed first and then the consumption function for non remittance receiving households will follow.

The coefficients for the probit model (see Table 4 below) in the first stage equation do not give the marginal effects of the variable in question on the probability that a household does not produce migrants and hence, does not receive remittances. These marginal effects, however, can be readily computed by a standard transformation. It is these marginal effects from estimating the probit model that are reported in Table 4.

Table 4: Probit Model (Marginal Effect), Selection Controlled Regression used for Counter-factual Consumption Function

Variables	P (No migration & no remittance)	
No. HH members >15yrs primary education	-0.0840	(-1.01)
No. HH members >15yrs secondary education	-0.0632	(-1.03)
No. HH members >15yrs university education	-0.0564	(-0.99)
Household size	-0.356***	(-3.07)
R.kids/Proportion of kids<15 to hh size	1.832***	(3.05)
Number of adults	0.514***	(3.47)
Sex household head(1=male)	0.352***	(3.00)
Head has secondary Or higher education(1=yes)	-0.250*	(-1.90)
Gonder	-0.108	(-0.65)
Mekelle	0.395	(1.53)
Hawassa	0.271	(1.40)
Amhara	-0.0680	(-0.28)
Oromo	-0.179	(-0.65)
Tigre	-0.400	(-1.23)
Gurage	-0.176	(-0.54)
Old age_hh(1=yes, if age of household head>=50)	-0.647***	(-4.88)
cons	-0.0714	(-0.24)
N	590	

Note: the table reports the marginal effects of a variable on the probability of a household with no migrant member abroad and hence receive no international remittances. Figures in parentheses are t- values (Significant at * p<0.1, ** p<0.05, and *** p<0.01)

Source: Computed from own survey data, 2013

None of the ethnic and city dummies are statistically significant.

As it can be seen from the above table, most of the human capital variables are statistically insignificant. However, more educated household heads are more likely to receive international remittances. This might have resulted from the efforts made by the educated household heads, to beat the challenges of immigration cost. Hence, it is expected that they try hard to finance this activity in the short run and receive remittances in the long run. Likewise female headed households have higher probability of receiving

remittances compared to male headed households. Larger family size is associated with higher probability of remittances while higher proportion of kids compared to adults in the household implies lower probability for migration and hence remittance. On the other hand, the number of adults in a family is positively correlated with no migration and no remittances.

Table 5: Annual per Capital Household Consumption Expenditure Estimates (Selection Corrected) for Non Remittance Receiving Households

Variables	Log of consumption per capital	
No. HH members >15yrs primary education	-0.0700	(-1.09)
No. HH members >15yrs secondary education	0.0138	(0.29)
No. HH members >15yrs university education	0.161***	(3.40)
Household size	0.102	(0.91)
R. kids/Proportion of kids<15 to household size	-0.656	(-1.13)
Number of adults	-0.292***	(-2.09)
Sex of household head(1= male)	-0.0346	(-0.32)
Head has secondary or higher education(1=yes)	0.236***	(2.63)
Gonder	-0.400***	(-3.24)
Mekelle	-0.709***	(-2.94)
Hawassa	-0.539**	(-3.90)
Amhara	-0.0278	(-0.17)
Oromo	-0.319*	(-1.69)
Tigre	0.505*	(1.84)
Gurage	-0.102	(-0.42)
Lambda	-0.472**	(-1.98)
Constant	9.854***	(30.48)
Prob > F = 0.0000		
R-squared = 0.2980		
Adj R-squared = 0.2583		
N = 299		

Note: Dependent variable is log of annual per capital household consumption expenditure (excluding remittances) which are used to construct counterfactual consumption for remittance receiving hhs. Figures in parentheses are t-values. * p<0.1, **p<0.05, ***p<0.01

Source: Computed using own survey data, 2013

Finally, older household heads are associated with higher probability of receiving remittances which is similar to our expectation. This variable age of household head is not included in the second stage consumption equation and hence identifies the selection equation.

Table 5 above shows the results for the ordinary least square (OLS) for the selection corrected consumption function estimates. As hypothesized earlier the human capital coefficient household members with university education has positive and significant coefficient and this implies that this variable has a positive effect on household income and hence on consumption expenditure as well. But, it is worth mentioning that number of adults has negative sign and statistically significant again this implies that higher number of adults leads to lower consumption. This may be due to the wider level of unemployment in the country especially in urban areas implying that most of the adults have no contribution to income. From the household head characteristics the number of household heads that have secondary or higher education is statistically significant implying that it has a positive contribution for household income and hence consumption per capita.

The most important finding in Table 5 is that λ is significant at 95% confidence interval and has a negative sign. This implies the existence of selection bias whereby the error term in the first equation in our probit function and second equation consumption function are negatively correlated indicating that unobservable factors that make participation less likely are tend to be associated with higher consumption function. This is consistent with the usual belief that migrant households are positively selected. Thus, OLS regression for the consumption function without taking into account the selection into consideration will bias the effect of remittance on consumption.

From the location dummy, Gonder, Hawassa and Mekelle are associated with lower consumption per capital compared to Addis Ababa. While the ethnicity dummy implies *Oromo* and *Tigre* have relatively lower and higher consumption per capital respectively compare to our reference group which includes ethnicity other than the four major ethnic groups.

Once we estimate the consumption function for non remittance receiving households, the values will be used to construct counterfactual consumption function for remittance receiving households.

Table 6: Regression to Estimate Predicted Per Capita Household Consumption Expenditure

Dependent variable 'log of per capital consumption expenditure'		
No. Household members >15yrs primary education	-0.0802**	(-2.04)
No. Household members >15yrs secondary education.	-0.0209	(-0.71)
No. Household members >15yrs university education.	0.0985***	(3.88)
Household size	-0.0154	(-0.28)
R.kids/Proportion of kids<15 to household size	0.105	(0.36)
Number of adults	-0.137**	(-1.99)
Sex of household head(1=Male)	0.0734	(1.29)
Head has secondary or higher education(1=yes)	0.264***	(4.49)
Gonder	-0.437***	(-5.48)
Mekelle	-0.403***	(-3.29)
awassa	-0.356***	(-3.89)
Amhara	0.142	(1.26)
Oromo	-0.0818	(-0.63)
Tigre	0.356**	(2.31)
Gurage	0.0135	(0.09)
treat_dummy(1=yes receive remittances)	0.161***	(3.08)
_cons	9.173***	(64.16)
N	= 590	
Prob > F	= 0.0000	
R-squared	= 0.2898	

* p<0.1, ** p<0.5, *** p<0.01, t statistics in parentheses

Note: Regression is based on the whole sample remittance receiving and non receiving households; the dependent variable is log of annual per capita household consumption expenditure. Parameters from the regression are used to predict annual per capita household expenditure (excluding remittances) for households which receive international remittances.

Source: Computed using own survey data, 2013

To construct actual consumption for remittance receiving households, we run an Ordinary Least Square (OLS) regression on the whole sample from which we predict the actual and counterfactual consumption function.

Table 6 above, reports the results obtained from using equation (13) to predict per capita household expenditure for both remittance receiving and non receiving households. Most of the coefficients have the right sign and level of significance; only the outcomes for the human capital variable primary education has unexpected sign and merit discussion. This unexpected result suggests that returns to education in the local employment for the lower levels of education are low (and possibly negative).

The variable ‘treat_ dummy’ which shows whether a household has a migrant member abroad and hence receive remittance or not is highly significant. The coefficient for this dummy shows that households which receive international remittances have on average 16.1 percent higher per capita consumption than those who don’t receive. This is consistent with the results of our descriptive statistics as discussed in the previous section.

To see the effect of international remittances on poverty the Foster-Greere-Thorbecke (hereafter FGT) poverty index (1984) is used. The FGT poverty measure is defined as:

$$FGT_{\alpha} = \frac{1}{N} \sum_{i=1}^h \left(\frac{p - y_i}{h} \right)^{\alpha}$$

Where ‘N’= total number of households, ‘p’ is the poverty line, ‘h’ is the total number of households living under the poverty line, and y_i represents the income of a family below the poverty line.

The three variants (depending on three values of α) of the poverty index used to estimate the impact of changes in international remittances on poverty are: first headcount index ($\alpha = 0$) measures the share of the population living below the poverty line. Second poverty gap index ($\alpha = 1$) measures the depth

of poverty, that is the amount by which an average poor family is below the poverty line. Lastly we have poverty gap squared index ($=2$) which measures the severity of poverty and, unlike the other two measures, it is sensitive to changes in the distribution of income among the poor.

The poverty line set by Federal Democratic Republic of Ethiopia the ministry of finance & Economic Development, “Ethiopia’s progress towards alleviating poverty: Interim report on 2010/11 poverty Analysis”, is used in this paper. The poverty line set by this report was computed based on the 1995/96 poverty line. To do so groups of consumption items defined in 1995/6 which generate 2,200 kilo calories were valued at 2010/11 national average price in order to obtain total urban poverty line and defined to be 3,781 Birr.

In this paper, we tried to adjust the above total poverty line constructed for urban areas by adjusting the rate of inflation between 2010/11 and 2011/12 hence the total poverty line became 5,293 Birr considering a 40 percent annual average rate of inflation during the period based on the 2012 World Bank report on the Ethiopian Economy. The three poverty indices are calculated using household consumption per capital adjusted by equivalence scale. The equivalence scale used takes into account the fact that children cost less than adults and there is economies of scale in consumption. This can be given as follows:

$$= (A + C)$$

Where E is Equivalence scale, ‘A’ is numbers of adults in the household, ‘C’ is number of children, α cost of children relative to adults and β measures economies scale. For poor countries like Ethiopia different literatures indicate that the cost of children relative to adults is very low while economies of scale is very high. Implying that ‘ α ’ is low while β is very high. α and β are respectively set to be 0.5 and 0.95 following Kedir and Disney (2004) as stated in Berhe (2012).

Table 7: Summary statistics of Monthly per capita consumption expenditure for actual and counterfactual for remittance receiving, non receiving and all sampled households

Variable	Mean	Std. Dev.
Remittance receiving households (Actual)	1026	384
Non Remittance receiving households(Actual)	830	372
All Sampled households(Actual)	931	390
Remittance receiving households (Counterfactual)	258	166
All Sampled households(counterfactual)	264	168

Source: Computed from own survey data, 2013.

Table 7 sums up the actual and counterfactual per capita household consumption expenditure for remittance receiving, non recipient and all sampled households. Two key findings emerge: first, in the counterfactual scenario in the absence of remittances households which used to receive remittances are poorer when compared to non-recipient households. In this scenario, the average level of expenditure for households receiving remittances is 2.3 percent below all sampled households. The second finding is in the case of actual scenario including remittances the average level of per capita consumption expenditure for remittance receiving households is quite higher compared to non remittance receiving households. Hence, average level of per capita consumption expenditure is 23.6 and 10.2 percent higher respectively than that of the households not receiving remittances and for all sampled households.

The table below shows the effect of international remittances on poverty. The different measures of poverty such as head count, poverty gap and squared poverty gap indicate a considerable decline in poverty among those who receive remittances. The poverty head count measures reduce the level of poverty from 30.4 to 10.9 percent implying that poverty declines by 64 percent in the actual case compared to counterfactual scenario. It is also equally important to note that poverty gap, which is measured in terms of percentage, shows how far the average expenditures of the poor fall short of the national poverty line reduces by 67 percent, slightly higher than the

reduction in poverty head count. In contrast to head count poverty and poverty gap, poverty is reduced at higher rate when measured by more sensitive measure: squared poverty gap. For example, the squared poverty gap measure shows that including international remittances in household consumption expenditure (income) does reduce the severity of poverty by 70 percent. These results suggest that international remittances reduce the severity of poverty more than absolute poverty.

Table 8: Effect of remittances on poverty for International remittance receiving households

	Households receive International remittances	Households receive no International remittances
Poverty head count (%)		
Actual	.109	.211
Counterfactual	.304-	-
Differences	↓ .195 (64%)	
Poverty gap (%)		
Actual	.002	.005
Counterfactual	.006	
Differences	↓ .004(67%)	
Poverty square gap (%)		
Actual	.00006	.0002
Counterfactual	.0002	
Differences	↓ .00014 (70%)	
N	293	299

Source: Computed from own survey data, 2013

The poverty levels in the counterfactual case for remittance receiving households is significantly higher compared to non remittance receiving households which is 21 percent, implying that poverty was higher among those recipients of remittances compared to non receiving groups prior to migration. But in the actual case the level of poverty is lower for remittance receiving groups compared to non-receiving implying how important

international remittances are in lifting up urban households from poverty to a relative prosperity in Ethiopia. For example in our survey, out of the 293 households that receive remittances, 89 of them were living below poverty line in the counterfactual case (before they start to receive remittances) but in the actual case including remittances, the number of households living beneath the poverty line declined to 32 households, implying that 57 households were lifted out of poverty. The effect of international remittances on the whole sample is reported in the following table.

Table 9: Effect of International Remittances on Poverty for All Sampled household

All Sampled Households	
Poverty head count (%)	
Actual	.160
Counterfactual	.282
Differences	↓ .122(43.2%)
Poverty gap (%)	
Actual	.004
Counterfactual	.006
Differences	↓ .002(33.3%)
Poverty square gap (%)	
Actual	.0001
Counterfactual	.0002
Differences	↓ .0001(50%)
N	592

Source: Computed from own survey data, 2013

Table 9 above shows, the level of poverty reduction among both remittance receiving and non receiving groups of households where in the counterfactual case head count poverty declining from 28.2 to 16 percent, indicating the level of poverty declines by 43.2 percent. Similarly, the poverty gap and poverty square gap decline significantly by 33.3 and 50 percent respectively.

For further illustration of our finding that international remittances have a significant impact on reducing the depth and severity of poverty in urban Ethiopia, Table 10 below examines the kinds of expenditure (income) groups of households that receive international remittances.

For instance, if greater proportion of household's consumption expenditure is covered through international remittances or if households at the bottom of consumption expenditure are receiving more international remittances compared to other consumption groups, hence, it is clear that international remittances are having greater impact on poverty.

To pursue this analysis, all households (both remittance recipient and non recipient) are ranked in to quintile groups on the basis of actual per capital household consumption expenditure including remittances. The first column shows the proportion of total households which receive international remittances in each quintile group. For remittance receiving households the second column shows the percent of total per capital household expenditure including remittances coming from international remittances to each quintile group.

Table 10: Distribution of remittance receiving households by Quintile group, ranked by per capita consumption expenditure including remittances

Rank	Proportion of remittance receiving Households		International remittance as percent of total household expenditure
Lowest	20	15%	82%
Second	20	18%	58%
Third	20	22%	68%
Fourth	20	23%	65%
Fifth	20	22%	64%
	100%		

Notes: Households ranked into quintile groups on the basis of observed per capita household expenditure (including remittances). For those households receiving international remittances, column (3) shows the percent of remittance receiving households from the whole sample while column (4) shows the percent of total per capita household expenditure (including remittances) coming from international remittances.

Source: Computed from own survey data, 2013

Similar to our expectation, the first column of the above Table 10 indicates that only 15 percent of the remittances receiving households are among the poorest households, while more than 55 percent are among those in fourth and fifth quintile indicating the rich households. It is also equally important to realize that the last column, of the same table, demonstrates that the poorest households that are found in the lowest quintile group receive very large shares of their total per capital household expenditure from remittances. For example for the lowest quintile group, on average households receive 82 percent of their total household consumption expenditure from international remittances, in the same way, for the second quintile it is 58 percent.

Given the above points, we can deduce here again that international remittances reduce the depth and severity of poverty in urban Ethiopia. This is due to the fact that poor households are receiving a greater portion of their income from international remittances.

4.3 Impact of International Remittances on Household Consumption and Investment: Evidence from Descriptive Statistics

4.3.1 Household Expenditure patterns between those who Receive and do not Receive Remittances

The summary statistics of Table 11 below shows household expenditure patterns of all sampled households. There is statistically insignificant difference between households that received international remittances and that did not received the same in terms of consumption expenditure on food, other non durable consumer goods (such as groceries like cleaning products, toiletries, clothing and shoes etc) and household services (such as transport expenses including public transportation, gas/maintenance of car/bike/brike, electricity and cooking fuels (petrol/gas/charcoal/wood) etc).

While comparing both groups of households in terms of household investment such as expenses on health and education some differences is exhibited. Comparing health expenses, between the two groups of households, there is statistically significant difference in both groups of households; where non remittance receiving households spend more than twice that of remittance receiving households. More or less expenditure on education is similar for both groups of households.

Table 11: Expenditure patterns of households

Household Consumption expenditure	Remittance Receiving HHs		Non-Remittance Receiving HHS		Difference in Mean		P-Value
	Mean	Std.Er	Mean	Std.Er	Mean	Std.Err	
Food consumption	5443	298	5361	542	-82	627	0.90
Other Consumer goods & service	2484	361	2088	348	-396	502	0.43
Household services: energy water, and telephone	967	74	1322	373	356	381	0.35
Education	1488	182	1550	435	62	455	0.90
Health	684	105	1478	771	794	720	0.27

Source: Own Data Survey, 2013

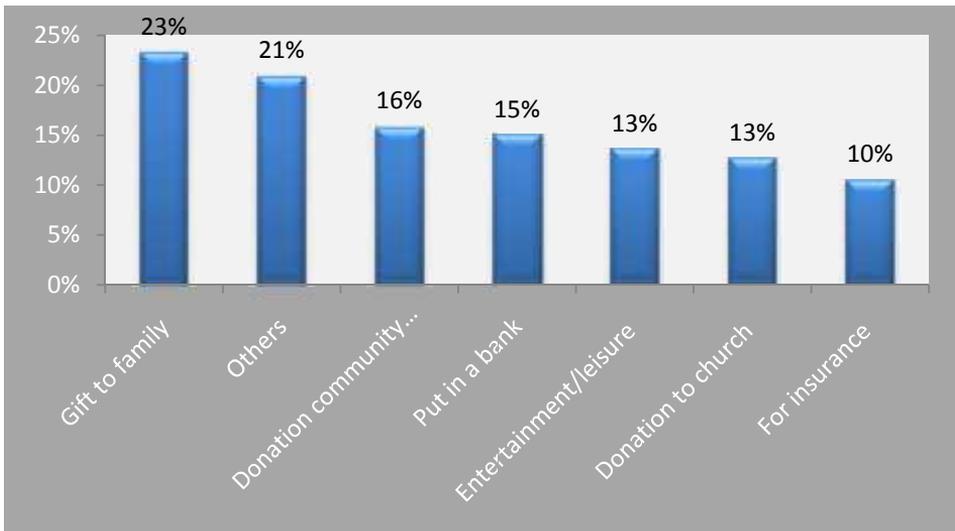
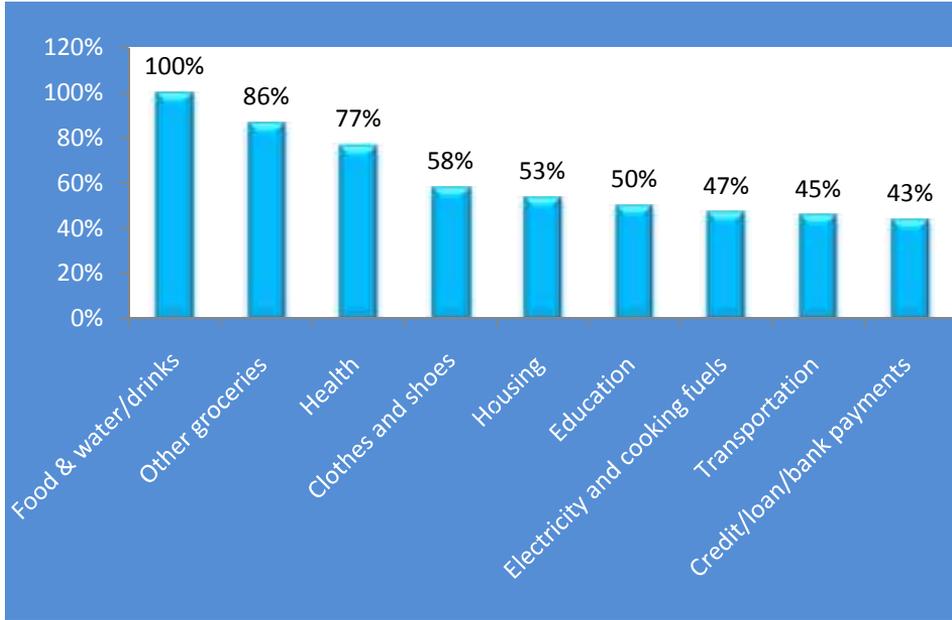
4.3.2 How international remittances are spent by remittance receiving households?

How international remittances are being used by households, among others, may be directly related with the well being of households. It is more convincing that poorest households are more likely to use a relatively higher share of remittance income for subsistence items such as food and clothing. Nevertheless the opposite is true for the relatively better-off households, where the largest share of remittances were mainly used for financing productive assets.

In our survey, based on our discussion in the previous sections, remittance recipient groups are relatively poorer compared to non-recipient groups in the counterfactual scenario; hence it is obvious that substantial portion of it is spent on food and other consumption goods than investment goods. Nonetheless, this should not be meant that every income is spent on consumption. On the contrary, a significant portion of remittance is also used for human capital accumulation, namely health and education, and physical investment such as housing.

To illustrate based on Figure 1 below, all remittance receiving households (100%) had spent some fraction of their income on consumption goods specifically on food. This implies that some portion of every penny obtained from remittance was spent on food consumption. Likewise, considerable share of remittances was also spent on physical investment such as housing. For instance from the same figure, more than three quarter of remittance receiving households had used part of their remittance income to cover health expenses. A little bit more than 50 percent of this group had used part of their remittance for housing/physical investment/ and human capital accumulation namely, education. Finally, many migrant sending households do not have savings. Indeed, given the low income of many households, it is not all surprising that only 15 percent of those remittance receivers had saved part of their remittance income in financial institutions, i.e. banks.

Figure 1: Descriptive Summary of consumption of the selected households that received international remittances



Source: Computed from own survey, 2013

The above figure also showed none of the remittance receiving households used part of their remittance income to invest in entrepreneurial or other income generating activities such as on small and microenterprises. But encouragingly around 50 percent of those households used part of remittance income for physical investment such as housing (either for renewal or construction/acquiring of new residential houses).

This result seems to be reasonably consistent with a number of studies conducted in a range of countries, according to Gammeltoft (2002), and Taylor (1998), for some countries not less than 80 percent of remittances spent on consumption, while smaller share of it was invested in land, housing, or new productive investments even though, investment in new productive assets can accelerate long-term economic growth.

Possible explanations why international remittances were mainly geared towards consumption than investment are: first lack of consistent and progressive in flow of remittances. According to our survey more than 60 percent of the remittance receiving households got remittance less than three to four months per annum and there is high variability in the inflow of remittances. The second and main reason is that the purpose for sending remittances by remitters is primarily to cover household consumption expense than investment as most of the remittance receiving households were relatively poor compared to non remittance receiving households in the counterfactual scenario.

4. Conclusion

To assess the impact of international remittances on poverty, household consumption and investment in urban Ethiopia, this study used primary household survey data collected from four major urban areas of the country namely Addis Ababa, Gonder, Hawassa and Mekelle.

Heckman two stage selection model was employed to evaluate the impact of international remittances on poverty. The reason for adopting this methodology is to control the problems of selectivity and endogeneity.

We used counterfactual consumption estimates for remittance receiving households in the absence of remittances. This is estimated from selection corrected consumption function of non remittance receivers. To control selection bias, the paper used a two-stage Heckman selection model. The extent of selection was found to be negative and statistically significant implying that non remittance receiving households were negatively selected in their unobservable characteristics.

The study finds that international remittances substantially reduced the level, depth and severity of poverty among remittance recipient groups and the whole sample. For the sub sample of households which received remittances poverty head count index, poverty gap and squared poverty gap declined by 64 percent, 67 percent and 70 percent respectively. While for the whole sample it was reduced by 43 percent, 33 percent and 50 percent respectively. When we compare the level of poverty in the counterfactual case (excluding remittances) between the two groups of households: remittance receiving and non receiving households, the level of poverty were higher for the former which is 30 percent while only 21 percent for non remittance receiving households. However, in the actual case including remittances poverty declined to 10.9 percent for remittance receiving households implying how important remittances are in reducing poverty in Ethiopia. To explain further based on our survey 89 out of the total 293 remittance receiving households were poor in the counterfactual case. But in the actual case when remittances are included, the number of households living beneath the poverty line declined to 32, implying that 57 households are lifted out of poverty. This finding also implies that poor urban households can and do produce international migrants.

We have two justifications for the findings of our study : First, based on the survey data around 44 percent and 68 percent of the total income and total consumption expenditure of the remittance receiving households is generated from international remittances respectively, this shows a considerable share of household's income is covered using income from remittances. Second, ranking households into quintile groups on the basis of per capital consumption expenditure including remittances indicates that households in the bottom quintile group received around 82 percent of their total household consumption expenditure from international remittances.

Evidence from Heckman two stage selection model revealed that compared to the counter factual scenario per capital consumption expenditure for remittance receiving households significantly increased and hence, the level of poverty has declined meaningfully.

Hence the above findings of this study seems to plausibly fit with the vast majority of empirical studies conducted in different countries such as in Ghana by Adams (2006); in Indonesia by Adams & Cuecuecha (2010) and others which found out that remittances have played a positive role in reducing poverty and enhancing welfare of households. However, there are also some empirical studies which proved the other way such as Wouterse (2008) in Burkina Faso, where remittances do not significantly reduce poverty rather aggravates income inequality.

Another key finding of the study on how international remittances are spent by recipient household using descriptive evidence shows that all remittance receiving households spend part of their remittance income mainly on consumptions goods such as food. Yet, significant numbers of households are also used part of it for investment such as health, education and housing. However; relatively insignificant numbers of households save part of the remittance income. But none of them used it to invest in entrepreneurial or other income generating activities. In conclusion international remittances are mainly spent on consumption than investment goods. In light of our

review of the literature, this finding is not in line with the dominant view that remittances are fungible and spend like any other source of income such as a study by Adams, Cuecuecha & Page (2008) in Ghana. Whereas it agrees with studies like Chami et.al (2003), which deduced that remittances are dominantly spent on consumption and are not channeled towards productive long term investment.

The possible explanations why international remittances are mainly geared towards consumption than investment in the selected urban areas is: first lack of consistent and progressive inflow of remittances. According to our survey more than 60 percent of the remittance receiving households got remittance less than three to four months per annum and there is high variability in the inflow of remittances. Second the main purpose for sending remittances by remitters is primarily to cover household consumption expense than investment as most of the remittance receiving households were relatively poor compared to non remittance receiving households in the counterfactual scenario.

The survey result also shows that comparing expenditure patterns of both groups of households, there is non-statistically significant difference in terms of expenditures on non durable goods such as food. But clear difference exists in expenditure patterns on health expenses, where non remittance receiving households spend more than twice on health compared to remittance receiving households.

In general, the findings suggest that remittances can be used as a tool to fight poverty in Ethiopia considering the fact that remittances had effect on poverty. Therefore this study can be used as an input to formulate policies associated with migrant remittances as they play a crucial role in reducing poverty in Ethiopia.

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Appendix

Table 1A: Variables used for the estimation of the model

Variables	Description
Log of per capital consumption expenditure (Dependent Variable)	Logarithm of annual per capital household consumption expenditure
Human Capital Variables	
No. HH mems > 15yrs prim educ.	Number of household members who have completed primary education
No. HH mems > 15yrs seco. educ.	Number of household members who have completed secondary education
No. HH mems > 15yrs univ. educ	Number of household members who have completed University education
Household Characteristics	
No. Child<=5 years old	Number of children less than 5 years of age
No. Child 5-15 years old	Number of Children between the age of 5 and 15 years
Number of adults	Number of adult household members
Household size	Number of people in the household
Household Head Characteristics	
Sex of household head (1=male)	Dummy for sex of household head (1=male)
Old age of head (1=yes)	Age of household head in years (>=50 yrs)
Head has primary education	Dummy for household heads who have completed primary education
Head has secondary education or higher (1=yes)	Dummy for household heads who have completed high school or higher education
Ethnicity (control group: other ethnic groups)	
Amhara	Dummy for Amhara households
Oromo	Dummy for Oromo households
Gurage	Dummy for Gurage households
Tigre	Dummy for Tigre households
Location (control group: Addis Ababa)	
Hawassa	Dummy for households from Hawassa
Gonder	Dummy for households from Gonder
Mekelle	Dummy for households from Mekelle
Treatment dummy	
treat_dummy (1=yes)	Dummy for households who receive international remittance (1=yes)

Table 2A: Summary of Explanatory variables for actual & counterfactual consumption regression for remittance, non receiving and all sampled households.

Variables	Actual Scenario			Counterfactual scenario	
	Remittance Receiving HHs	Non remittance Receiving HHs	All Sampled HHs	Remittance Receiving HHs	All Sampled HHs
Human capital variables					
No. HH mems>15yrs prim educ.	0.39(0.64)	0.40(0.72)	0.39(0.69)	0.40(0.73)	0.39(0.69)
No. HH mems>15yrs seco educ.	0.96(1.06)	1.07(1.11)	1.02(1.09)	2.07(1.11)	2.02(1.09)
No. HH mems>15yrs univ educ.	0.85(1.12)	1.00(1.36)	0.93(1.25)	1.00(1.36)	0.93(1.25)
Household Characteristics					
Household size	4.26(1.93)	4.12(1.78)	4.19(1.86)	5.27(1.93)	5.19(1.86)
No. Child <= 5yrs old	0.30(0.53)	0.28(0.60)	0.29(0.57)	0.27(0.58)	0.29(0.56)
No. Child 5-15 yrs old	0.72(0.89)	0.71(1.02)	0.72(0.96)	0.71(1.02)	0.71(0.95)
Proportion of kids to adults	0.20(0.23)	0.23(0.21)	0.22(0.22)	0.23(0.22)	0.22(0.22)
Number of adults	3.09(1.56)	3.28(1.56)	3.19(1.56)	4.28(1.56)	4.19(1.56)
Sex of household head(1=Male)	0.52(0.50)	0.63(0.48)	0.48(0.49)	0.63(0.48)	0.48(0.49)
Head has Prim. Education(1=yes)	0.82(0.38)	0.80(0.40)	0.81(0.39)	-	-
Head has Seco. Education(1=yes)	0.58(0.50)	0.58(0.50)	0.58(0.49)	-	-
Location					
Gonder	0.16(0.37)	0.21(0.41)	0.19(0.39)	-	-
Mekelle	0.25(0.44)	0.24(0.43)	0.25(0.43)	-	-
Addis Ababa	0.46(0.50)	0.44(0.50)	0.45(0.50)	-	-
Hawassa	0.13(0.34)	0.11(0.31)	0.12(0.33)	-	-

Variables	Actual Scenario			Counterfactual scenario	
	Remittance Receiving HHs	Non remittance Receiving HHs	All Sampled HHs	Remittance Receiving HHs	All Sampled HHs
Ethnicity					
Amhara	0.49(0.50)	0.47(0.50)	0.49(0.50)	-	-
Oromo	0.11(0.32)	0.11(0.32)	0.11(0.32)	-	-
Tigran	0.27(0.44)	0.29(0.46)	0.28(0.45)	-	-
Gurage	0.05(0.22)	0.06(0.23)	0.05(0.23)	-	-
other	0.08(0.28)	0.07(0.25)	0.07(0.26)	-	-
old_age household head	0.53(0.50)	0.35(0.48)	0.44(0.49)	0.35(.47)	-
Observations	328	308	636	328	636

NB. Standard deviations are given in parenthesis

Source: Computed from own survey data, 2013

Determinants of Price Dynamics in Ethiopia¹

*Solomon Mosisa Gofere*²

Abstract

Since recent years inflation has become the most important macroeconomic problem in Ethiopia. This study examines the sources of this inflationary pressure using annual data spanning over 1971 - 2014. The study estimates a comprehensive price equation and performs some simulation analysis to uncover the sources of inflationary pressure. The result of the exercise indicates that monetary and fiscal fundamentals are important determinants of price dynamics in the short run. In the long run, output remains to be the most important variable. The result also indicates that the relationship between inflation and foreign prices is rather weak.

JEL Classification: E17, E31, E64, C51

Key Words and Phrases: inflation, macroeconomic policies, money supply, fiscal deficit and real GDP

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² Graduate student, Columbia University in the City of New York, SIPA

1. Introduction

In the last few years Ethiopia has experienced a number of inflationary episodes, which despite several stabilization measures continued to soar. Inflation started to gather a momentum in the late 2005 and early 2006, few months after the national election of the country. General prices rose by more than 43 percent on average and food price inflation reached 60 percent in 2008. Although the picture is relatively less pronounced, non-food price has also been rising over the same period. Although general inflation slowed down to 9 percent annual growth in 2009 and 2010 the figures remained at high level in 2011 steadily increasing to reach average annual rate of 28.1 percent. Despite efforts by monetary authorities, the average rates remained above the target levels in 2012. This shows that inflation has become the most important macroeconomic problem of the Ethiopian economy in recent years.

One salient feature of the recent inflationary pressure in Ethiopia is that it is led by food inflation. On average, food prices increased relatively faster than non-food prices over the recent years except for some years with bumper food harvest and plummeting prices. Furthermore, food inflation is generally more erratic than the non-food inflation. This along with the relatively higher share of food items in the general CPI makes the recent inflationary pressure predominantly food price inflation. This, however, looks puzzling given the fact that the recent growth in Ethiopia is led by agricultural output growth. Between 2003/04 and 2013/14 Ethiopian economy grew by 10.9 percent with good performance of the agricultural sector. Agricultural GDP growth rate specifically averaged 9.0 percent during the same period. Furthermore, world food price increases are believed to have small effects on the domestic food prices given the limited size of food imports (Tadesse, 2008).

The results of the studies on why Ethiopia is experiencing rapid price rises are inconclusive. In fact, apart from few, many of these studies draw mainly on basic descriptive analysis. Ahmed (2007) documented that the current

rampant inflation in Ethiopia is caused by increase in aggregate demand and structural change in agricultural markets. Leoning et al (2009), on the other hand, focuses on the role of international food prices and exchange rate are as the main determinants of domestic prices. Similarly, Duravall and Sjo (2012), using data from Ethiopia and Kenya, conclude that world food prices and exchange rates are key determinants of inflation in the long run. They also report that money growth and agricultural supply shocks drive prices in the short run. World Bank (2010), on the contrary, argues that the increased money supply solely contributed to current inflationary episodes. In sum, there is no consensus on why Ethiopia is facing high and varying episodes of inflation.

Since the early phases of inflationary episodes, government and monetary authorities have implemented various stabilization policies to contain inflation. Government used to subsidize the price of petroleum products until late 2008 when it switched to subsidize food prices. In the late 2008 government started to import food items and supply to domestic market at subsidized prices. When both policies failed to bring inflation to the target level, government switched to place price caps on the retail prices of several commodities in January 2011. However, shortly afterwards it proved that the measure was not working when the intervention in the market created supply shortage of these commodities and inflation jumped to 38.1 percent in June 2011 from 17.7 percent in January 2011, when price regulations were first introduced. In 2012 the National Bank of Ethiopia introduced a directive that required commercial banks to hold 27 percent new loan disbursement in low-yield National Bank of Ethiopia's five-year T-Bills. The National Bank of Ethiopia also implemented a directive that restricted government borrowing through direct lending from the National Bank of Ethiopia. It appears that these measures have finally succeeded to control the inflationary pressures in recent years with inflation rates within the target level.

The failure of the monetary authorities to control the price spikes was partly due to the fact that the sources of the price spikes were not clear.

Consequently, the authorities had to experiment one policy after the other, and only to witness that inflation is yet soaring. This implies that there is a need to identify sources of recent inflation in Ethiopia to inform policy making. The objective of this study is, therefore, to examine the major sources of recent inflation in Ethiopia. In particular, the study intends to show how different policy and structural factors feed in to price dynamics in Ethiopia. In doing so we try to show how monetary and fiscal policy practices may have resulted in such inflationary episodes in recent years. Furthermore, to complement the descriptive analysis, we estimate a comprehensive empirical model and also perform some simulation analysis.

The rest of the paper is organized as follows. Section 2 analyses both fiscal and monetary fundamentals and shows their relationship with inflation figures. Section 3 focuses on econometric analysis and presents the results. Section 4 concludes.

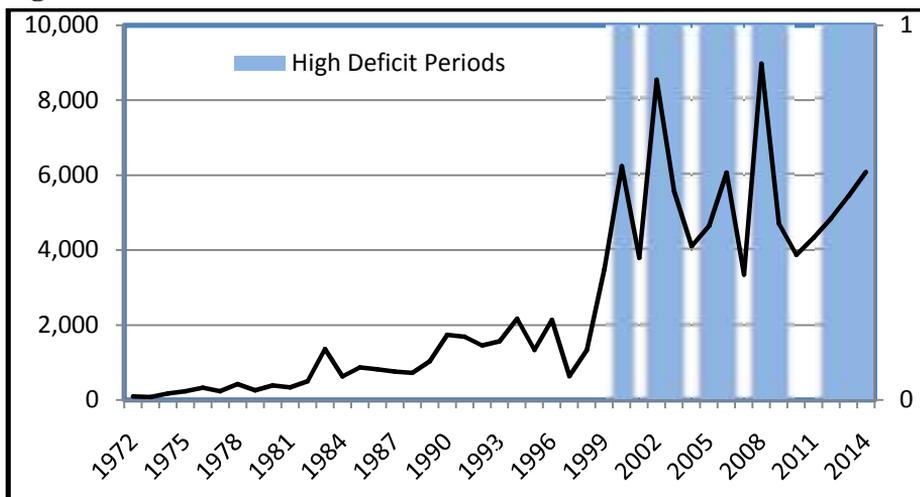
2. Fiscal and Monetary Fundamentals and the Recent Inflation

Historically, Ethiopia has not experienced high inflation. Inflation was associated mainly with a fall in agricultural output and years of higher production were known to witness plummeting prices. Between the periods 1981- 1985, for example, real GDP fell by about 2.05 percent on average and general prices experienced a relatively higher growth rate of about 6 percent. On the other hand, between 1986 and 1990 the average rate of inflation was 2.80 percent because of robust output growth over the same period. In the following five years the average rate of inflation was 13.26. It is important to note here that the real GDP growth rate over the same period was 1.55 percent. The second half of the 1990s witnessed stable prices with an average general inflation rate of 1.03 percent. These periods were again years of good weather conditions and abundant harvest in Ethiopia.

Indeed, this is not the whole story. Before the year 2002/03 government and the National bank of Ethiopia exercised tight monetary and fiscal policy, which in general contributed to the low inflation pressures during these periods. However, in the post 2002/03 years inflation began to appear as a major problem of the economy. This followed the government's move towards less conservative monetary and fiscal policy (Alemayehu and Kibrom, 2008). As argued by Montiel (1989) high inflation in developing countries is often linked to underlying high fiscal imbalances, which may trigger high money growth and set off the balance of payments crisis forcing exchange rate depreciation.

Fiscal deficit as percentage of GDP was less than 6 percent on average during the socialist government. In particular, except in the last years of the regime, deficit as percentage of GDP was less than 4 percent during the period. Although the deficit level was relatively lower, the overall economic mismanagement resulted in a relatively higher inflation level that averaged 8.99 percent. In particular, the early days of the regime had witnessed pronounced level of inflation. With the coming to power of the current government, the deficit level took new paths and the annual fiscal deficit as percentage of GDP over 1991-2014 ascended to 8.45 percent. In the eve of the recent inflationary episodes that started to soar in 2006, the fiscal deficit GDP ratio averaged 9.81 between 2000 and 2005. This in particular is a significant shift in the trend of fiscal deficit given the fact that GDP has also significantly increased over the same period. The fiscal deficit level was even more pronounced after 2005, a period during which inflation was rampant. Although there is no evidence that the change in trends of fiscal deficit was behind the recent inflationary episodes, a closer look at the financing mechanisms points to that direction.

Figure 1: The trend of nominal fiscal deficit



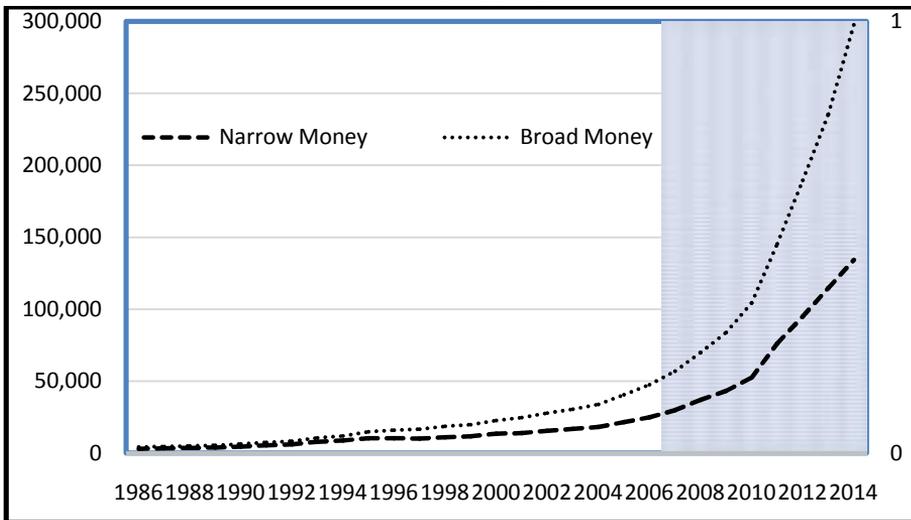
Source: Computed from MoFED data

Ethiopian government finances its fiscal deficit from different sources. Some of these include external grants, privatization proceeds, domestic and foreign borrowing. Prior to the recent inflationary episodes more than 60 percent of the fiscal gap were financed by foreign borrowing and external grants. This along with the low level of the fiscal gap during those periods allowed stable price levels, which usually fluctuates in response to aggregate supply. In the build-up to the recent inflation, however, the level of fiscal gap took new path and the financing mechanism also saw significant shifts. In particular, starting from 2006 the share of fiscal gap that is financed through domestic borrowing from the banking sector has been rising. Similar trend was continued until 2011 when the new directive restricted the money creation capacity of the commercial banks.

Prices dynamics and hence, inflation rates are also significantly determined by the stance of monetary policy. Theoretically, stable price level requires the growth rate of nominal money supply that is at par with the rate of nominal output growth. On average, nominal annual money supply growth lingered about 15.4 over the period 1991-2010. The nominal money supply

growth over the last ten years has even loomed higher. Between 2005 and 2010, during and on the eve of soaring inflationary pressures in Ethiopia, the rate of annual money supply growth climbed to 20.7 percent on average. In 2008 and 2009, a period during which the average rate of inflation reached 30.8 percent, the average rate of money supply growth was close to 21.5 percent. This indicates that there seems to be strong relationship between inflation rate and the money supply growth in Ethiopian economy, although it is difficult to conclude such predictions without formal analysis. Figure 2 below shows the trend of both narrow and broad money since 1986. The trend shows the sharp rise in both narrow and broad money supply since 2006. The growth rate was even more pronounced after 2010.

Figure 2: Trends of some monetary aggregates.

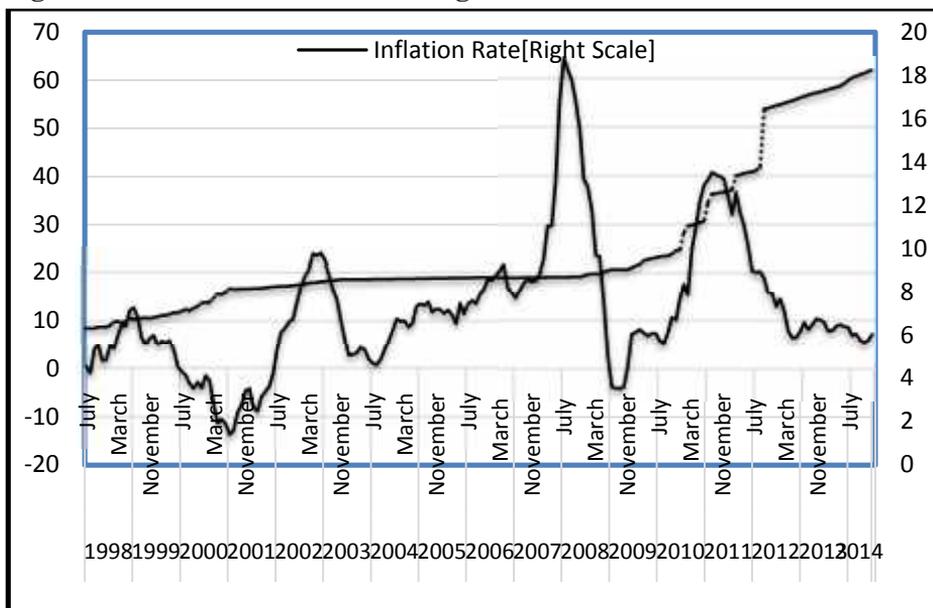


Source: Computed from NBE data

Ethiopia follows what is called more like a crawling peg exchange rate system where the exchange rate between Ethiopian Birr and USD is depreciating steadily since the early 1990s. The National Bank of Ethiopia closely monitors the exchange rate and allows only small percentage change in exchange rate over a given period. Consequently, it is not clear whether the National Bank of Ethiopia controls the exchange rate or the money

supply³. During the recent inflationary episodes, the trend of the exchange rate has also significantly changed leading to sharp depreciation. Since 2005 the exchange rate depreciated by more than 110 percent including the onetime 20 percent depreciation in the aftermath of the 2011 price hike. In 2008 general inflation reached more than 60 percent. This sharply deteriorated the trade balance forcing the reserve assets to less than two months of import bill. Consequently, the rate sharply depreciated during 2009-2011. After a relief in 2009, inflationary pressure relapsed in 2011 intensifying the BOP crisis. This forced the National Bank of Ethiopia to depreciate the currency by 20 percent over-night in September 2012.

Figure 3: Inflation rate and exchange rate trends



Source: Computed from CSA and NBE data

³ Practically, it is difficult to control both because fixed exchange rate requires central bank intervention in the foreign exchange market, which in-turn affects the money supply level in the economy.

In general, trends of exchange rate in the recent past can be considered both as a cause and effect of the inflation trends. Before the recent inflation episodes, exchange rate and trade balances were stable. With the rising inflation level in 2007/8 Ethiopia's export products were made less-competitive leading to huge trade balance deficit. This forced the monetary authorities to let the higher depreciation rate of the currency in 2009/10. But then the rising import price and increase in aggregate demand due to cheap export intensified the already relapsing inflation momentum requiring further depreciation in the years to come.

3. Theoretical Framework and Econometric Analysis

This paper adopted the approaches followed by Moser (1995) and Olubusoye and Oyaromade (2008) to model the inflationary process in Ethiopia. Following Moser (1995) it is assumed that the overall price level (P) is a weighted average of the price of tradable goods (P^t) and non-tradable goods (P^n), and can be represented in log-linear form as

$$\log P = \alpha(\log P^n) + (1 - \alpha)(\log P^t) \quad (1)$$

Where α represents the share of non-tradable goods in total expenditure.

The price of tradable goods (P^t) is determined exogenously in the world market and, in domestic currency terms, can be represented by foreign prices (P^f) and the exchange rate (e):

$$\log P^t = \log e + \log P^f \quad (2)$$

From the above expression both an increase in the exchange rate (in domestic currency terms) and an increase in foreign prices will lead to an increase in price in the tradable sector and hence overall price level.

Assuming that the demand for non-tradable goods moves in line with the overall demand in the economy, the price for non-tradable sector is set by the money market equilibrium where real money supply equals the real money demand. Log-linear form of such condition yields the following expression for non-tradable goods prices:

$$\log P^n = \beta(\log M^s - \log m^d) \quad (3)$$

where M^s represents the nominal stock of money, m^d is the demand for real money balances, and, β is a scale factor representing the relationship between economy-wide demand and demand for non-tradable goods.

The demand for real money balances is assumed to be a function of income (transaction demand for money), expected inflation and interest rate. Explicitly writing,

$$m^d = \tau_1 y - \tau_2 p^e - \tau_3 i \quad (4)$$

According to money demand theory, an increase in the stock variable (real income) will stimulate money demand, whereas an increase in the domestic opportunity cost variable (expected inflation) will lead to a fall in demand (Moser, 1995). Based on adaptive expectations the expected rate of inflation in period t is assumed depend on actual inflation in period $t-1$ and expected rate of inflation in period $t-1$.

$$P^e_t = d(\Delta \log P_{t-1}) + (1 - d)P^e_{t-1} \quad (5)$$

Setting d to unity, and using the reduced-form equation in (4) above, equation(3) can be written as follows:

$$\log P^n = \beta(\log M^s - \tau_1 \log y + \tau_2 \Delta \log P_{t-1} + \tau_3 i) \quad (6)$$

Finally using equation (2) and (6) in equation (1) yields

$$\log P = \alpha\beta(\log M^s - \tau_1 \log y + \tau_2 \Delta \log P_{t-1} + \tau_3 i) + (1 - \alpha)(\log e + \log P^f) \quad (7)$$

In developing countries where deficit-financing mechanisms vary from domestic and foreign borrowing to monetary finance, the level of fiscal gap also remains to be one of the most important factors influencing the price dynamics. Therefore, the above model will be augmented by including the level of fiscal deficit. Furthermore, we include a measure of monopoly mark-up to test for the claim by government that the inflationary pressure is due to artificial price hike by monopoly firms. In particular, we use Bain's monopoly mark-up index, which is computed from operating surplus data of large and medium scale industries in Ethiopia. Given its importance in discussions around policy circles, we estimate the model by including international petroleum price index.

With all these arguments the empirical model to be estimated in this study is:

$$P_t = f (M_t^s, Y_t, P_t^e, i_t, e_t, D_t, P_t^{petr}, B_t) \quad (8)$$

+ - + - + + + +

Where:

P_t – is general consumer price index compiled by the Central Statistics Authority (CSA) of Ethiopia. Food accounts about 57 percent of the general index with the remaining accounted for by the non-food items.

P_t^e – is expected inflation. Following the works of Olubusoye and Oyaromade (2008), we calculated expected inflation as a first difference of the logarithm of the current price level. This approach is consistent with both the rational and adaptive expectation hypotheses.

Y_t – is real Gross Domestic Product.

i_t – is nominal average annual deposit interest rate

e_t – is average annual exchange rate

D_t – is fiscal deficit excluding grants

P_t^{petro} – is international petroleum price index

B_t – is Bain's monopoly mark-up index

While increase in output is expected to decrease inflation in the long run, increase in money supply, increase in fiscal deficit and devaluation of domestic currency are expected to intensify inflationary pressure. Similarly, higher inflation expectation, higher petroleum price and monopoly mark-up are also anticipated to increase inflation. Furthermore, we expect that increase in interest rate decrease inflationary pressure.

4. Analysis and Results

Most macroeconomic variables exhibit strong trends and hence, are not amenable to econometric analyses pertaining to stationary series. Therefore, to apply standard estimation or testing procedures in a dynamic time series model, it is typically required that the variables are stationary (Verbeek, 2008). There are several ways of testing for stationarity of a variable. The results of the tests are presented in Table 1 below. The ADF test result shows that all variables are non-stationary at level and stationary at first difference. KPSS test for unit root also rejects the null of stationary series at level for all variables and fails to reject the null of stationary series at first difference for all variables. Therefore, we conclude that all variables are integrated of order one.

Table 1: The Unit Root Test Results

Variables	ADF		KPSS	
	I(0)	I(1)	I(0)	I(1)
<i>lnCPI</i>	-0.6685	-3.7874	0.7289	0.1240
<i>lnECPI</i>	-0.0190	-6.5394	0.1420	0.0185
<i>LnRGDP</i>	1.1511	-4.6915	0.9236	0.5922
<i>lnMONEY</i>	1.4199	-5.2562	0.7194	0.1847
<i>LnDEFICIT</i>	-0.9258	-7.7254	0.3657	0.0826
<i>INTEREST RATE</i>	-1.4042	-5.3805	0.1580	0.0812
<i>lnPETROLEUM</i>	-1.2964	-5.7845	0.4777	0.1089
<i>EXCHANGE RATE</i>	-0.9309	-4.5605	0.6830	0.1450
<i>lnBain's Index</i>	-1.3730	-3.9831	0.4923	0.1324

In such cases where all the variables are found to be non-stationary, OLS may lead to spurious results. However, it is possible to have valid estimates with non-stationary series if the linear combination of these non-stationary series is found to be stationary. Therefore, it is important to test for the co-integration of the series. To test for co-integration and number of co-integrating vectors the model is first estimated using the VAR estimation procedure. This is due to the fact that most macroeconomic variables are endogenous in nature, which makes a model that describes the dynamic evolution of variables from their common history more appropriate.

The Johansen (1986) procedure uses the maximum likelihood estimation method, which enables us to test the number of co-integrating vectors. In the procedure there are two distinct tests. These tests are the maximum eigenvalue test (λ_{max}) and the trace test (λ trace), which are likelihood ratio tests with no usual Chi-squared distributions. In this study we use trace test to test for the number of co-integrating vectors. Trace test reject the null hypothesis of at most one co-integrating vector ($r=1$) at one percent (see Table 2 below). On the other hand, it fails to reject the null of at most two ($r=2$) co-integrating vectors against the alternative of three vectors ($r=3$). This implies that the model has two co-integrating vector.

Table 2: Cointegration Tests Result: The Trace Test

Maximum Rank	LL	Eigenvalue	Trace Statistic	Critical Value (5%)
0	54.218	.	152.981	94.15
1	89.462	0.813	82.493	68.52
2	109.116	0.607	43.186*	47.21
3	118.355	0.355	24.707	29.68
4	124.172	0.241	13.073	15.41
5	129.137	0.210	3.144	3.76

Diagnostic tests on error terms indicate that the errors are white noise. The JB test of normality of error terms from the VAR model indicates that the

error terms are normal. Furthermore, the VAR residual serial correlation test shows that we fail to reject the null hypothesis of no serial correlation at standard significance level indicating that the errors are not serially correlated. The errors are also homoskedastic. The joint Chi-squared residual heteroskedasticity test statistic fails to reject the null of homoskedastic errors. Therefore, in general, the error terms behave in such a way that the Johansen procedure is valid. Co-integration analysis is also sensitive to the lag structure of the model specified. The standard model selection criteria of LR and SC indicate that lag order of two is appropriate for the model. The model is, therefore, estimated with lag order two.

Restriction tests show that the two co-integrating vectors are price and expected inflation equations. Therefore, the two co-integrating vectors are normalized with respect to the logarithm of consumer price index and expected inflation. Estimates of long-run relationship of the model are presented in Table 3 below. The long run model indicates that increase in output leads to price stability. On the other hand, money supply doesn't have significant impact on price dynamics. This result is consistent with theoretical predictions and the results from other similar studies (see Leoning et al 2009). Monetary aggregates affect inflation only in the short-run. Similarly, widened budget deficit tend to set-off higher inflation in the long run. Theoretically, fiscal deficits could have positive or negative impact on inflation in the long run. Increased fiscal expenditure on infrastructure increases output and market integration, leading to stable prices in the long run. However, increased government expenditure that goes to finance current consumption may result in inflationary pressures in the short to long run. Furthermore, real exchange rate depreciation tends to be inflationary in the long run. Yet, its economic significance is less robust. On the other hand, international petroleum prices, nominal deposit interest rate and index of monopoly mark-up are not significant determinants of inflation in the long run.

Table 3: The long-run model (normalized on CPI and Expected Inflation)

Variables	CE1: Normalized on lnCPI			CE2: Normalized on lnECPI		
	Coefficients	Stand. Errors	Z-Values	Coefficients	Stand. Errors	Z-Values
lnCPI	1	--	--	0	--	--
lnECPI	0	--	--	1	--	--
lnRGDP	1.375	0.278	4.93	1.215	0.348	3.49
lnMONEY	-0.135	0.191	-0.71	-1.291	0.239	-5.4
lnDEFICIT	-0.108	0.046	-2.34	-0.395	0.057	-6.83
EXCH. RATE	-0.012	0.003	-3.99	-0.005	0.038	-0.15
lnPETROLEUM	-0.281	0.260	-1.07	0.210	0.176	1.23
INTER. RATE	-0.139	0.119	-1.16	-0.091	0.023	-3.83
lnBain's Index	0.065	0.059	1.10	0.472	0.518	0.911
Constant	9.736	--	--	1.610	--	--

Consumers and firms form inflation expectations based on past and current macroeconomic fundamentals. To study how inflation expectation responds to other macroeconomic policy variables, we normalized the second co-integrating vector around expected inflation. The result from this long run equation gives intuitive implications. Output growth leads to downward adjustment in inflation expectation. On the other hand, monetary expansion and higher fiscal deficit leads to higher inflation expectation. Real exchange rate and petroleum prices have no significant impact on expectation formations. However, it is too optimistic to rely on this result given the shaky nature of the way inflation expectation is computed in this study.

The short run dynamics of the model as revealed by the Vector Error Correction Model (VECM) is presented below in Table 4. The co-integrating terms bear expected signs and are significant. Both terms carry negative signs, implying that the system adjusts back to its equilibrium values after a

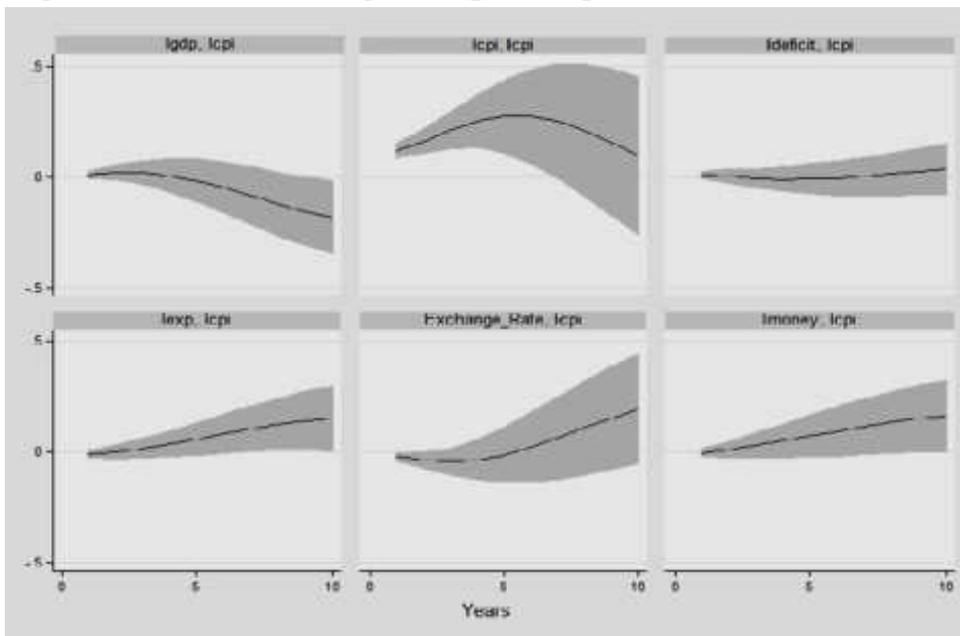
shock. However, it takes relatively longer periods for the system to fully adjust towards its equilibrium. In particular, VECM result indicates that inflation and expected inflation adjust to previous period's disequilibrium at rate of 5.0 and 3.6 percent per annum respectively. Another key result from the short run analysis is that output is insignificant in inflation equation. Money supply, on the other hand, significantly and positively affects inflation. This result along with the long-run analysis above shows the relative importance of moneys supply in the short run than long run. Similar to the long run result, fiscal deficits triggers inflationary pressure in the short run. Furthermore, exchange rate depreciation leads to higher inflation. On the other hand, nominal domestic interest rate is statistically insignificant. In fact, the nominal domestic interest rate is closely monitored and regulated by National Bank of Ethiopia and vary, if any, only marginally in the short run. Despite the claim in the policy circles that petroleum price and monopoly mark-up are key determinant of price, they are insignificant in short run inflation equation.

Table 4: The short-run model

Dependent: D(lnCPI)			
Variables	Coefficients	Standard Errors	Z-Values
ce(1)(-1)	-0.050	0.021	-2.38
ce(2)(-1)	-0.036	0.014	-2.57
D(lnCPI)(-1)	0.323	0.216	1.50
D(lnECPI)(-1)	-0.049	0.027	-1.83
D(lnGDP)(-1)	-0.321	0.265	-1.21
D(lnMONEY)(-1)	0.192	0.058	3.81
D(lnDEFICIT)(-1)	0.040	0.017	2.36
D(EXCH.RATE)(-1)	0.024	0.011	2.18
D(lnPETROLEUM)(-1)	0.013	0.050	0.25
D(INTEREST RATE)(-1)	0.000	0.016	0.01
D(lnBain's Index)(-1)	0.021	0.014	1.50
Constant	0.021	0.043	0.50

So far we modeled the direct effects of endogenous variables on price dynamics. However, a shock to the one variable not only directly affects that specific variable but also transmitted to all other endogenous variables through the dynamic (lag) structure of the model. Therefore, the indirect effects of a variable to which a shock is introduced are also important information that deserves analysis on its own. In time series analysis such indirect impacts are very well captured by the impulse response analysis. An impulse response function traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables (Verbeek, 2005). Yet, the validity of the forecasts from the impulse response function strictly depends on the stability of the VECM model. The stability test of VECM model indicates that none of the characteristic polynomial roots lie outside the unit circle (see appendix), which implies that we can safely base our forecast on the estimated model. The result of the simulation exercise is presented in Figure 4 below.

Figure 4: Cumulative orthogonal impulse response function of lnCPI



The cumulative impulse response function is estimated for a shock to consumer price index, broad money, expected inflation, fiscal deficit, real effective exchange rate and real GDP for 10 years. The result indicates that one standard deviation shock to consumer price leads to persistently high price over the following years. On the other hand, one standard deviation shock to real GDP leads to a significant deflation in the long run. This is consistent with the short-run and long run results above. A shock to expected inflation and money supply on the other hand leads to higher prices in the long run. Shocks to exchange rate and fiscal deficits on the other hand have only marginal long-run impacts on price dynamics.

5. Conclusion

In this study it is tried to uncover the determinants of recent inflationary pressures in Ethiopia. In particular, the study used both simple descriptive analysis as well as rigorous parametric analysis to trace the relationship between inflation and other macroeconomic trends in Ethiopia. From the analysis the following conclusions (and policy implications) can be drawn.

First, fiscal deficit is a key determinant of inflation both in the long run and in short run. This result seems plausible given the fact that government finances significant percentage of the deficit through domestic borrowing from the banking sector. It is also to be noted that government had access to monetary finance through direct borrowing from the National Bank of Ethiopia until recently. This probably also explains how the monetary authorities managed to contain inflation to a target level only after closing this direct lending arrangement. Second, money supply is important determinant of price dynamics only in the short-run. On the other hand, output remains to be a principal driver of price dynamics in the long run. In particular, we have shown that in the long run inflation rate is more elastic to output than any other variable in the model. This result goes along with the predictions of Ahmed (2007), which puts structural and demand factors at the forefront.

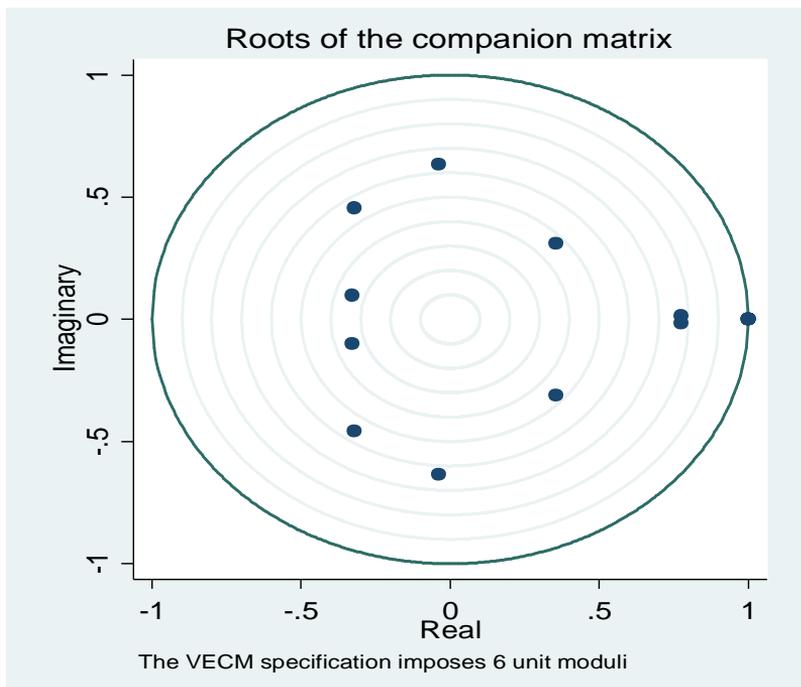
Third, despite the claims around the policy circles, petroleum prices and monopoly mark-ups have no significant relationship with price dynamics. This is also at odds with the results of Leonings et al (2009) who showed that external factors account for significant amount of the current price escalation in Ethiopia. Fourth, in the short run, monetary and fiscal fundamentals are more important determinants of price dynamics than output. Furthermore, the role of price expectation in determining inflation is very marginal. Finally, from the simulation exercise, prices are more sensitive to a shock to price and a shock to money supply growth than a shock to any other variable. It also shows that the shock to real GDP tends to stabilize the inflation pressures both in immediate years and long run. On the other hand, a shock to fiscal deficit increases inflation only moderately while a shock to money supply intensifies inflation in the long run. All these results add-up to imply that the short-term solution to inflation in Ethiopia lays both in the monetary and fiscal policy practices. Structural factors of the economy are key in the long run. In particular, increasing output and addressing the structural constraints remain to be the most important areas where a potential policy should focus. However, a detailed policy prescription requires more rigorous study than this study dealt with.

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Appendix A: Inverse roots of VECM: Stability test



Effectiveness of Foreign Aid on the Growth of the Agricultural Sector in Nigeria

*Clement Atewe IGHODARO¹ and Isaac Chii
NWAOGWUGWU²*

Abstract

This paper examined the effectiveness of foreign aid to the growth of the agricultural sector in Nigeria using the ARDL and the ECM approach and quarterly data covering the period 1981 to 2009. While all the variables used were found to be I(1), four cointegration relationships exist between the dependent and the independent variables. Contrary to expectation, the parameter estimate of foreign aid has a negative and insignificant relationship with agricultural output in the short and long run. On the contrary, savings and technological trend are significant and have positive relationship with agricultural output both in the short run and long run. A major policy implication of the result is that improved technology is imperative to the increase in agricultural output in both the short run and the long run rather than encourage foreign aid for agricultural growth in Nigeria.

Key words: Aid, Autoregressive Distributed Lag, Error Correction Model

¹ Ph.D; Department of Economics & Statistics, Faculty of Social Sciences, University of Benin

Benin City

Email: clemigho2006@yahoo.com

GSM: +234 7033102860

² Ph.D; Department of Economics, Faculty of Social Sciences, University of Lagos

Akoka, Yaba,

Lagos

1. Introduction

Nigeria is very rich in agricultural resource base though these resources have to be adequately harnessed in order to diversify the economy and reduce over the dependence on crude oil. In spite of this rich resource endowment, there has been a gradual decline in agriculture's contributions to the nation's economy. The trend in the share of agriculture in the gross domestic product shows a substantial variation and long-term decline from 60 percent in the early 1960s through 48.8 percent in the 1970s and about 22.2 percent in the 1980s. The agricultural sector is the most important non-oil economic activity; it is also the single largest employer of labor forces (70 percent according to NBS, 2009) and contributed 40.07% of Gross Domestic Products (GDP) in 2010. Low agricultural output has a negative impact on the economy of Nigeria which may result to low capacity utilization in the industry.

Important resources needed to improve on agricultural output are capital related and these are largely inadequate domestically, which consequently warrants the need for external capital (Kargbo, 2012). Theoretically, aid is meant to bridge the savings - investment gap that poor and emerging economies face. The effectiveness of foreign aid has been the subject of much debate in economics. Previous studies of the aid-growth nexus have produced ambiguous results and have been criticized on the ground that most of the studies are based on cross-country regression. They lump together countries of heterogeneous characteristics and size; hence, cannot be used for country specific policy. Gomanee, Girma & Morrissey (2001) argue that aid may not influence all policies and therefore, it is difficult to assess the impact of aid on policy at least in a cross country framework.

Studies on aid – growth nexus for Nigeria are either cross country studies e.g. (Adamu & Ighodaro, 2011; Uneze, 2011) or if it is country specific study, it is usually on the impact of aid on the overall economy, for example, (Fasanya & Onakoya, 2012; Bakare, 2011; Abidemi, Abidemi & Olawale,

2011). These studies did not consider the effectiveness of aid on sectoral growth. One of the studies on aid - agricultural growth relationship for Nigeria is Akpokodje & Omojimate (2008). They use a simultaneous equation model in their estimation. A major criticism of such model is that existing theory may not be sufficiently precise to suggest compelling causal models; in the process of model specification and identification, compromises may be made that vitiate the assumptions of the original theory (Fergusson, 1995). This study fills this gap by empirically considering the effectiveness of aid on the agricultural output in Nigeria using quarterly data from 1981 to 2009 as well as the ARDL and the ECM estimation techniques. Following section 1, section 2 reviews some related literature, theoretical framework and model specification are considered in section three while section 4 dwells on presentation, interpretation and discussion of results. Section 6 provides policy implications of results and conclusion.

2. Review of Related Literature

The effectiveness of aid can be traced back to the two-gap model (Chenery & Strout, 1966), which remains the most influential theoretical underpinning of the effectiveness of aid literature. In this model, developing countries face constraints on savings and export earnings that hamper investment and economic growth. Aid flows are meant to fill the gap between investment needs and domestic savings. Bacha (1990); Taylor (1994) also recognize that government(s) of some developing countries simply do not have the revenue raising capacity to cover a desired level of investment. Foreign aid provided directly to the government(s) can potentially relax this fiscal gap as long as it is used for public investment purposes. Akpokodje & Omojimate (2008) use a simultaneous equation model to investigate the effect of foreign aid on agricultural growth during 1970-2007 for Nigeria. Using agricultural growth, savings, aid and agricultural imports as endogenous variables, they find that foreign aid has a significant positive effect on agricultural growth in Nigeria. However, the results do not support the view that foreign aid flows more to countries with low savings.

Using cross country data, Adamu & Ighodaro (2011) attempted to ascertain the impact of foreign aid on economic growth in ECOWAS countries using panel data for 14 countries covering the period 1999 through 2009. The model allowed for both language and country effects which were found to be significant. Foreign aid was found to have a significant and positive effect on growth among the ECOWAS countries. The effect of foreign aid on economic growth was found to be stronger in the French-speaking countries. The non-linear effect of foreign aid on economic growth was tested but was found not to be significant. Uneze (2011) on his part tested the impact of foreign aid and aid uncertainty on private investment in West Africa using an unbalanced panel data from 1975 to 2004. The results show that multilateral aid affects private investment positively, but not bilateral aid, and uncertainty, measured as the coefficient of variation has a negative impact on private investment. Malik (2008) examined the effectiveness of foreign aid on economic growth using a cointegration and the ECM for the period 1965-2005 in the six poorest highly aid dependent African countries (Central African Republic, Malawi, Mali, Niger, Sierra Leone and Togo). The empirical result estimated for each country shows that in the five out of the six countries, foreign aid has a significant negative long run effect on economic growth, the only exception was Togo. Foreign aid has a long run positive impact on growth in Togo. In the short run aid has no significant effect on economic growth per capita for most of the countries except for Niger. In a recent study, Alabi (2014) attempted to establish the impact of agricultural foreign aid on agricultural growth in Sub-Saharan Africa using a dynamic specification, Generalized Method of Moments (GMM) framework. The econometric analysis suggests that foreign agricultural aid has a positive and significant impact on agricultural GDP and agricultural productivity.

3. Theoretical Framework and Model Specification

Given a generalized neoclassical aggregate production function that follows Inada condition (assumptions about the shape of a production function) augmented with exports as below:

$$Y_t = A_t F(K_t, P_t, X_t) \quad (1)$$

Where Y_t is the aggregate output, K_t is capital inputs, P_t is population, and X_t is total exports. The production function, equation (1) is the export growth model originally proposed by Ballasa (1978). To introduce foreign aid, we follow Burke & Ahmadi-Esfahani (2006) with the assumption that capital can be decomposed into domestic savings and foreign aid. The “savings gap” is the idea behind disaggregating capital into savings and foreign aid. According to Chenery & Strout (1966), foreign aid can be used to solve the problem of domestic savings which could be directed to investment and for the purpose of this study, investment into the agricultural sector. Foreign aid and savings in equation (1) can be rewritten as:

$$Y_t = A_t (S_t, F_t, P_t, X_t) \quad (2)$$

Where S_t is aggregate domestic savings; F_t is foreign aid and other variables are as earlier defined apart from the dependent variables which is taken to be output of the agricultural sector. To know the contribution of each of the variable to the growth of the agricultural sector, equation (2) can be re written as:

$$Y_t = A_t (S_t^\Gamma, F_t^S, P_t^u, X_t^x) \quad (3)$$

Where A_t is technological trend.

To interpret the coefficients as elasticity, we take the logarithms of both sides of equation (3), resulting in the equation below:

$$LNY_t = \Gamma LNS_t + S LNF_t + u LNP_t + x LNX_t + A_t \quad (4)$$

A priori, it is expected that $\Gamma, S, u, x, > 0$. The major interest here is to know the sign of the parameter S . Noting that $LNY_t = AGRGDP_t$;

$$LNS_t = LNSAVG_t; LNF_t = LNFAID_t; \quad LNP_t = LNPOPL_t;$$

$$LN X_t = TEXPT_t \text{ and } A_t = T_t. \text{ Therefore, equation (4) becomes:}$$

$$LNAGR GDP_t = r LNSAVG_t + s LNFAID_t + u LNPOPL_t + x LNTEXPT_t + T_t \quad (5)$$

3.1 Methodology and Data Sources

The sample period for this study covers quarterly data from 1981 to 2009. This period is chosen as it corresponds to the period where uniform and consistent data on the relevant variables are available. All the relevant data were obtained from the Central Bank of Nigeria Statistical Bulletin (various issues) and the National Bureau of Statistics (various issues). The autoregressive distributed lag (ARDL) method and the Error Correction Models are applied in the study using the Microfit 4.0 for Windows software.

3.2 Econometric Procedure

(a) The Stationarity Test:

The Augmented Dickey Fuller (ADF) test is employed to ascertain the stationarity of the variables. The specification is expressed as:

$$\Delta Z_t = \alpha_0 + \alpha_1 Z_{t-1} + \sum_{i=1}^{\infty} \alpha_i \Delta Z_{t-1} + v_t \quad (6)$$

$$\Delta Z_t = \alpha_0 + \alpha_1 Z_{t-1} + \alpha_2 t + \sum_{i=1}^{\infty} \alpha_i \Delta Z_{t-1} + v_t \quad (7)$$

Equations (6) and (7) are specified with only trend and trend plus intercept, where: v_t is the residual term and

$$Z_t = (LNAGR GDP_t; LNSAVG_t; LNFAID_t; LNPOPL_t; LNTEXPT_t).$$

(b) Johansen Co-integration Test

Cointegration test was done using the Johansen & Juselius (1990) method. This involves cointegration test based on Maximal Eigenvalue of the Stochastic Matrix and the Trace of the Stochastic Matrix as specified as the equations below:

$$\lambda_{\max}(r, r+1) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_{r+1}) \quad (8)$$

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \quad (9)$$

where $\hat{\lambda}$ is the estimated values of the characteristics roots (called eigenvalues). The first is called the maximum eigenvalue test. It ascertains the hypothesis that there are r co-integrating vectors versus the hypothesis that there are $r+1$ co-integrating vectors. The second is known as the trace test. It tests the hypothesis that there are at most r co-integrating vectors. In this test, λ_{trace} equal to zero when all the $\hat{\lambda}_i$ are zeros.

(c) The Error Correction Model (ECM)

The acceptance of cointegration between two series implies that there exists a long run relationship between them and this means that an error-correction model (ECM) exists. Equation (5) can be rewritten to have the error correction component

Δ is lag operator

$ecm(-1)$ is one period lag of the specified below as:

$$\Delta \text{LNAGRGDP}_t = \gamma + \sum_{i=1}^j \beta_i \Delta \text{LNSAVG}_{t-i} + \sum_{i=1}^k f_i \Delta \text{LNFAID}_{t-i} + \sum_{i=1}^l \delta_i \Delta \text{LNPOPL}_{t-i} + \sum_{i=1}^m \theta_i \Delta \text{LNTEXPT}_{t-i} + \sum_{i=1}^n [\Delta T_{t-i} + \text{ECM}(-1)] + \varepsilon_t \quad (10)$$

where:

Δ is lag operator

$ecm(-1)$ is one period lag of the residual

γ is the constant term

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are respective parameters

ϵ_t is the error term

4. Presentation, Interpretation and Discussion of Results

4.1 Unit Root Result

The empirical results obtained from the unit root test show that the variables are all I(1) as presented in Table 1 below.

Table 1: ADF Stationarity Results

Variable	ADF Test (Intercept but not Trend)	Conclusion	ADF Test (Trend & Intercept)	Conclusion
LNAGRDP	-1.1388 (-2.8874)	Non-Stationary	1.8554 (-3.4504)	Non-Stationary
	-4.2109 (-2.8877)	Stationary I(1)	-4.3298 (-3.4508)	Stationary I(1)
LNSAVG	-0.3382 (-2.8874)	Non-Stationary	-2.2415 (-3.4504)	Non-Stationary
	-3.9924 (-2.8877)	Stationary I(1)	-4.0528 (-3.4504)	Stationary I(1)
LNFAID	-2.1619 (-2.8877)	Non-Stationary	-1.0047 (-3.4508)	Non-Stationary
	-7.7145 (-2.8879)	Stationary I(1)	-7.6851 (-3.4512)	Stationary I(1)
LNPOPL	-1.0230 (-2.8874)	Non-Stationary	-1.4724 (-3.4504)	Non-Stationary
	-8.1653 (-2.8877)	Stationary I(1)	-4.8222 (-3.4508)	Stationary I(1)
LNTEXPT	-0.71464 (-2.8874)	Non-Stationary	-2.8285 (-3.4504)	Non-Stationary
	-6.6463 (-2.8877)	Stationary I(1)	-6.6226 (-3.4508)	Stationary I(1)

Figure in parenthesis are the critical value (5%)

4.2 Cointegration Results

The Johansen cointegration result reveals the existence of four long run relationship (determined at the points where the test statistic is greater than the 95% Critical Value) between the dependent and the explanatory variables based on Maximal Eigenvalue of the Stochastic Matrix (Table 2a) and the Trace of the Stochastic Matrix (Table 2b).

Table 2a: Cointegration Based on Maximal Eigenvalue of the Stochastic
Cointegration with no intercepts or trends in the VAR
Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic
Matrix

115 observations from 1981Q2 to 2009Q4. Order of VAR = 1.
List of variables included in the cointegrating vector:
LNAGR GDP LN SAVG LNFAID LNPOPL LNTEXPT
List of eigenvalues in descending order:
.99125 .41186 .24229 .12046 .0053061

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	545.0147	29.9500	27.5700
r <= 1	r = 2	61.0415	23.9200	21.5800
r <= 2	r = 3	31.9072	17.6800	15.5700
r <= 3	r = 4	14.7612	11.0300	9.2800
r <= 4	r = 5	.61182	4.1600	3.0400

Use the above table to determine r (the number of cointegrating vectors).

Table 2b: Cointegration Based on Trace of the Stochastic Matrix
 Cointegration with no intercepts or trends in the VAR
 Cointegration LR Test Based on Trace of the Stochastic Matrix

115 observations from 1981Q2 to 2009Q4. Order of VAR = 1.
 List of variables included in the cointegrating vector:
 LNAGRGDP LNSAVG LNFAID LNPOPL LNTEXPT
 List of eigenvalues in descending order:
 .99125 .41186 .24229 .12046 .0053061

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	653.3364	59.3300	55.4200
r ≤ 1	r = 2	108.3217	39.8100	36.6900
r ≤ 2	r = 3	47.2802	24.050	21.4600
r ≤ 3	r = 4	15.3730	12.3600	10.2500
r ≤ 4	r = 5	.61182	4.1600	3.0400

Use the above table to determine r (the number of cointegrating vectors).

An examination of the result in Table 3 below shows that the one period lag value of agricultural output positively and significantly determines its present value. This implies that previous quarter's production of agricultural products provides incentives to produce more this in the current quarters probably as a result of the increase in the income of farmers. Domestic savings impact positively and significant in the determination of agricultural output in the country. However, its one period lag value impacted negatively on agricultural output. The implication of this is that in the previous quarters, rather than investing in agriculture, farmers preferred to save their income resulting to low agricultural output in the current period. The exposure of the country to foreign aid surprisingly impacts negatively and insignificantly on the growth of the agricultural sector of the country contrary to the result obtained by Akpokodje & Omojimate (2008); Alabi (2014). This implies that higher foreign aid have been associated with lower agricultural output contrary to expectation. The Population variable has a positively signed coefficient estimate in line with economic theory. It suggests that higher level of population is associated with higher growth of agricultural output.

This finding shows that the consequence of population on Nigeria's economic growth will manifest directly through increases agricultural output. Contrary to expectation, the coefficient of total exports is negatively signed and insignificant in the determination of agricultural output. As expected, the current value of technological trend is significant and has a positive relationship with agricultural output. However, its lag value is significant and has a negative relationship with agricultural output. The model has a good fit. It explains more than 96 percent of the systematic variation in the dependent variable. Moreover, the absence of any serious problem of autocorrelation is shown by the value of Durbin's h-statistic, 1.8152. The F – statistic value of 418.2568 shows the existence of a significant relationship between the dependent variable and the regressors.

Table 3: ARDL (1,2,0,0,0) selected based on Akaike Information Criterion

Autoregressive Distributed Lag Estimates

ARDL(1,1,0,1,0,1) selected based on Akaike Information Criterion

Dependent variable is LNAGRDP 115 observations used for estimation from 1981Q2 to 2009Q4			
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNAGRDP(-1)	.29653	.069590	4.2610[.000]
LNSAVG	.27376	.15040	1.8202[.072]
LNSAVG(-1)	-.19568	.14007	-1.3970[.165]
LNFAID	-.016943	.020970	-.80798[.421]
LNPOPL	104.1912	12.8404	8.1144[.000]
LNPOPL(-1)	-116.4571	13.1091	-8.8837[.000]
LNTEXPT	-.0043144	.029360	-.14695[.883]
T	57.7290	9.0287	6.3940[.000]
T(-1)	-57.6356	9.0151	-6.3932[.000]
R-Squared	.96929	R-Bar-Squared	.96698
S.E. of Regression	.095610	F-stat. F(8, 106)	418.2568[.000]
Mean of Dependent Variable	10.2390	S.D. of Dependent Variable	.52613
Residual Sum of Squares	.96898	Equation Log-likelihood	111.4678
Akaike Info. Criterion	102.4678	Schwarz Bayesian Criterion	90.1156
DW-statistic	1.7747	Durbin's h-statistic	1.8152[.070]

Table 4: Estimated Long run Coefficients using the ARDL Approach

Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,1,0,1,0,1) selected based on Akaike Information Criterion

Dependent variable is LNAGRDP			
115 observations used for estimation from 1981Q2 to 2009Q4			
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNSAVG	.11100	.045752	2.4261[.017]
LNFAID	-.024085	.029951	-.80415[.423]
LNPOPL	-17.4362	2.7158	-6.4202[.000]
LNTEXPT	-.0061332	.041683	-.14714[.883]
T	.13270	.017303	7.6693[.000]

Table 4 reveals that only savings and technological trend are significant and have positive relationship with agricultural output both in the short run and long run. This is in line with economic theory as increase in both saving and technological trend would have increasing effect on agricultural output. For example, when savings of farmers increase significantly, they are likely to have enough money to buy farm inputs like fertilizers and other farm implements during farming season. Apart from that, they are also likely to have enough money from savings to hire more farm labourers and agricultural equipment which most likely leads to increased agricultural output when efficiently used. With respect to technological trend, a new farming technology like new farm equipment, new improved seeds/seedlings, insecticides, fungicides, etc will increase agricultural output in the long run. Contrary to expectation, the parameter estimate of foreign aid has a negative relationship with agricultural output in the long run. This implies that foreign aid are either not adequately channeled to the agricultural sector or if the reverse is the case, the level of corruption in the sector particularly in the distribution of certain farm inputs has made it not to positively impact on the agricultural sector. Unfortunately and contrary to expectation, population has a contrary negative sign, though; significant in the determination of agricultural output. The negative sign may be interpreted to mean that as the population increases, rather than people go

into agriculture, most of them would prefer white collar jobs. Furthermore, total exports impacted negatively on agricultural output contrary to expectation and it is not significant. The strongest impact on agricultural output in the long run is technological trend.

4.3 Error correction representation

The results of the error correction representation of the models are presented in Table 5 below.

Table 5: Error Correction Representation for the selected ARDL Model

Error Correction Representation for the Selected ARDL Model

ARDL(1,1,0,1,0,1) selected based on Akaike Information Criterion

Dependent variable is dLNAGRGDP			
115 observations used for estimation from 1981Q2 to 2009Q4			
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dLNSAVG	.27376	.15040	1.8202[.071]
dLNFAID	-.016943	.020970	-.80798[.421]
dLNPOPL	104.1912	12.8404	8.1144[.000]
dLNTEXPT	-.0043144	.029360	-.14695[.883]
dT	57.7290	9.0287	6.3940[.000]
ecm(-1)	-.70347	.069590	-10.1088[.000]
List of additional temporary variables created:			
dLNAGRGDP = LNAGRGDP-LNAGRGDP(-1)			
dLNSAVG = LNSAVG-LNSAVG(-1)			
dLNFAID = LNFAID-LNFAID(-1)			
dLNPOPL = LNPOPL-LNPOPL(-1)			
dLNTEXPT = LNTEXPT-LNTEXPT(-1)			
dT = T-T(-1)			
ecm = LNAGRGDP - .11100*LNSAVG + .024085*LNFAID + 17.4362*LNPOPL + .006133 2*LNTEXPT -.13270*T			
R-Squared	.62695	R-Bar-Squared	.59880
S.E. of Regression	.095610	F-stat.	F(5, 109) 35.6294[.000]
Mean of Dependent Variable	.016608	S.D. of Dependent Variable	.15095
Residual Sum of Squares	.96898	Equation Log-likelihood	111.4678
Akaike Info. Criterion	102.4678	Schwarz Bayesian Criterion	90.1156
DW-statistic	1.7747		

R-Squared and R-Bar-Squared measures refer to the dependent variable $dLNAGRDP$ and in cases where the error correction model is highly restricted, these measures could become negative.

As expected, the error correction variable $ecm(-1)$ has negative sign and statistically significant (Table 5). The coefficient of $ecm(-1)$, -0.70347 as in Table 5 suggests that adjustment process is good and more than 70% of the previous quarter's disequilibrium in agricultural output from its equilibrium path will be corrected in the current quarter. The result further shows that population increases has been a major contribution to agricultural production in Nigeria in the short run. This may be due to the fact that majority of the populace may be engaged in agriculture in the short run, meaning more hands on the farm as population increases. On the long run, most of those who entered into agriculture in the short run may have lost interest in agriculture due to poor incentives.

5. Conclusions and Policy Implications of Results

The paper attempted to investigate the effectiveness of foreign aid on the growth of the agricultural sector in Nigeria. The result reveals that any increase in domestic savings, in both short run and long run will impact positively on the agricultural sector in Nigeria. On the other hand, foreign aid is not beneficial to the agricultural sector in Nigeria in both the short run and the long run. Population impacts positively on the agricultural sector in the short run while it was significantly negative in the long run. The size of the absolute value of the error- correction coefficient indicates that the speed of restoration to equilibrium in the event of any temporary displacement of the variables of interest is very high. A major policy implication of the results is that policy makers in Nigeria should encourage savings. This can be done by increasing deposit interest rate as such savings could be used by farmers to acquire important farming inputs like fertilizers and new crop varieties during planting season. It may also enable them to acquire loans from the bank and such loan could be channeled into viable agricultural practices. The use of fertilizer and new crop variety will in the short and long run increase agricultural output. Furthermore, improved technology is imperative to the increase in agricultural output in both the short run and the long run.

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