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The Impact of Trade Openness on Poverty via Agricultural TFP in Ethiopia: A Sequential Dynamic Computable General Equilibrium Micro Simulation Analysis[1]

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Abstract

This study tries to address the impact of trade on poverty through of agricultural total factor productivity (TFP). Thus, we employed a Sequential Dynamic Computable General Equilibrium Model linked to a Micro Simulation Model. We also used an econometric model to estimate the agricultural TFP of Ethiopia to create scenarios.

The estimation results of this study shows that trade openness has a positive impact on agricultural TFP and our simulation result revealed that the proposed policy change mainly tariff cut and trade induced agricultural TFP have an incremental effect on all macroeconomic variables. However, poverty is exacerbated due to trade openness and tariff reduction during the simulation period.

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1.   Introduction

The importance of trade openness in the reduction of poverty has been debated over the last three decades (for example, Brooks, (2003), Hameed and Nazir, (2006), and Kruger, (2009). One of the major challenges has been how exactly is trade openness channelled to influence the level of poverty in developing countries. Winters (2000) identifies seven possible mechanisms by which trade openness influences poverty: Farm household; distribution channel; wage and employment; taxes and spending; shocks, risks and vulnerability; economic growth and technology (total factor productivity); and short-term adjustment. Among these channels total factor productivity can be regarded as the most important conduit to carry the trade openness impact on poverty.

This is because the livelihoods of the vast majority people in developing countries depend on the agricultural productivity, such as Ethiopia. The agricultural sector provides employment opportunity to the rural population, supply production for the domestic as well as for international markets (Dethier and Effenberger, 2011). This implies the advancement of the sector enables the governments of these nations to meet the target they set to alleviate poverty. This argument has been supported by the empirical works of various studies (Christiaensen and Demery, 2007; Loayza and Raddatz, 2009; Godoy and Dewbre, 2010).

Opening up of trade would have a positive impact on the agricultural TFP[3] because it has a potential to provide and to transfer a variety of new technologies from abroad. This is supported by the work of Madsen (2005) that in the OECD[4] countries, international technology has an upbeat spill-over effects on TFP through trade. But, the effect of trade is not only limited to improving TFP, it can go beyond that. Sherman et.al. (2006) found that trade induced productivity gain can have a significant contribution in the

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[3] TFP refers to Total Factor Productivity
[4] OECD is Organization for Economic Cooperation and Development

diminution of poverty. However, this may not be realized unless the policy makers create a conducive economic environment and trade reform with poverty mapping analysis that benefit the majority of the population in general and the rural dwellers in particular (Abebe and Alemayehu, 2011).

Focusing on Ethiopia, some scholars have tried to assess what would happen to the country's economic growth, inequality and poverty situation if trade openness is allowed in the economy, particularly, following Ethiopia's anticipated accession to the WTO[5] (For example, Dejene et al., 2007; Seid, 2007; Bisrat, 2009; Ermias, 2009). However, most of these works used only the removal of tariffs in order to capture the openness and thereby change in the poverty status. But, the complete tariff cut may not necessarily reflect the degree of openness. More importantly, these studies have also been limited in explaining the mechanisms by which trade influences poverty.

Therefore, this paper addresses the question how the trade openness influences poverty through agricultural TFP in Ethiopia. To this end, we will employ the Dynamic Computable General Equilibrium-Micro Simulation (DCGE-MS) models. The DCGE model is crucial in this kind of study because it can capture various markets in the economy, present outcomes in sectoral level in line with macroeconomic framework and ability to link the macroeconomic outcomes with MS to analyze poverty. In order to create scenarios and thereby run the DCGE model, we will also perform econometric estimation on the agricultural TFP as the function of trade openness and other relevant variables.

The paper is organized as follows. Section 2 provides a literature review of trade, poverty and their links, specifically TFP. Section 3 describes trade, agricultural growth and poverty in the Ethiopian economy. Section 4 outlines the methodology that the paper will employ. Section 5 presents the empirical results and section 6 sets forth the conclusion and policy implications.

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[5] WTO is World Trade Organization

2.   Literature Review

2.1.   Theoretical review

Openness of trade can play a paramount role in the process of economic development of a country. Trade can provide access to a variety of goods and services, market opportunities and thereby increase domestic production, getting better information and transfer of technology that improves productivity, improve resource allocation and reduce inefficiency (Brooks, 2003) and this may lead to the achievement of higher economic growth and reduce poverty (for example, White and Anderson, 2001; Kakwani and Pernia, 2000).

But, to understand the way how trade influence poverty depends of measuring trade openness is crucial. In this aspect, there are two ways of gauging openness, namely 'revealed openness' and 'policy openness' (Dowric-Golley, 2004). The former (is defined as the ratio of total trade to GDP) measures the degree of distortion indirectly using prices and quantities, that is, it is based on outcomes, whereas policy openness measures policy instruments directly, that is based on incidence.

Winters (2000) identifies seven possible mechanisms by which trade openness influences poverty: Farm household; distributive channel; wage and employment; taxes and spending; shocks, risks and vulnerability; economic growth and technology (total factor productivity); and short-term adjustment. But these channels can be classified as static effect and dynamic effect on poverty when they transmit trade openness impacts. A static effect of trade on poverty is manifested through the household, distributive channel, wage and employment; taxes and spending, whereas the dynamic effects are revealed through shocks, risks and vulnerability; economic growth and technology (total factor productivity); and short-term adjustment.

In this regarded, trade induced technology or agricultural TFP on poverty is the most important conduit in the context of developing nations. This is also

supported by a study of Bhagwati and Srinivasan (2002) that trade openness enhances TFP, which immediately promotes growth and thereby reduce poverty.

On the other hand, there are theories that explain how trade openness exacerbates poverty. The theory of absolute advantage implies that a country that loses in pure trade competition might face higher levels of poverty because when the country imports, it may get into debt. If this import is unable to create new, productive, and competitive activities, higher deficit would be inevitable and thereby poverty could ensue (Echevrria, 2005).
Trade openness may further the "poor" vulnerable to economic fluctuations because the "poor" lack physical, financial and/or human capital (Brooks, 2003). To protect such part of the society from vulnerability and to increase the beneficial effect of trade, trade openness reform should centre the "poor".
 Higher agricultural TFP due to trade can lead poverty. Specifically, when the growth of agricultural TFP due trade greater than the growth of output, production may need to use less input to produce the same level as previous amount and this leads decline in employment and thereby intensify poverty (Winters et al., 2004).

2.2. *Empirical Review*

To provide policy prescription and understand the connection between trade and poverty in the real world, the exiting theories have to be verified using pragmatic studies. There are many practical studies that assess the poverty impact of trade and the conduits that trade influences poverty. Much of these studies use Computable General Equilibrium-Micro-Simulation analysis.

Using the global CGE model and econometric estimate of trade induced TFP; Sherman et al. (2006) analyze the preferential trade agreements between Morocco and EU, and those of Egypt and EU. They found that trade induced TFP contributes a lot in the reduction of poverty in Morocco and Egypt.

Similarly, different studies discover that agricultural productivity gain is crucial to reduce poverty. For instance, Hassine *et al*. (2010) examines the impact of trade induced agricultural TFP on poverty. To capture agricultural technological change due to trade openness, first they estimated agricultural TFP using the latent Class Stochastic Frontier Model. Then by combining this estimated TFP with static Micro-Simulation CGE model they assessed the poverty impact of trade induced agricultural TFP. Their simulation result reveals when trade induced productivity is considered, the agricultural and full liberalization would reduce poverty in Tunisia by 19% and 38%, respectively.

Some studies have been undertaken to get the picture of the relationship between trade and poverty in Ethiopia. Using a Static CGE Micro-Simulation model, Dejene et al. (2006) identify that although a 100% tariff removal would improve the welfare of farm households, poverty at the national level might step up. On the other hand, Seid (2007) and Bisrat (2009) employed the Dynamic CGE to examine the impact of trade liberalization on poverty in Ethiopia. Their simulation result showed that in the long run trade liberalization could reduce poverty. However, in the short run Seid (2007) found that poverty remains unaffected by trade liberalization whilst Bisrat (2007) found that trade liberalization would exacerbate poverty in Ethiopia in the short run.

By utilizing econometric analysis of rural household panel data, Adugna (2009) uses the change in the price of input and output channel by which trade liberalization affects change in poverty status of rural farm household in Ethiopia. His result depicts that the probability of remaining being poor and falling into poverty would be higher if trade liberalization changes the price of cash crops. But, a combination of relative price change (due to trade liberalization) with access to credit and schools would create a higher probability for the household to be out of the poverty category.

However, these pragmatic studies in the case of Ethiopia around the issue of trade and poverty have missed through which channel trade impacted poverty. More importantly, they ignore the importance trade induced agricultural TFP on poverty. Assessing trade impact on poverty through agricultural TFP in the case of Ethiopia should be given priority because the agricultural sector has played an important role in Ethiopia. The importance of the sector has been stressed by finding of Mulat *et al.* (2003) that in order to overcome the severity of poverty in Ethiopia agricultural growth complement with its productivity growth is crucial.

3. Trade, Agricultural Growth and Poverty in Ethiopia

Under this topic we will review the trade, agricultural growth and poverty situation in Ethiopia between 2005 and 2010. The external sector of the Ethiopian economy includes export and imports of agricultural and industrial items; and trade in service. The export sector has grown by 38.4% between 2009 and 2010, and by 36.7% between 2008 and 2010. Most of the increase in export is attributed by the growth of Coffee and Oilseeds. For example, in 2008 coffee and oilseeds had grown by 35.8% share and 14.9% share of the total export. Similarly, coffee had grown by 26.4% share and the percent share of oilseeds was 17.9 in the year 2010 (NBE, 2010).The import side of the country has shown increment as the export sector.

Although the percentage changes of import are smaller than the percentage change in export, the volume of import much more than the export. In 2008, the volume of import was USD 6,810.5 mil. But, the volume of export was USD 1,465.7 mil. Similarly, this big gap is also true in the years 2009 and 2010. Such differences have been revealed in the mentioned years as well as the country's trade history (from the imperial regime) result the country to exercise negative trade balance.

The agriculture sector of Ethiopia is the main source of food consumption; it is also the livelihood of the majority of the country's farmers and the major

source of foreign currencies. Thus, the growth of this sector has many implications for the country's economy as a whole and on the poverty situation in particular. According to the 2010 NBE report, the total value of the agricultural items had grown successively from 2005 to 2010. In 2005, the sectoral GDP of the sector was birr 39,728 mil., this growth continued to increase into 48,225 mil in 2007 and in 2010 reached 59,348 mil.

But, whether these increments of the agricultural GDP growth are emanated due to the increased in the total agricultural output or the increased general price level is the issue that should be addressed. When we assess the contribution of the agricultural sector to the GDP growth, its contribution continuously declined and replaced by the service sector. In 2005, the agricultural contribution was 6.4% and turn down to 3.2% in 2010, in the meantime the contribution of the service sector had increased from 5.1% in 2005 to 6% in 2010.

In the case of poverty situation in Ethiopia, we compare the head count index, the poverty gap index and poverty severity index (i.e., a class of decomposable poverty measures, FGT) of 2004/05 and 2010/11 using Household Income Consumption and Expenditure (HICE) surveys of CSA. This is depicted in Table.1 below. Accordingly, HCIE shows the ratio of the poor to the population at the national level, in rural and urban have declined in 2010/11 comparing from the year 2004/5. The PGI measure of poverty also shows that the mean consumption shortfall of the poor relative the poverty line across the whole population has depressed in terms national, rural and urban level.

However, the inequality among the poor has widened in 2010/11. At the national level, poverty severity has increased from 0.027 in 2004/5 to 0.031 in 2010/11. Similarly, in the rural area as well as in the urban area of the country the inequality among the poor has inflated. In rural area, it has increased to 0.032 from 0.027 and in urban, the severity has recorded to 0.027 from 0.026.

Table 1: National, Rural and Urban poverty indices

	2004/05	2010/11
National		
head count index	0.387	0.296
poverty gap index	0.083	0.078
poverty severity index	0.027	0.031
Rural		
head count index	0.393	0.304
poverty gap index	0.085	0.08
poverty severity index	0.027	0.032
Urban		
head count index	0.351	0.257
poverty gap index	0.077	0.069
poverty severity index	0.026	0.027

Source: the 2004/5 and 2010/11 HICE survey of CSA of Ethiopia and MoFED's (2012) computation

4.   Data and Methodology

To capture the poverty impact of trade, the paper will employ a dynamic CGE (which is developed by IFPRI: International Food Policy Research Institute) and Micro-simulation (MS) models, that is, a Top-down approach. Besides this, to see how trade influence poverty via agricultural TFP in Ethiopia and to create scenarios, the study estimates agricultural TFP. For these purposes, secondary data are applied. The sources of these data are CSA (The agriculture sample surveys between 2006-2010 and the 2004/2005 Household Income Consumption and Expenditure (HICE) Metadata), International Trade Center (ITC UN) data of import and export between 2006 and 2010) and the 2005/06 SAM (Social Accounting Matrix) of Ethiopian Development Research Institution (EDRI).

4.1.   Methodology
4.1.1   Econometric Model

The objective of estimating of the agricultural TFP in Ethiopia in this paper is to the get the value of the parameter of trade openness which helps to set the simulation value of the agricultural TFP in Ethiopia.

To estimate the agricultural TFP, the study assume the Cobb-Douglas production function that

$$Q_{it} = A_{it} L_{it} \ La_{it} \qquad\qquad\qquad\qquad (1)$$

Where Q is total output

A is agricultural total factor productivity (TFP)

L is labor which is proxy by the number of holders

La is area of cultivated land,

and   are share parameters of L and La, respectively

i represents agricultural commodity, i.e, i= 1,2,3…..n

t is production year

Taking the natural logarithm on both sides of equation (1)

$$lnQ_{it} = lnA_{it} + \ lnL_{it} + \ lnLa_{it} \qquad\qquad\qquad (2)$$

We can generate the agricultural TFP (A) of each item for each year using either equation (1) or equation (2)

$$TFP_{it} = \frac{A_{it}}{L_{it}^{r} La_{it}^{s}} \qquad\qquad\qquad\qquad (3)$$

Alternatively,

$$\ln A_{it} = \ln Q_{it} - r \ln L_{it} + s \ln La_{it} \qquad\qquad\qquad (4)$$

Equation (3) and (4) the "Solow Residual" it means the part output that is not explained by the labor and capital/land (Solow, 1957; Comin, 2006). This "Solow Residual" simply represents the TFP.

Once we get the level of agricultural TFP of each item for each year, it is possible to estimate TFP. But it is necessary to get the possible determinants of agricultural TFP in the given economy. Based on some empirical works on developing countries (for example, Kumar et.al, 2008; Fantu, 2012) the factors the influence agricultural TFP in Ethiopia would be fertilizer (allfirti), seeds, pesticide, irrigation, extension package (which includes how to use best practice, transfer of technology to farmers and education among others), trade openness (trade) and agro-ecological zone (dummy).

$$TFP_{it} = f(allfirti, seeds, pesticide, irrigation, extension, trade, dummy) \quad \textbf{(5)}$$

$$lnTFP_{it} = {}_0 + {}_1 ln\ allfirti_{it} + {}_2 lnseeds_{it} + {}_3 lnpesticide_{it} + {}_4 lnirrigation_{it} + {}_5 ln\ extension_{it} + {}_6 lntrade_{it} + {}_7 dummy + e_{it} \quad \textbf{(6)}$$

4.1.2. DCGE Model

In examining of the poverty impact of trade, applying Computable General Equilibrium Model is more convenient. In fact, other methods are available to analyze the impact of trade and trade policies change on economy-wide in general and on poverty in particular, but some of these models concentrate on micro-level analysis by ignoring the broader market and macroeconomic effects and/or excluding the decision making individual agents and/or disregarding factor markets are among others (Thurlow et.al, 2011).

The advantage of CGE over such models is that its ability to reflect a country's economic structure and linkage because the model incorporates the interactions between different economic decision agents and its ability to be linked with micro-simulation modules to capture the effect of any change in the economy on households. In this DCGE model is separated into two:

"within-period" and "between-period". The within-period part, was developed by Lofgren et al. (2002), is static and solves the maximization problem of the consumers and the producers based on the prevailing prices. The between-period section, on the other hand, updating some of exogenous variables is either externally-determined or based on the previous period result (Thurlow et al., 2011).

4.1.3. Micro-Simulation Model

To analyze the poverty impact of trade through agricultural TFP, we will employee FGT[6] measure of poverty index, which was developed by Foster, Greer and Thorbecke in 1984.

This index is actually the extension of poverty indices of Sen (1979). The FGT - index is considered as a standard measurement of poverty because this measurement is additively decomposable (total poverty is the sum of a weighted average of sub-group of poverty levels). In addition, FGT incorporates inequality measures, the head count ratio and the income-gap ratio.

In FGT poverty $(P\ )$[7] is defined as:

$$P\alpha(y;z) = \frac{1}{n}\sum_{i-1}^{q}\left(\frac{z-yi}{z}\right)^{\alpha}$$

Or
$$P\ \alpha = \int_{1}^{z}\{ ((\frac{z-y}{z}))^{\alpha}\ f(y)\}dy$$

≥ 0, $i \geq 1$ and $z > 0$

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[6] FGT stands for Foster, Greer and Thorbecke.

[7] *Where   is the measures poverty aversion, z is poverty line, y is income, i represents household or the sub-group of individuals which their income is below poverty line and n is number of population. Larger   emphasis to the poorest poor, P0 is the headcount ratio (it counts the number of the poor in the total population, was formulated to capture the problem of constructing poverty index using available information). P1 is a renormalization of the income-gap index (This measures the aggregate short-fall of income all the poor taken together from the poverty line) and P2 measures the severity of poverty (which measures the gap between poverty line and the average income of poor people, in short the index measures the square of the poverty gap).*

To get the impacts of our simulation on poverty, we demarcate the poverty line is based on the EDRI's SAM which defines the bottom 40% as poor in terms of descending household consumption expenditure level. Therefore, the poverty line is Birr 1782.98. The important thing that we note is that in the SAM rural, households are disaggregated into ten based on zonal level and urban households are divided into four on the basis of small and large settlement. We aggregated the rural households into two as rural poor and rural non-poor. However, the IFPRI's DCGE is modeled as urban households into urban poor and urban non-"poor". Then we introduced the adjusted expenditure per adult and poverty line in the MS model using DAD[8] (distribution analysis software) to calculate the poverty indices using FGT.

5.   Econometric and Simulation Results

In this section we begin with the presentation of the estimation result of agricultural TFP and following this, the economy-wide and the poverty impact of simulation of tariff reduction and an increase in agricultural TFP will be described.

5.1.   *Econometric Result*

We performed appropriate statistical tests to test the employed panel data, the parameters of estimates and the specification of the model. Breusch and Pagan LM test suggests that the model should be a Random Effect Model (REF). Accordingly, the result is given in Table 2.The result shows that fertilizer, seeds, irrigation, extension package and trade openness are statistically significant while pesticide and agro-ecological dummy (AgE) fail to explain agricultural TFP statistically.

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[8] The DAD (distribution analysis) software was developed by Duclos *et.al* in 2010 "…to facilitate the analysis of and the comparison of social welfare, inequality, poverty and equity across distribution of living standards".

The negative sign of the coefficients of seeds and irrigation may signify that their application on the given cultivated land could be beyond the optimal level, but the negative coefficient of the extension package might be indicative of the fact that an extension package provides knowledge and information to farmers on how improving TFP would reduce the price of their produced items, as a result of which the farmers may not be willing to increase their productivity and they may allocate their resources sub-optimally which contributes to TFP decline.

The positive coefficient of fertilizer and trade openness could be explained by the fact that an increase in the application of fertilizer use by one percent would induce the agricultural TFP to increase by 1.063 percentage points, on average. In the same way, an increase in trade openness by one percent, on average, would trigger the agricultural TFP to respond by 0.144 percentage points.

The dependent variable pesticide is statistically insignificant, thus we cannot say anything about the association between pesticide and agricultural TFP. Regarding to the sign, the application of pesticide may not consider the agro-ecological difference of various regions in the country, thus it is likely to produce negative impact on agricultural TFP.

Table 2: Random-Effect GLS regression results for agricultural TFP

lntfp	Coef.	Std. Err.	z	P>|z|
_cons	14.0894	2.238	6.30	**0.000**
lnallfirtr	1.0633	0.2848	3.73	**0.000**
lnseed	-1.2522	0.1761	-7.11	**0.000**
lnpesticide	-.13788	0.1095	-1.26	**0.208**
lnirrigatn	-0.4574	0.1196	-3.82	**0.000**
lnextensie	-0.5134	0.1861	-2.76	**0.006**
Lntrade	0.1442	0.0631	2.29	**0.022**
AgE(dummy)	0.3063	0.2041	1.50	**0.133**

R-sq: within = 0.3532 overall = 0.9190 Wald chi2 (7) = 192.83 sigma_e = 0.14538502
Between = 0.9558   Prob> chi2 = 0.0000   rho = 0

5.2. Simulations

Baseline scenario
The model which we applied, DCGE, is calibrated to reflect what would happen to the economy when there is no policy change and external shocks; and to generate the growth path over time. Here the assumption is that the economy exhibits changes which arise from changes in the annual growth of factor supply and productivity (Thurlow *et al., 2011*). In our case, the base-run simulation covers the period between 2006 and 2015.

Simulation 1
Since currently Ethiopia is in the process of accession to the World Trade Organization (WTO) and most of the country's trading partners are the members of the WTO, it is reasonable to take the WTO's tariff cut requirement to create scenarios. Thus, we simulate a 24% tariff cut, assuming that Ethiopia will join in the category of developing countries within the simulation period. The maximum tariff cut for the agricultural items that developing countries are required is 24%. However, the tariff reduction for the non-agricultural items is not uniform. Thus, we apply a 24% tariff cut for all sectors. The result of this tariff cut on the economy may be affirmative or negative on the economy in general and on poverty in particular.

Simulation 2
In this scenario we simulate agricultural TFP using our estimation result given in Table 1. Accordingly, an increase in trade openness by 1% results in an increase in agricultural TFP by 0.144%, on average. This simulation is important to see how trade influences poverty in this economy through the agricultural TFP.

Simulation 3
This simulation is a combination of Sim-1 and Sim-2. It helps to understand how trade policy (tariff cut by 24%) associated with enhancing agricultural

TFP due to trade openness influences the economy and the poor in this economy, alternatively the combination of the two simulations more to capture the definition of trade openness.

Simulation 4

One of the factors that can influence the agricultural TFP is the level of the usage of fertilizer. Here again we use the above estimation result. Suppose that the price of fertilizes decreases, then there will be a tendency to increase the application of fertilizer. If this is the case, an increase in the use of fertilizer by 1%, on average, has an incremental impact on the agricultural TFP by 1.06%. The importance of the introduction of this simulation in our model is to compare which of the simulations, i.e., Sim-2 or Sim-4, is more important in explaining the process of poverty reduction.

5.3.   Simulation Results

For the sake our study, we only present the simulation results pertaining to the macroeconomic and sectoral effects of the above scenarios.

5.3.1.   The Macroeconomic Effects Simulation

The result of sim-1 in is depicted in Figure 1 and Table 3. When the country uses a 24% trim downs of tariff, it results in an increase in RGDP at factor cost by 15.08% percent from its initial value but this is a 0.006% increment when we compare with business as usual (BAU) situation. This increase in RGDP at factor cost would be explained by the fact that though there is a reduction of investment and government expenditure, by 0.08 and 0.03 percentage point changes, respectively, it is clearly offset by an increase in 0.04 percentage point change in private consumption and a 0.16 percentage point change in real export.

The increase in private consumption leads to an increase in absorption by 0.01percentage point change from BAU (or 13.54% increased from the

initial value), although investment and government expenditure decreases. An increase in a 0.11percentage point change in real import is also recorded in this simulation. The decrease in government income by 0.33percentage point change shows that the government revenue may not be maintained when it reduces tariff.

When we look at CPI, it has increased by 0.05percentage point change. This may be due to the fact that while real import has increased, the domestic producers are more interested to export instead of selling domestically. Since the increase in real export outweighs the increase in the real import, it implies that the domestic demand remains uncovered leading to an increase in CPI. In Sim-2, it can be understood that an increase in agricultural TFP due trade openness changes all the selected macroeconomic indicators positively within the simulation period in Ethiopia. Again in the Figure 1 and the Table 3 the increase in private consumption, investment, recurrent government expenditure and real export by 0.09% change, 0.01% point change, 0.08% point change, respectively, outweigh the increase in real import by 0.03% point.
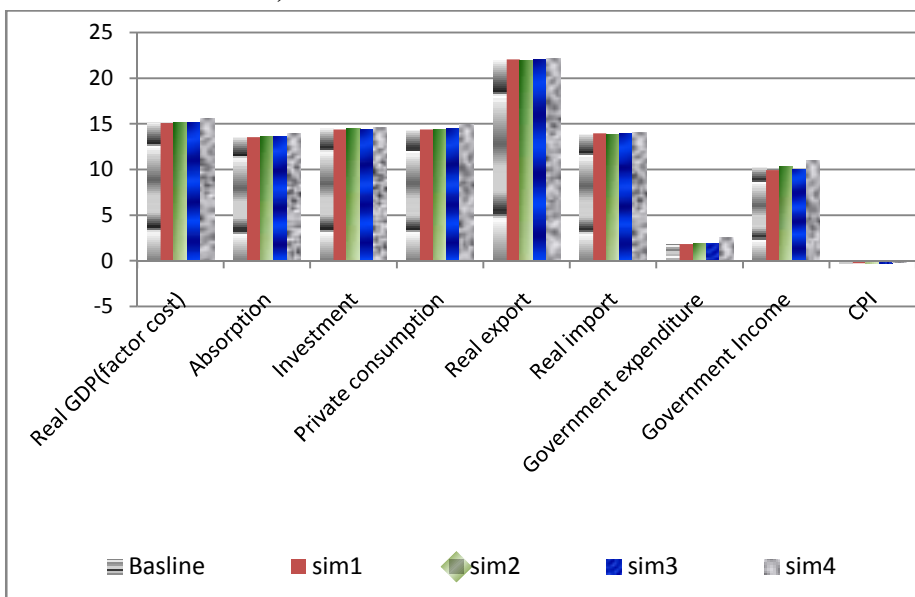
Sim-3 contributes an increase RGDP at factor cost by 0.08% from BAU situation. Absorption has increased by 0.07% change as a result of an increase in private consumption, investment and the government expenditure. As agricultural TFP increase by 0.144%, the government income increase by 0.11% change. However, the CPI has increased by 0.02% change.

Comparing sim-3 with BAU situation, Table 5 and Figure.1 provide the combination of sim-1 and sim-2 results an increase in RGDP at factor cost by 0.081%, absorption by 0.08%, private consumption by 0.13%, real export by 0.20%, real import by 0.13%, recurrent government expenditure by 0.06% and CPI by 0.06%. However, investment and recurrent government income have decreased by 0.068% and 0.23%, respectively. The increase in RGDP is aroused due to the increased in private consumption, recurrent

government expenditure and real export greater than the decrease in investment and real import. The increase in private consumption also contributes absorption to change positively. In this scenario, the domestic demand still unable to be satisfied while real import has increased and this results CPI to increase.

Finally, the result of simulation 4 indicates that RGDP at factor cost has grown by 0.56% change because private consumption, investment, recurrent government expenditure and real export have increased as shown in Table 3 and Figure.1. The increase in absorption by 0.49% change would be explained by the increment of private consumption, investment and government expenditure by 0.65%, 0.09% and 0.78% changes, respectively.

Figure.1: Simulation results of Macroeconomic Indicators (% change from initial)

Source: Simulation result from the DCGE model.

Table 3: Simulation results of Macroeconomic Indicators (percentage point changes)

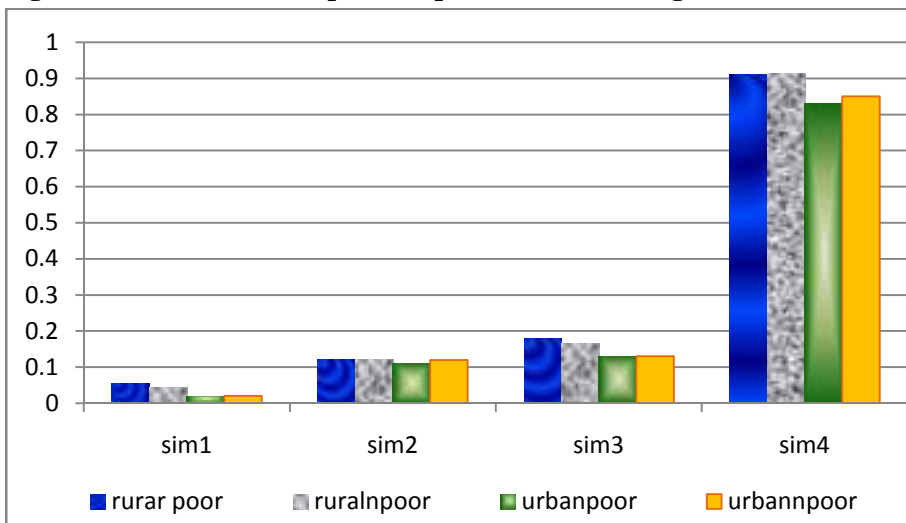|	Sim1	Sim2	Sim3	Sim4
Real GDP (factor cost)	0.00596	0.07509	0.08136	0.56043
Absorption	0.01412	0.06567	0.08012	0.48856
Investment	-0.08186	0.01329	-0.06822	0.09325
Private consumption	0.04319	0.0865	0.12987	0.64225
Real export	0.16215	0.03959	0.20234	0.30281
Real import	0.10617	0.02592	0.13257	0.19879
Government expenditure	-0.02647	0.08627	0.0615147	0.642856
Government Income	-0.33439	0.1052594	-0.229315	0.773974
CPI	0.04485	0.0172	0.06165	0.12712

Source: Simulation result from the DCGE model.

5.3.2. *Consumption Expenditure Growth Effect of Simulation (% change from baseline)*

In the simulation period, the consumption expenditure of all household groups have registered a very small growth as we relate to the baseline run simulation interlude. As Figure.2 portrays, in sim1, expenditure of rural poor household and rural non poor household have raised by 0.056% and 0.044%. These changes are greater than that of urban households. This is also true in sim2 and sim3.

In sim4 we found that greater percentage increments than the others simulations, that is, expenditure of rural poor, rural non poor, urban poor and urban non poor have increased on average by 0.91%, 0.914%, 0.83% and 0.85%, respectively, between 2006 and 2015. However, the registered augmentations on consumption expenditure are too small and less than 1%. Therefore, one should not expect these changes to reduce poverty. The household consumption expenditure per adult (Exp/adult), which is not reported here but we employed in the micro-simulation model, confirms the above facts that in each simulation it has increased with insignificant amount.

Figure 2: Private Consumption Expenditure (% change from baseline)

Source: Simulation result from the DCGE model.

5.3.3. *Sectoral Effects of Simulations*

Under this topic we present the effects of the simulations on the agriculture, the industry and the service sector growth. We divide the agricultural sector into cereals, cash crops and other agricultural outputs. We also carve up the industrial sectors into manufacturing and other industry growth.

Figure 3 depicts the business as usual scenario case the growth of cereal production, cash-crops, other types of agricultural products, manufacturing, other types of industrial outputs and services increases by 15.74%, 16.68%, 13.49%,19.18%, 18.27% and 15.14%, respectively. In sim-1, a reduction in tariff results in an increase in cereal production by 15.7%. Comparing this percentage change with the baseline scenario, it is less. This could be explained by when tariff decreases, imported cereal become cheaper than domestically produced, thus domestic producers may be enforced to reduce their production. Cash-crops and other agricultural products also increase by 16.67% and 13.48%.

This situation is similar to the case of cereal production. In the industrial sector's production, both manufacturing and other industrial sector productions have grown by 19.4% and 18.37%, respectively. These growths are greater than that of the BAU situation. This is because a reduction of tariff enables the efficient domestic industries to import raw materials with cheap cost. Therefore, the industrial output has increased. However, in this simulation the service sector has grown by less than the growth in the base-run simulation.
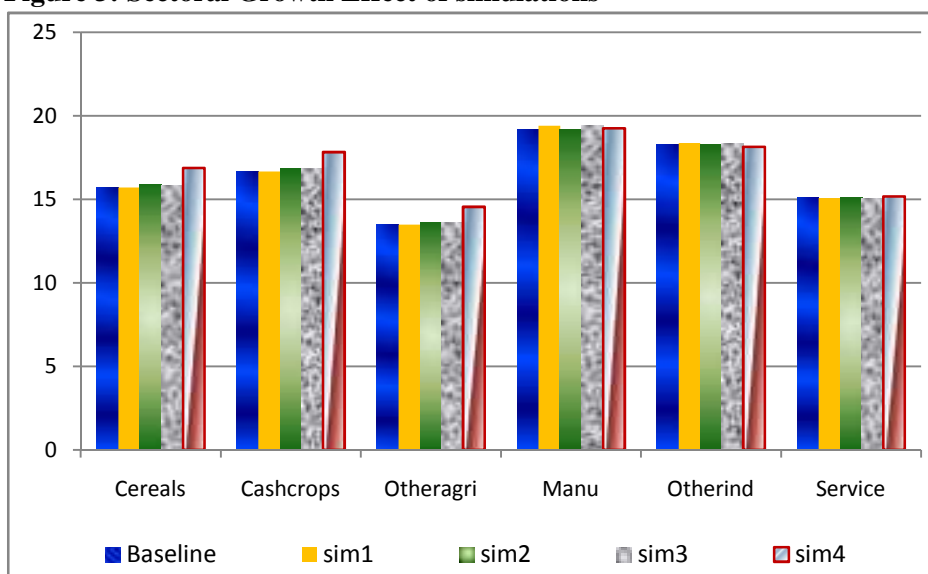
In simulation 2, all sectors' production has grown except the service sector in comparison with the baseline growth. This implies trade induced agricultural TFP enhance the production of the agricultural and the industrial sectors. This again helps to understand there is some kind of relatively strong link between these two sectors. But, there is less significant growth of the service sector due to this simulation.

The combination of tariff reduction and trade induced agricultural TFP in sim-3 also shows similar results as sim-2 except they have different values. Nevertheless, the growth in the service sector has declined. This may be tariff reduction and trade induced agricultural TFP more favor to the agricultural and the industrial sectors than service sector.

In the case of Ethiopia the link between the service sector with the agricultural sector is very much less and tariff reduction is mostly applied to non-service sectors. As a result any progress in the agricultural sector is not reflected in the service sectors.

In the last simulation, productions of all sectors have grown. For example, cereal production has swelled by 16.88%, manufacturing products has grown by 19.25% and the service sectors also have shown an increment by 15.17%. Comparing with the baseline scenario, the results of sim-4 are higher.

Figure 3: Sectoral Growth Effect of simulations

Source: Simulation result from the DCGE model.

5.3.4. *Poverty Effects of Simulations Results*

5.3.4.1. *Poverty Head Count Index (P_0)*

From Table 4, we understand that poverty head count index has recorded a small rise in national, rural and urban areas in all simulations, except sim-4 compared with the baseline scenario case. When we look at the poverty head count index of rural and urban, "poor" people in rural is higher than urban areas. This result can be explained as in sim-1, the reduction of tariff has a strong impact on the agricultural sector than the industrial sector in the case of Ethiopia. This tariff reduction enables the country to import more agricultural items with lower price from either the country with efficient agricultural sector or the country that subsidized the agricultural sector. As a result, the domestic farm output price declines or remains unsold.

In urban area tariff reduction reduces prices, which may drive some domestic firms to exit the market notwithstanding the depressed price that leads to an increase in the number of "poor" people. As the majority of the rural peoples' livelihood is based the agricultural sector the impact of such policy has a dramatic effect on this subdivision of the country's sector than the others. Therefore, higher level of "poor" per population is revealed in rural area. In sim-2, trade induced agricultural TFP also has a declining price effect because it has a direct effect on the agricultural items that is farmers could produce a greater amount of output than before.

At the given level of the national and the rest of the world (RoW) demand, there may exist a surplus which its substantial amount leftovers unsold or sold by small prices that leads farmers to allocate resources sub-optimally. But, the outcome of this simulation on the industry is indirect. Thus, it is expected that there will be less increments in the number of "poor" in urban than rural. The result of sim-3 can be enlightened using the combined justification of sim-1 and sim-2.

Simulation 4, however, results a greater change in the national, rural and urban "poor". The national, the rural and the urban poverty head count index have grown by 8.97%, 10.2% and 8%, respectively. This again could be elucidated as in the above three simulations.

Table 4: Poverty Head Count Index (P_0)

Simulation	baseline	sim1	sim2	sim3	sim4
National	0.1001	0.1291	0.1109	0.1398	0.1898
Rural	0.1107	0.1452	0.1239	0.1579	0.2127
Urban	0.0918	0.1164	0.1006	0.1256	0.1718

Source: Micro-simulation result

5.3.4.2.   Poverty Gap Index (P_1)

The micro-simulation result shown in Table 5 indicates that the aggregate consumption shortfall relative to the poverty line has widened in all scenarios between 2006 and 2015.

In sim-1, the reduction of tariff leads to the poverty gap of the national poor, rural poor and urban poor have grown by 2.26%, 2.43% and 2.14%, respectively.   The substitution and income effects of the tariff cut for imported foreign goods are negative, implying that domestically produced goods are substituted. Although tariff cut would provide a variety of items with cheap price, the domestic producers selling prices are decreased strongly and end up with domestic production cut as well as unemployment. Therefore, the separation distance between   the aggregate consumption shortfall and poverty line has further increased.

In sim-2, sim-3 and sim-4, we also found similar consequence as sim-1 but the interpretation is different. In sim-2, the poverty gaps have increased by 1.88%, 1.99% and 1.79%, for the national "poor", the rural "poor" and the urban "poor", respectively. The fourth simulation also has similar direction. In general, the result of sim-2 and sim-4 show that as agricultural TFP increases, cheap agricultural output would prevail in the market.

Although the registered rise of poverty gap index is relatively small, the potential impact should not be underestimated. Unless the industrial sector increases its productivity, which enables to absorb the surplus of labor in the agricultural sector as a result of the increased agricultural TFP, the "poor" will further become "poorer". The third simulation revealed that the combined effect of sim-2 and sim-3 guides an increase in poverty gap in the three categories of the "poor". From these simulation results we understand that more resources are needed to eliminate the disparity between the aggregate consumption short-fall and the poverty line.

Table 5: Poverty Gap Index (P_1)

Simulation	baseline	sim1	sim2	sim3	sim4
National	0.0168	0.0226	0.0188	0.025	0.0354
Rural	0.0177	0.0243	0.0199	0.0269	0.0386
Urban	0.0161	0.0214	0.0179	0.0235	0.0329

Source: Micro-simulation result

5.3.4.3. Poverty Severity Index (P_2)

This measurement of income poverty is vital in a sense that it captures both the distance separating the "poor" from poverty line and gives more value to those poor who are way far from the poverty line. Thus, it helps to see the magnitude of the poverty level on the poor. Our simulation result is presented in Table 6.

When we relate sim-1 with BAU scenario, the severity of poverty in the national "poor" has increased by 0.17%. The respective increment in poverty severity in the rural and the urban "poor" are 0.18% and 0.16%. We found similar results in sim-2 and sim-3 as sim-1 designating little growth of the poverty severity. However, huge percentage increases in sim4 are revealed that 55.78%, 62.19% and 50.76% growth in the national, rural and urban, respectively, poverty severity. Overall, the rural poor are greatly affected by these policy simulations and what we have understood is these policies should be incorporated with other "poor" policies.

Table 6: Poverty Severity Index P_2

Simulation	baseline	sim1	sim2	sim3	sim4
National	0.0046	0.0063	0.0052	0.0071	0.5624
Rural	0.0047	0.0065	0.0053	0.0073	0.6266
Urban	0.0045	0.0061	0.0051	0.0068	0.5121

Source: Micro-simulation result

6.   Conclusion and Policy Implications

Understanding of the impact of trade on poverty is a crucial issue for developing country to create appropriate policy measures. Whether trade has impeding effects or not on poverty remains debatable. Trade is believed to reduce poverty by introducing new technology which enables efficient resource allocation, enhancing productivity and making available diversity of products with fewer prices. Whereas others argue that trade associated with tariff reform and openness may have an exacerbating effect on poverty because it displaces domestically produced goods and wind up with the higher idle domestic resource. In this viewpoint, we set forth our attempt to analyze the impact of trade on poverty through agricultural TFP in the case of Ethiopia.

Since such issue covers both the macro and micro aspect of the economy, we employed the dynamic computable general equilibrium model linked with the micro-simulation model. Their link is based on the "top-down" approach. To create scenarios we used the WTO's maximum tariff requirement for agricultural items of developing nations and we also estimated the agricultural TFP with respect to trade openness. For DCGE-micro-simulation purpose, we utilized the2005/06 EDRI's SAM and the HICE survey data of 2004/5. Whereas for the econometric estimation we used the agricultural sample surveys data of CSA and import and export of ITC UN between 2006 and 2010. The simulation result indicates an increase in most macroeconomic variables. As expected, all simulations stimulate growth in GDP, absorption, export, import and private consumption. However, the increase in household consumption expenditure is insignificant that in all scenarios, it exhibited below one percent. On the other hand, tariff cut leads to a reduction of investment, government expenditure and government income in the simulation period.

This shows the tariff reduction may discourage domestic producers to invest in the domestic economy and government may not be able to compensate the

reduction of its revenue using imposition of domestic tax. When we look at the impact of trade on poverty, we consider both the tariff policy and trade induce agricultural TFP (we used the two variables to capture trade openness). The micro-simulation result suggests that the proposed level of tariff cut and trade induced agricultural TFP will slightly worsen the level of poverty in both rural and urban areas in the simulation period. This result may consistent with the argument that the growth of productivity due to trade have to be less than the growth of output, otherwise agricultural productivity would exacerbate poverty (Winters, 2000).

Finally, we recommend that to get the full picture of the impact of trade openness on poverty in Ethiopia, other channels, by which trade influence poverty should be assessed. In addition that achieving a positive impact of trade on poverty through agricultural TFP needs pro-poor complementary policies that boost the industrial sector productivity and human capital development, and policies that create efficient market and thereby reduce poverty in the country. It should also be helpful to maintain the growth of in the agricultural TFP less than the growth in agricultural output.

References

Adugna, L. (2009). "Trade liberalization and changes Poverty Status in Rural Ethiopia: What are the links?" *International Economic Journal.*

Alemayehu, G. and Abebe, S. (2011). "Trade Liberalization, Poverty and Inequality", Institute of African Economic Studies, Working paper Serious *No. A08/2011*

Bhagwati, J., and Srinivasan, T. N. (2002). "Trade and poverty in the Poor Countries", *American Economic Review,* Vol. 92, No. 2:180-83.

Bisrat, T. (2009). "Trade liberalization, Inequality and Poverty in Ethiopia", A Dynamic Computable General Equilibrium Micro Simulation Analysis, Addis Ababa University

Brooks, D. (2003). "Trade and poverty: What are the Connections?" Asian Development Bank, ERD Policy Brief No. 21", OECD Food, Agriculture and Fisheries Working Papers, No.23

Christiaensen, L. and Demery, L. (2007). "Down to Earth: Agriculture and Poverty in Africa", the World Bank.

CSA (Central Statistical Agency of Ethiopia). (2007). "Household Income Consumption Expenditure (HICE) Survey 2004/05", Addis Ababa, Ethiopia.

CSA. (2006, 2007, 2008, 2009 and 2010). "Agricultural Sample Survey, Report on Farm Management Practices, Addis Ababa. Ethiopia.

Dejene, A., Belay, F. and Sindu, W. (2007). "Trade liberalization, Poverty and Inequality in Ethiopia", A CGE Micro-simulation analysis, Poverty and Economic Policy, MPIA.

Dethier, J. J. and Effenberger, A. (2011). "Agriculture and Development", A Brief Review of the Literature. The World Bank, Development Economics Research Support Unit.

Dowrick, S. and Golley, J. (2004). "Trade openness and Growth: Who Benefits?" *Oxford Review of Economic Policy*, Vol.20, No. 1.

Duclos, J. Y., Araar, A. and Fortin, C. (2010). DAD: A Software for Distributive Analysis (Analysis Distributive), MIMAP Programme, International Development. Research Centre, Government of Canada and CRFA, Universtie Laval

Echevrria, J. (2005). "Trade and Poverty: Any Help from Theory?" CIES, Opinion Paper.

EDRI (Ethiopian Development Research Institute). (2009). Ethiopia "Input Output Table and Social Accounting Matrix", EDRI in collaboration with IFPRI and Institute of Development Studies, University of Sussex.

Ermias, E. (2009). "Economy Wide Impact of Unilateral Agricultural Trade Liberalization, A Recursive Dynamic CGE Model for Ethiopia: The Case of EPA", Addis Ababa University

Fantu, N. B. (2012). "Growth in Total Factor Productivity in the Ethiopian Agriculture Sector: Growth Accounting and Econometric Assessments of Sources of Growth", Development Strategy and Governance Division, International Food Policy Research Institute – Ethiopia Strategy Support Program II, Ethiopia, Working Paper 37

Foster, J. Greer, J. and Thorbecke, E. A. (1984). "Class of Decomposable Poverty Measure", *Econometrica,* Vol. 52, No. 3, pp. 761-766.

Godoy, C. D. and Dewbre. J. (2010), "Economic Importance of Agriculture for Poverty Reduction", *OECD Food, Agriculture and Fisheries Working Papers*, No. 23, OECD Publishing.

Hameed and Nazir. (2006). "Economic Globalization and its impact on Poverty and Inequality: Evidence from Pakistan"

Hassine, N, Robichaud, V. And Decaluwé, B. (2010). "Agricultural Trade Liberalization, Productivity Growth and Poverty Alleviation: A General Equilibrium Analysis", CIRPEE, Working Paper 10-22.

ITC (International Trade Centre, UNCTAD), 2006, 2007, 2008, 2009 and 2010: Countries Data on Imports and Exports

Kakwani, N. and Pernia, E. (2000). "What is pro-poor growth?", Asian Development Review, Vol. 18(1), 1-16.

Kruger, A. O. (2009). "Trade Openness Is Now More Important Than Ever", Special Report.

Kumar, P., Mittal, S. and Hossain, M. (2008). "Agricultural Growth Accounting and Total Factor Productivity in South Asia: A Review and Policy Implications", Agricultural Economics Research Review, Vol. 21 July-December 2008 pp 145 - 172.

Loayza, N. and Raddatz, C. (2009). "The Composition of Growth Matters for Poverty Alleviation", the World Bank.

Lofgren, H., Harris, L. R., Robinson, S. (2002). "A Standard Computable General Equilibrium Model (CGE) in GAMS, International Food Policy Research Institute (IFPRI).

Madsen, J. (2005). "Technology Spillover through Trade and TFP Convergence: 120 Years of Evidence for the OECD Countries", Institute of Economics, EPRU.

Mulat, D. Fantu, G. and Tadele, F. (2003). "Growth, Employment, Poverty and Policies in Ethiopia: An Empirical Investigation", Recovery and Reconstruction Department, International Labour Office, Geneva.

NBE (National Bank of Ethiopia). (2010). Annual Report

Seid, M. (2007). "Impact of Trade Liberalization on Growth and Poverty in Ethiopia: A Dynamic Computable General Equilibrium Model", Addis Ababa University.

Sen, A. (1976). "Poverty: An Ordinal Approach to Measurement", *Econometrica*, Vol. 44, No. 2.

Sherman, R. McDonald, S. Evans, D. and Gasiorek, M. (2006). "Trade Liberalization with Trade Induced Technical Change in Morocco and Egypt: Findings and Wider Research Implications", Paper prepared for the GTAP Conference Ethiopia

Solow, R. M. (1957). "Technical Change and the Aggregate Production Function" The Review of Economics and Statistics, Vol. 39, No. 3 (Aug., 1957), pp. 312-320

Thurlow, J., Diao, X., Benin, S. and Fan, S. (2011). "Agricultural Strategies in Africa: Evidence Economy-wide Simulation Models"

White, H. and Anderson, E. (2001). "Growth vs Redistribution: Does the pattern of growth matter?", Development Policy Review, Vol. 19(3), 167-289.

Winters, L. A. (2000). "Trade, Trade Policy and Poverty: What are the Links?" Discussion paper No.2382, February 2000, Centre for Economic Policy Research

Winters, L. A. McCulloch, N. and McKay, A. (2004), "Trade Liberalization and Poverty: The Evidence So Far", *Journal of Economic Literature*, Vol. XXLII. pp 73-115.

The Nigerian, Swedish and Chilean Pension Systems: A Comparative Analysis of Schemes and Reforms

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Abstract

The contemporary global debate about pension reforms is based mainly on the concern for the long-term financial viability of existing government operated pension systems. Against this background, Nigeria, Sweden and Chile responded to the challenges posed by their pension systems by initiating reforms. While Chile and Nigeria completely moved from a defined benefit system to a defined contribution system, Sweden chose a "hybrid", a model which has received wide acclaim by social security experts. Given the interest pension systems and reforms have generated globally as well as in Nigeria, a cross-country comparative analysis is imperative to bring into sharp focus the specific differences and similarities in these three pension reforms if any. Thus, this study comparatively evaluates the Nigerian, Swedish and Chilean pension reforms as a means of enriching ongoing global debate and cross-country comparisons on pension reform experiences. Guided by a three dimensional classification framework which describes the options available in reforming a pension system, three core benchmarks were used for this comparative analysis. These are the objective(s) of reform, the model of reform adopted, and the likely outcomes of reform vis-à-vis meeting the redistribution, saving and insurance functions of a pension scheme. Results indicate that the Chilean and Nigerian models are less likely to achieve the redistribution and insurance functions of a pension scheme while the Swedish model is better placed to achieve all the three key functions of a pension system. It is recommended that opportunities for achieving the redistribution and social insurance functions of a pension scheme should be explored in subsequent amendments to the pension legislation.

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1.   Introduction

The contemporary global debate about pension reform is based mainly on the concern for the long-term financial viability of existing government operated pension systems (Lindbeck and Persson, 2003). While the definition of pension reform may vary, the theme has been consistent: public pay-as-you-go (PAYG) pension schemes are increasingly becoming excessively burdensome and projections of the proportion of Gross Domestic Product (GDP) that will be "absorbed" by public pensions are high (Lindbeck and Persson, 2003).

Despite the recognition of national peculiarities in the problems affecting national pension systems, the pension reform debate compares and contrasts the World Bank model and the model preferred by the International Labour Office (ILO). The underling normative assumption of the World Bank's model is that private funded schemes are inherently superior to public PAYG pension systems. The ILO, however, argue that many of the existing public PAYG systems continue to function efficiently and with some parametric reforms, could meet the structural and institutional challenges (McKinnon and Charlton, 1999).

Nigeria, Sweden and Chile have all reformed their pension systems in order to address the different challenges they face in delivering an efficient and sustainable pension system. While the Swedish model have largely received widespread acclaim as a model to be emulated (see Palmer, 2002; Palme, 2005; Selen and Stahlberg, 2007)[2], Nigeria have been criticised for "copying" the Chilean model without taking into account its weaknesses, as well as Nigeria's peculiar socioeconomic and institutional environment (Casey and Dostal, 2008). The main objective of the study is to comparatively evaluate the Nigerian, Swedish and the Chilean Pension Reform policies which came into effect in 2004, 1999 and 1981 respectively

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[2] Indeed, several countries such as Latvia, Italy, Poland, Hungary, etc have emulated the Notional Defined Contribution (NDC) idea of the Swedish model (Palmer, 2002)

as a means of enriching ongoing global debate and cross-country comparisons of pension reform experiences (for example, see Hyde and Dixon, 2008; Muller, 2008; Casey and Dostal, 2008; Barrientos, 2002; Grech, 2010; and Anderson, 2012)[3]. From the standpoint of pension reform literature in Nigeria, this study provides a fresh perspective in evaluating the evolving outcome of the 2004 Nigerian pension reform policy. This because extant studies have largely focused on the Nigerian experience (alone) with respect to governance and institutions of the old DB pension scheme (Odia and Okoye 2012), financial market development (Mesike and Ibiwoye, 2012), savings mobilization, capital market development and economic growth (Gunu and Tsado, 2012) and history of the pension system in Nigeria (Odo, et al, 2011) and the features, prospects and challenges of pension management in Nigeria (Fapohunda, 2013).

2. Global Pension Crises: An Overview

From a global perspective, pension crisis mean that there are more people who will require financial support but less money to provide for it (Tanner, 1998). This is largely because current government run PAYG systems are faced with two major problems rooted in demography and political economy (World Bank, 1994). First, we have an aging world. The proportion of the population over the age of 60 will double by the year 2030 from about 8% to more than 16%.[4] Furthermore, we are experiencing a decline in fertility rates around the world. In 1970 the fertility rate was approximately 3.3%. Today it is down to 2.96%, and by 2020 we expect it to be as low as 2.5%. The result

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[3] The key benchmarks for these comparative studies includes: policy learning and policy transfer (Casey and Dostal, 2008), sustainability of reforms (Grech, 2010), the politics of choice in occupational pensions (Anderson, 2012), debate on pension privatization as a subset of neoliberal agenda of welfare retrenchment (Hyde and Dixon, 2008), old age support in developing countries (Barrientos, 2002) and political economy considerations (Muller, 2008)

[4] The situation is worse in countries that are members of the Organisation for Economic Cooperation and Development (OECD) where the percentage of the population over the age of 60 will go from approximately 18% to an astounding 32% (Tanner, 1998).

of changing demographic structure means that the worker/retiree ratio is shrinking rapidly (Tanner, 1998)[5].

The second problem is perhaps more fundamental. The PAYG systems break the link between contributions and benefits. Consequently, politicians are likely to succumb to the elderly lobby to increase benefits even when such a move is not fiscally sustainable (Tanner, 1998). In addition, developing countries like Nigeria have weak institutional arrangements making the pension system susceptible to corruption and mismanagement (Shams, 2004). The World Bank (1994), report that extended family and other traditional ways of supporting the retired are weakening due to urbanization, mobility, war and famine.

3.   Conceptual Analyses

Pension Reform evokes certain primary questions: What is a Pension System? What is its essence? Why do governments interfere? Besides providing conceptual clarification, the answers to these questions could also provide a benchmark for a meaningful comparative analysis.

3.1.   *Pension System*

A Pension Scheme or System is the totality of plans, procedures and legal processes of securing and setting aside funds to meet the social obligation of care which employers owe their employees on retirement or in case of death and disability (NICON, 2005). It serves as a structured method of providing economic security to an individual when he can no longer support himself (Onifade, 2001). As a pre-arranged and well thought out plan, it gives the beneficiaries confidence that the benefits promised are secure and will be

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[5] This implies that the number of workers "paying" into the PAYG system and transferring their wealth to current retirees is getting smaller and smaller. For example in Austria and Belgium, the ratio is already below 2:1. By 2030 it will likely be below 1:1 (Tanner, 1998)

paid at the appropriate time (Onifade, 2001). It can also be viewed as a financial plan through which a worker's benefit is provided for whenever it falls due based on the rules of the plan (Chinwuba, 2003).

3.2   *The Essence of Pension Schemes*

The primary purpose of a Pension Scheme or System is to help individuals or households achieve an allocation of life resources by smoothing consumption over life, as postulated in the Life–Cycle Hypothesis (Ando and Modigliani, 1954). This is achieved by transferring resources from ones working life to post-retirement when income dries up. Specifically, however, there are three reasons for the existence of Pension Plans, viz: Social Insurance, Re-distribution, and Savings (Modigliani and Muralidhar, 2004).

First, Social Insurance is particularly valid for public systems. It is equivalent to undertaking a social obligation to ensure that all citizens, especially the old, have the requisite resources to meet their basic needs thus insuring them against disability, longevity, insolvency, inflation and investment risks. Second, Pension Schemes could serve as a re-distribution mechanism for transferring resources from the "rich" to the "poorer" segments of society that cannot afford to accumulate adequate reserves[6]. Third, pension schemes enable the accumulation of savings at the macro and micro level. As economic theory postulates, countries need savings for capital formation, and individuals need savings to support themselves in the non-earning phase of their lives (Modigliani and Muralidhar, 2004).

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[6] Although redistribution features are not a pre-requisite for a Pension Scheme, they differentiate a Pension Scheme from a "Social Security" scheme, where a basic (rather than a generous) minimum pension payment is provided (Modigliani and Muralidhar, 2004).

3.3. Why do Governments Intervene?

Aaron and Reischaver (1998) report that the primary reasons for the state to provide pension arrangement stems from the belief that many citizens are "myopic"[7] and lack the information to enable them accumulate adequate resources for retirement, as well as the idea that many segments of the society may not be "sophisticated" enough to set up appropriate arrangements. Yet another reason for government involvement is the absence of developed insurance and capital markets that put annuities beyond the reach of most people. The World Bank (1994) argued that "the long term poverty problem"[8] also necessitates the intervention of governments.

4. Types of Pension Plans

Pension Systems can be broadly categorised by the benefits they promise and how the promised benefits are managed/financed[9]. The choice is often between two types of pension plans: Defined-Benefit (DB) and Defined-Contribution (DC)[10].

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[7] The word "myopic" is traditionally used to describe individuals who (irrationally) do not realize their need for resources as they grow older. However, a more recent view of myopic behaviour is that an individual, albeit concerned about future needs, tends to discount the near future at a higher discount rate than the distant future (such as the retirement period) (Lindbeck and Persson, 2003).

[8] This describes a situation where there are pockets of severe poverty among those whose lifetime incomes is too low to cover minimally adequate consumption levels during their working years and therefore, retirement.

[9] Unless stated otherwise, section IV and V is largely drawn from Modigliani and Muralihar (2004) where a more comprehensive discussion on the types of pension systems, their similarities and differences is provided.

[10] For a new insightful categorization of pension systems, especially vis-a-vis the new concept of NDC, see Gora and Palmer (2004). This study however, sticks to the general distinction between DC and DB pension plans

4.1. Defined-Benefit Plan

DB Pension Plan (also known as PAYG system) provides a "defined-benefit"–a pre-specified annuity-either in absolute currency or as a fraction of a measure of past earnings and years of employment. The *guaranteed* pension benefit could be in either real or nominal terms. Participants, sponsors, or both make contributions that could change over time. Such plans rely on inter and intra generational pooling of investment and liability risk, which is called the "social allocation of risk".

4.2. Defined-Contribution Plan

In DC Pension Schemes, participants, sponsors, or both make pre-specified contributions either in absolute currency or as a fraction of a measure of salary. These contributions may also be partially or totally voluntary. Participants invest contributions in financial/non-financial assets. The final pension benefit prior to retirement is *uncertain* because it depends entirely on asset performance. Note that in DC plans, it is possible for contributions to change over time due to changes in tax laws or if the existing contribution rate provide an insufficient or excessive replacement rate.

The main distinction between a DB and DC plan can be succinctly summarised thus:

> *'The essential characteristic of DB plan is that the terminal outcome is defined (a target replacement rate to be paid to participants is articulated by a sponsor), whereas in a DC plan, the terminal outcome is variable'*

With respect to investment characteristics, the table below provides a comparison of DB and DC pension schemes.

Table 1: Investment Characteristics of DB and DC Pension Schemes

Defined Benefit	Defined Contribution
(1) Provide stable benefits.	(1) Allow for matching of cash flow with needs
(2) Plan sponsor bears risk	(2) Individual bears risk.
(3) Pool investment risk	(3) Individual has choice in investment.
(4) Provide insurance against longevity	(4) Allow for bequeathing of wealth.

Source: Modigliani and Muralidhar, (2004).

However, choosing between DB and DC plans also has non-investment implications. For example, DC plans require well-educated, financially literate workers to use the freedom of choice to ensure adequate replacement rates at retirement. DB plans must be supported by strong government institutions to ensure that sufficient funds are soundly invested to meet future liabilities[11]. With respect to contribution and returns, the link between defined benefit and defined contributions pension plans is described thus:

> *'Nominal contributions over working life, compounded at the expected return on assets (With or without volatility) = Expected wealth at retirement = Expected present value of desired annuity as of the retirement date (Which can be related to replacement rate)'*

The statement above can be represented algebraically as follows:

$$E_{W_t} = P_t(1+r)^t \qquad\qquad \textbf{1}$$

Where,

$E_{W_t} =$ Expected wealth at retirement

$P_t =$ Nominal contributions over working life

$r =$ Rate of return on investment

$t =$ Time or number of years

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[11] Modigliani and Muralidhar (2004) opined that innovative new plans that incorporate the beneficial characteristics of each type of plan can achieve the same objective. For example, Blommestein et al. (2009) show that hybrid plans appear to be more efficient form of risk sharing than either of DC or DB plans

Nominal contributions are equal to the contribution rate multiplied by the nominal wage. That is:

$$P_t = a(W_t) \hspace{4cm} \textbf{2}$$

Where,

P_t = Nominal contributions over working life

a = Contribution rate

W_t = Nominal wage

t = Time or number of years

As an illustration, assume the contribution rate is fixed. When returns are volatile, this equation characterizes a DC plan. If the volatility of returns is eliminated, either through an investment strategy or a guarantee, then final wealth and the present value of the annuity at retirement becomes a function of salary growth. In other words, if the rate of return is guaranteed, the replacement rate (the rate of pension annuity to some measure of salary) can be guaranteed, given salary growth. Thus the equation above can also characterise DB plans.
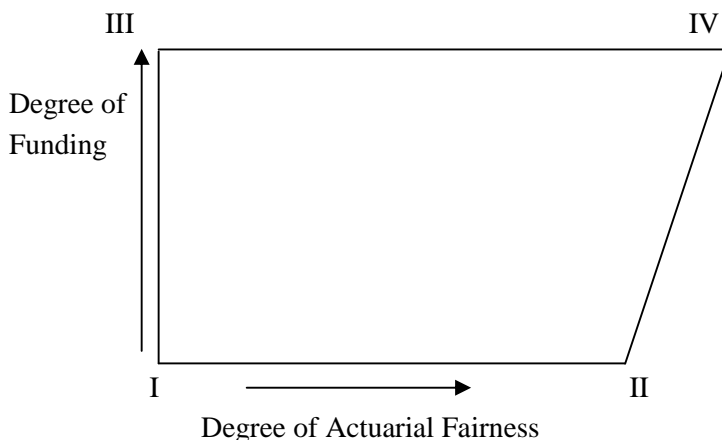
5.   A Framework for Comparing Pension Reforms

Pension reform encapsulates institutional change[12]. Lindbeck and Pearson (2003) provide a three dimensional classification framework which describes the options available in reforming a pension system, viz: DB versus DC, funded versus un-funded and actuarial versus non-actuarial pension system[13]. This three-dimensional classification facilitates separating the consequences of pension system for work incentives (highlighted by the actuarial non

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[12] Hobley and Shields (2000) posit that institutional change focuses on the rules and processes that govern relationships between organizations and the public, and between different organizations. It refers to changes in the architecture and relationships between the public, agencies and organizations

[13] The term actuarial is used to describe the relationship between contributions and benefits at the individual level (Lindbeck and Persson, 2003)

actuarial dimension), capital formation (highlighted by the funded non-funded dimension) and risk sharing (highlighted by the DB/DC dimension). Regardless of the immediate objective of a Pension Reform, it can theoretically be described as a movement in these three dimensions.

Figure 1: Taxonomy of Social Security Systems

Source: Lindbeck and Persson, (2003).

5.1. *Making the System more Actuarial: A Move from I to II*

The starting point for most countries initiating pension reform is in the neighbourhood of position I in Figure 1 above. While some countries limit their ambitions to *parametric* reforms by either reducing benefits or raising contribution rates (without changing the basic rules of the system), other countries change the benefits rules in an actuarial direction, while maintaining a PAYG system. Still other countries undertake *systemic* reform of their PAYG system, by a radical shift from a position close to I to a position close to II, with individual, so-called notional account of pension claims (see Lindbeck and Persson, 2003).
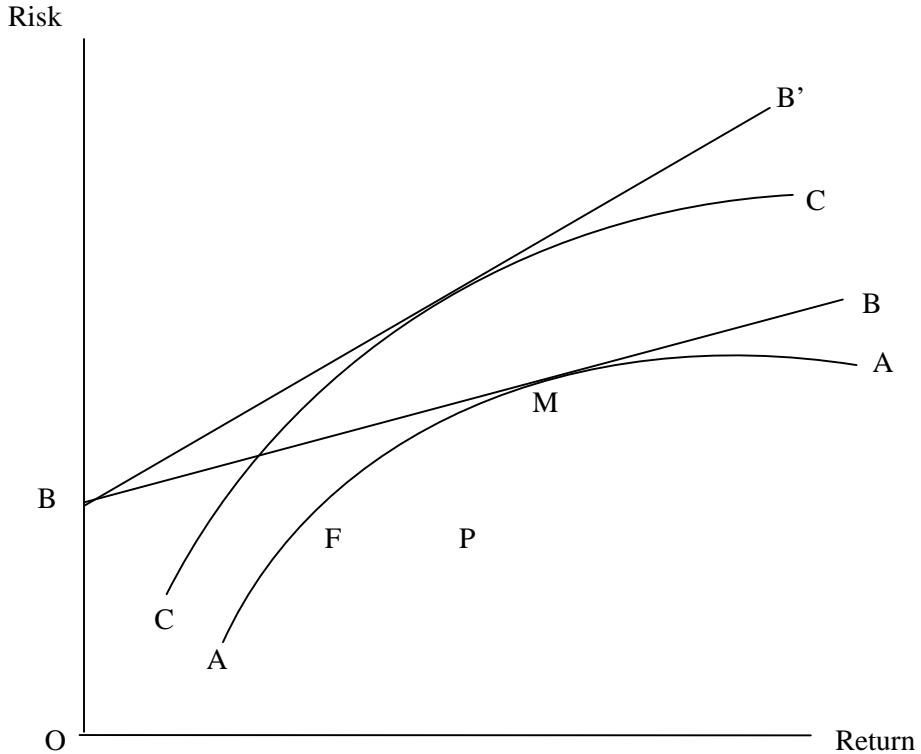
5.2.   *Shifting to a Funded System: A move from II to IV*

There are three arguments often used to justify shifting to a funded system: (a) the individual would receive a higher return on his mandatory saving (b) aggregate national saving would increase and (c) better risk diversification of pension claims could be achieved. In a shift from a quasi-actuarial to an actuarially fair, fully funded system, an individual will experience two changes in his budget constraint. First, he will receive a market return on his mandatory savings rather than a return equal to the growth rate in the tax base. Second, he may have to pay a new tax on income or consumption in order to honour the claims of the old PAYG pensioners (Lindbeck and Persson, 2003).

5.3.   *Defined-Benefit/Defined-Contribution   Dimension-A   Portfolio Approach*

Figure 2 below illustrates how different pension systems operate with respect to the risk-return space. The efficient frontier is depicted by the curve CC, above the AA curve- but it could just as well be below AA. A non-constrained individual will then choose a combination of the risk-free asset, traditional risky asset, and the mandatory PAYG asset-a position located somewhere on the capital-market line BB. For a liquidity constrained individual, on the other hand, the introduction of a PAYG system means that he will be confined to point P. According to the government revealed preference, point P is superior to point O, which the liquidity constrained individual would choose in the absence of a mandatory system. Indeed, this is one reason why a PAYG system is introduced in the first place (Lindbeck and Persson, 2003).

Figure 2: Risk – return Portfolio Opportunities in Mandatory Pension Systems

Risk

O   Return

If there is a total shift to a fully funded system, the PAYG asset, that is, pension claims with an uncertainty yield tied to the growth rate of the tax base, disappears. A non-constrained individual can then choose a risk/return combination along the capital market line BB that is tangent to the original efficiency frontier AA- just as if there was no mandatory system. Theoretically, this conclusion holds not only if the individual can choose among many competing pension funds, but also if there is a single government operated fund-provided that well functioning derivative market exist and that the individual is able and willing to transact in these markets (Lindbeck and Persson, 2003).

6.   Chilean Pension Systems / Reform

In May 1981, Chile replaced its government run PAYG retirement scheme with a private system where workers fund their own retirements through compulsory savings. This system is a fully funded DC scheme that is mandatory for all workers who entered the labour force after January 1983. Workers, who were in the labour force prior to January 1983, had the option of remaining in the old government run system, or moving to the new system. Workers who remained in the old system received their pension rights guaranteed under the new law, while those who moved received from government "recognition bonds" that acknowledged their contributions under the old system. The recognition bond matures when the workers reaches retirement age, dies, or becomes disabled (ARMC, 2004).

The new DC Pension Scheme is administered by specialised private companies called Administrasdoras de Fondos de Pensiones (AFPs) which are pension fund administrators. Each month workers deposit a minimum of 10% of their wages in their individual pension savings accounts, managed by AFPs of their choice (ARMC, 2004). This percentage applies only to the first $22,000 of annual income. Therefore, as wages go up with economic growth, the "mandatory savings" content of the pension system goes down. A worker may contribute an additional 10% of his wages each month, which is also tax deductible, as a form of voluntary savings. The workers contribution are invested in various securities such as equities and fixed income instruments amongst others. The contributions and the returns are tax deductible (ARMC, 2004). The Chilean Pension System is regulated by an independent government agency, i.e., the Superintendencia de Administradoras de Fondos de Pensiones. At the point of retirement, beneficiaries are provided with three retirement options, viz: a lifetime annuity, programmed withdrawals (based on their life expectancy and those of their dependants) or a temporary programmed withdrawal with a deferred lifetime annuity (ARMC, 2004).

The Pension Reform in Chile has been reported to have contributed significantly to savings and economic growth of the country. For example, the private Pension System has been a major factor in increasing savings. Between 1984 and 1997, the country's economy grew at about 7% on average per year, investment and savings increased and inflation was reduced from around 25% to below 10% range (ARMC, 2004).

However, several drawbacks of the Chilean model of Pension Reform have been identified. These include high risk of personal misfortune (e.g. sickness and invalidity) and volatility in the rates of return on investment funds[14] (see Gillion and Binilla, 1992), high transitional cost estimated to amount to almost 5% of GDP (see Uthof (1993), low compliance, adverse distributional effects and high administrative costs (see Singh, 1996).

7.   Swedish Pension Systems / Reform

Sweden's Public PAYG Pension System underwent sweeping reforms in 1999, intended to eliminate most of the subsidy in the system and tie benefit more closely to contributions. The new system applies to all employees born after 1954 and is being gradually applied to those born between 1938 and 1953; employees born before 1938 will not participate in the new system. The new public system has three tiers: an "Income Pension", a "Premium Pension" and a "Guarantee Pension" (Palme, 2003).

7.1.   *Income Pension*

One fundamental change is that the earnings related component becomes the "first tier" with the benefit formula adhering to the principle of DC. Here, the total size of the contribution (18.5%) has been defined with a view to maintaining the replacement levels of the old system in expenditure terms.

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[14] According to Gillion and Binilla (1992) this falls short of the minimum standards imposed by the ILO Convention on Social Security on invalidity, old age and survivor's benefits.

The reform involves an increase roughly equal to a scenario in which the ceiling of the old system is linked to earnings. The concept of notional accounts means that the PAYG character of the system is retained in this part since the contributions (which is 16% of earnings) of the working age population are used to pay the pensions of the retired population. However, the size of the contribution is registered in the individual (notional) accounts. The principle is that all contributions are "accumulated" and attributed a rate of return equal to the growth in average annual pensionable income of all insured person (Palme, 2003).

Although there is no fixed retirement age in the new system, the pension cannot be drawn before the age of 61 and there is no legal right for employees to continue in employment beyond the age of 67. Withdrawal is flexible, not only beyond the age 67, but also in terms of percentage. The size of the pension is determined by the accumulated notional wealth and the life expectancy of the cohort (although the pension is lifelong for each individual). The "annuity" from this part of the system is calculated at an interest rate of 1.6%. This interest rate has been imputed in the conversion of the accumulated notional wealth in order to ensure a more even income distribution over time during retirement. The pension of people born in 1954 and later will be fully calculated in accordance with the new benefit formula. Pension of people born between 1938 and 1953 will be determined by a combination of old and new rules. The cost of administration has been calculated at 0.7% of contribution or 0.02% of notional capital (Palme, 2003). The benefit formula was designed in accordance with the principle of lifetime earnings as the basis for determining the size of future pensions. This is shown in algebra as follows:

$$\text{Annuity }_{\text{with r}} = C / G_{ir} \qquad \text{`} \qquad\qquad \textbf{3}$$

Where,

$C =$ Notional capital accredited at the time of retirement

G_{ir} = Life expectancy from the time of retirement with a real rate of return r

In the formula above, G_{ir} is defined as follows:

$$G_{ir} = \frac{\sum_{t=i}^{N}(1+r)^{-(N-i)}lx_i}{lx} \qquad \textbf{4}$$

Where,

lx = Value for the age we are considering

N = Last year for which people presently living are alive

t = Time period

r = Real rate of return (1.6%)

An important motive here is the creation of a structure that will provide a strong incentive to increase the labour supply and make all types of redistribution occurring within the system explicit and motivated by social policy consideration. Thus, future entitlements to income pension are not only linked to earnings but also to other forms of income such as social insurance benefits, including credits for having small children, engaging in tertiary education and doing national service. Child care provides special grounds over and above income and other earnings for awarding pension entitlements (Palmer, 2000).

7.2.   *Guaranteed Pension*

The provisions for low-income pensioners constitute the strongest redistribution elements[15]. The Guaranteed pension (GP) is linked to the income pension (IP). This means that only those who lack an IP will get a GP at the maximum rate. Those who have an IP below the guaranteed level will receive a GP supplement. This differs from the old system in that those who have earned entitlement to IP will get a slightly higher total statutory

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[15] The universality of the basic provisions is important when you consider the classical social policy goal of combating poverty (Palme, 2003).

pension (sum of GP and IP) than those with only a GP (Palme, 2003). The reformed public system is insulated from what happens with private provision since the GP is only linked to the IP (including the funded component) and not to private pensions, whether occupational or individual (Palme, 2003).

7.3.   Fully Funded Individual Account within a Public Framework

This part of the reform opens up the possibility for private fund managers to handle individual contributors within a public framework where public authorities both collect contributions and pay out the pensions. It also introduces individual risk-taking within the social insurance system, where programmes are usually designed for collective risk sharing. As indicated above determinations with regard to the size of the total contribution rate in the new system were guided by a desire to secure the same benefit levels as in the old system, while the size of the notional accounts benefits was determined by the explicit goal of maintaining earned entitlements. This left 2.5% for a pre-funded element (Palme, 2003).

Contributions to the Swedish System are compulsory. They are collected jointly with the other contribution by the National Tax Board (RSV). The National Debt Office manages the funds until the final assessment of a person's taxable income is made. The money is then transferred to the Premium Pension Authority (PPM). The PPM manages the individual account of all contributions to the system. Each individual can choose a maximum of five different fund managers for his/her accumulated funds and fund manager(s) can be switched each day of the working week without cost (Palme, 2003).

The PPM aggregates all individual choice everyday and trades them with the fund managers, thus ensuring saver anonymity. The accumulated funds of each individual are equal to the contributions and annual return on investment (plus inheritance gains and minus administrative costs). Funds

can be withdrawn from the system starting at the age of 61 but can be postponed as long as the contributor wishes. The withdrawal is always in the form of an annuity provided by PPM. The annuity is either a fixed interest annuity or a variable annuity. The proportion of funds that can be withdrawn is flexible. The administrative cost of the PPM is currently about 0.3 percent of assets. To this about 0.5 percent for the fund managers' administrative cost must be added (Palme, 2003).

There are many benefits to Sweden's new system. The combination of partial privatisation and reform of the PAYG portion of the retirement system has resulted in a fiscally sustainable system. Others are greater incentive to work, increased national savings, a flexible retirement age, lower taxes and less government spending, opportunities for more reform, a fairer system that no longer redistributes income from the poor to the rich, and greater retirement income for retirees (Norman and Mitchelle, 2000).

In spite of its wide acclaim, some loopholes have been identified in the Swedish system too[16]. Although the real assets in the Swedish Trust Fund are a benefit, these real assets are accompanied by risks because politicians control how the money in the trust fund is invested. Politically inspired investment harm workers by putting their retirement funds at risk and harm the economy by misallocating savings (Norman and Mitchelle, 2000). Lastly, the Pension Reform has not dealt with one of Sweden's major structural problem of absenteeism. Although it has increased for twenty years, mainly due to women changing from part-time work to full-time work, the annual number of per capita hours worked has fallen on the average by 0.4% per year since 1960 (Norman and Mitchelle, 2000).

8.   Pension Reform in Nigeria

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[16] See Palmer (2002) for some insightful comments by L. J. Kotlitikoff, J. Liebman and A. Borsch-Supan on the downsides of the Swedish pension reform

A reform of the Pension System in Nigeria was necessary because government was no longer able to adequately meet its pension obligations under the old PAYG system. Studies such as Shams (2004) and ARMC (2004) document the failures of the PAYG System. The Pension Reform Act (2004) [17] has brought about fundamental changes to the structure of leaving service benefits and the way they are provided for with a clear shift from DB to DC system. The main features of the Pension Reform Act 2004 include:

(a) Contribution of funds by both the employer (7.5%) and the employee (7.5%) to fund retirement benefits in public and private sectors. Ceteris paribus, the value of the contributions at any point in time can be estimated thus (Maiturare, 2006):

$$C_n = \frac{A[(1+i)^n - 1]}{i} \qquad\qquad \textbf{5}$$

Where,

C_n = Value of contribution

n = Number of years of contribution

A = Average annual contribution

i = Average (net) investment yield over the n period
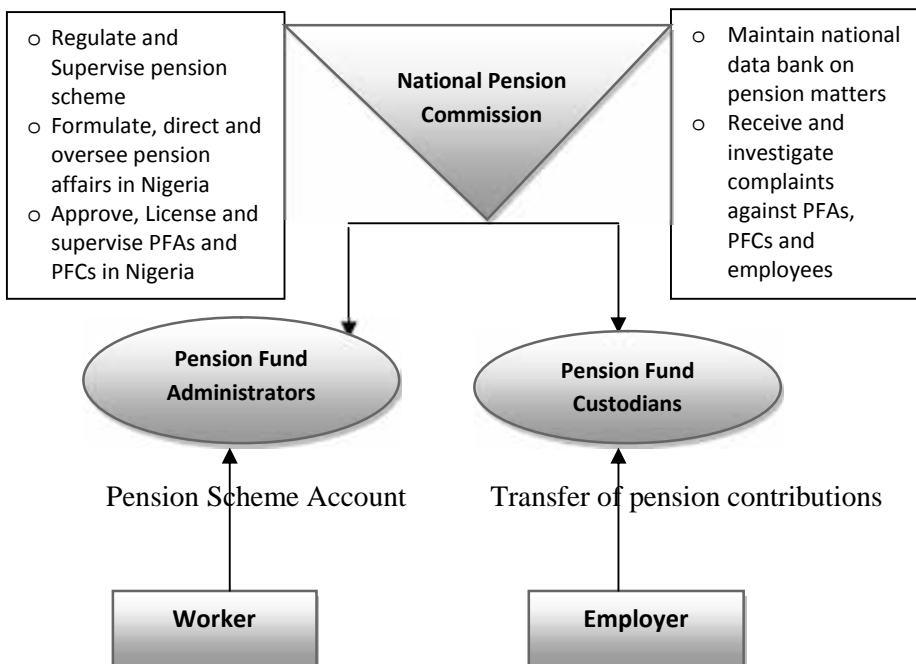
(b) Crediting the employee's Retirement Savings Account with Pension Fund Administrators (PFAs) with any funds so contributed;

(c) Pension Fund Assets are to be privately managed by professional pension fund managers;

(d) Strict regulation of the activities of Pension Funds Administrators and Custodians of Pension Fund Assets under uniform laws and regulations for both the Public and the Private Sectors;

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[17] The Pension Reform Act (2004) have recently been amended and passed into law in 2014. However, the amendments primarily borders on guidelines about a) tax exemptions, b) withdrawal from retirement savings account, c) offences and Penalties, d) scope and coverage e) the basis and rates of contribution (see Pension Reform Act, 2014). Thus the key benchmarks for comparison of the three models as well as the findings and conclusions of this article remains valid

(e) Establishment of the National Pension Commission (NPC) charged with the responsibility for matters relating to the regulation, supervision and effective administration of The Scheme

(f) Transitional Departments (Civil Service, Military, Police, Customs, Immigrations and Prisons and Security other security agencies) to handle transition logistical issues

In addition to the salient features of the Nigerian pension reform itemized above, the diagram below shows the key organs and stakeholders in the new pension reform industry.

Figure 3: Architecture of the New Pension System

Source: Garba, 2006

Table 3: Key Differences between the Old and New Pension System in Nigeria

Feature	Old	New
Benefit Entitlement	Fixed and Defined	Variable- Function of the Retirement Account Balance
Contributions	Unfunded/Very Limited Funding	Funded by Employer and Employee
Mode of Withdrawal	Gratuity and Pension	Annuity or Programmed Withdrawal + Lump Sum Above Specified Minimum.
Regularity/Payment	Depend on Government/Employer	Independent of Government

Source: Provident Alliance Ltd, 2005

Based on the overview information provided on the Swedish, and the Chilean pension system and the 2004 Nigerian pension reform Act, Table 4 below provides a detailed and focused comparison of the three pension reforms. The based on key indicators of their ability to achieve the redistribution, savings and insurance functions of a pension scheme are highlighted, viz: features such as model of new scheme, its goal(s), pattern of contribution, public and private institutions involved, availability of safety nets, administrative costs, determinant of benefits, etc.

Table 4: Comparison of the Three Pension Reforms: Chile, Sweden and Nigeria

Feature	Chile	Sweden	Nigeria
1. Old Pension Scheme	o Defined Benefit	o Universal Pension (FP) and Graduated Supplement (SPT)	o Defined Benefit
2. New Pension Scheme	o Defined Contribution	o Three Tier System with Savings, Insurance and Re-distributive Functions: • Income Pension • Guarantee Pension • Premium Pension	o Defined Contribution
3. Date	o 1981	o 1999	o 2004
4. Goals	o To create a social security system opened for all citizens, based equally on freedom and solidarity, promoting fairness as well as efficiency.	o Insurance, Savings and Re-distribution	o Ensure that every pensioner would receive benefits regularly; assist individuals save and establish uniform rules for pensions.
5. Employee Contribution	o 0.1*E; where E is less than or equal to $22,000	o Income Pension-0.16*E (notional account) o Premium Pension-0.025*E (fully funded individual account)	o 7.5% of Monthly Emolument o 2.5% of Monthly Emolument for the Military
6. Employer Contribution	o Zero	o Zero	o 7.5% of Monthly Emolument. o 12.5% of Monthly Emolument for the Military.
7. Tax Implications	o Tax Deductible	o Tax Deductible	o Tax Deductible
8. Institutions	o Superintendence of Pension Fund Administrators	o Premium Pension Authority o National Tax Authority o National Debt Office	o National Pension Commission (NPC) o Transitional Departments

		o National Social Insurance Board o Local Insurance Offices	
9. Pension Fund Managers	o Administrasdoras de Fondos de Pensiones (AFPs)	o Premium Pension Authority	o Pension Fund Administrator (PFAs) o Pension Fund Custodians (PFCs)
10. Safety Nets	o Minimum Pension Guaranty, but arbitrarily set at about 75% of minimum wage and subject to a minimum of 240 months of contribution	o Notional Accounts First Pillar	o Minimum Pension Guaranty but only for those that have contributed for a certain number of (unspecified) years.
11. Investment Options	o Equities and Fixed Income Instruments	o Equities and Fixed Income Instruments	o Equities, Fixed Income Instruments and Real Estate
12. Rate of Return and Risk	o Uncertain but must not be lower than specified minimum	o Income Pension: the growth in average annual pensionable income of all insured employees. o Guarantee Pension… o Individual Account: Uncertain	o Uncertain but must not be lower than a minimum (yet to be specified)
13. Freedom of Choice vis-a-vis fund managers	o Workers are free to choose any AFP and transfer from one to another up to twice in a year.	o Up to five fund managers and funds can be switched each day of work at no cost.	o Free to choose any PFA. Can only switch from one to another at least once in a year.
14. Retirement Age	o Not Specified	o Not Specified	o Not Specified
15. When Pension Can be Drawn	o Retirement, Death or Disability	o From 61 years	o Retirement or from 50 years (subject to section 3 (2)) whichever is later
16. Choices When Pension Could be Drawn	o Lifetime annuity o Programmed Withdrawal	o Income Pension and Graduated Pension: Annuities	o Programmed monthly or quarterly withdrawals

	o Temporary Programmed Withdrawal and Deferred Lifetime Annuity	o Individual Account: fixed interest annuity or variable annuity	o Lifetime Annuity o Conditional Lump sum withdrawal
17. Administrative Cost	o Variable – as high as 15% of contribution in 1990	o Income Pension: 0.7% of Contribution or 0.02% of Notional Capital o Premium Pension: 0.3% of assets (PPA) + 0.5% of assets (Pension Fund Managers)	o 3% of investment returns • 2% for PFA • 0.6% for PFC • 0.4% for NPC
18. Determinants of Benefits	o Contributions, rates of return, inflation, risk and uncertainties	o Income Pension: Accumulated Notional Wealth, Life Expectancy, Social Insurance Benefits (credit for children, education and national service) o Guarantee Pension: Annuity from income pension o Premium Pension: Contributions, rates of return, inflation, risk and uncertainties	o Contributions, rates of return, inflation, risk and uncertainties
19. Transition Mechanism	o Recognition Bonds Payable at the time of Retirement.	o Compensatory pension in transition to notional accounts	o Federal Government Retirement Bonds Redeemable at the time of Retirement
20. Freedom of choice between new and old schemes	o Mandatory for all workers who entered the labour force after January 1983 but optional for those who were in the labour force before then.	o Mandatory for all employees born after 1954. Gradually applied to those born between 1938 and 1953. Those born before 1938 are not eligible to participate in the new system.	o Mandatory for all employees that have three years or more to retire as at 1st July 2004. Those that have three years or less to retire as at that date are exempted.

Source: Author-compiled from overview on the three pension reforms

9.   Discussion of Comparative Analysis

The model of pension reform adopted as well as its goal(s) are major indicator of whether a pension system will be able to achieve the redistribution, savings and insurance function (see feature 2 in Table 4 above). Based conceptual analysis on pension systems, the definition and distinction between DB and DC pension schemes as well as options in reforming a pension system, Nigeria and Chile clearly adopted the DC system while Sweden chose a hybrid of DC and DB. In addition, Table 4 above show that only the Swedish model explicitly has redistribution, savings and insurance functions as its goal (see feature 4) which is reflected in the hybrid nature of the system. The number of institutions in place to implement the reforms (see feature 8) also reflects the difference between the Swedish model (five institutions due to its hybrid nature and multiple goals) and the Nigerian and Chilean model (two and one respectively due to their relatively narrow focus in terms of its goal). The nature of safety nets (feature 10) in the three systems also reflects their capacity to achieve the insurance and redistribution functions. While there are preconditions to qualify for a minimum pension in the Chilean and Nigerian model, there are non in Swedish model as one pillars dedicated to providing minimum pension. Another key measure of the capacity of a pension scheme to achieve the insurance function is the rate of return and the risk sharing capacity of the system (see feature 12). Because the rate of return and risk is based on three main pillars in the Swedish model, uncertainty with respect to rate of return on contributions is mitigated and the capacity to insurance retires against old age risks is enhanced. Comparing the determinants of pension benefits in the three systems also reveals that benefits in the Nigerian and Chilean models depends on rates of investment return, inflation, risk and uncertainties, while the Swedish model is anchored on the three main pillars of the system (see feature 18). The three pension systems compared above will most likely achieve the savings functions of a pension scheme because either employer and employee or both are mandated to contribute for the future retirement benefit of the employee (see feature 5

and 6), which was not the case in old PAYG system. However, the savings rate is likely to be higher in Nigerian and Chilean systems because of its relatively weak provision for redistribution and risk mitigation. But, this will go a long way in improving aggregate savings; bridging the gap between the demand and supply of investible funds.

The fact that the Swedish model explicitly have insurance and redistribution functions among its goals (and made explicit provisions to achieve them), is central in how it differs from the Nigerian and Chilean models which do not explicitly have these functions among its key objectives or goals. In particular, the Nigerian model cannot achieve the redistribution function because there is no explicit provision to allocate resources from the richer segments of the society to those with low lifetime incomes. As we have seen, achieving the insurance function of a pension scheme is explicitly based on uncertain investment return and inflation risk in both the Chilean and Nigerian models which undermines the insurance function. However, Modigliani and Muralidhar (2004) argued that innovative new plans that incorporate the beneficial characteristics of each type of model can achieve the same objective. This is demonstrated by Blommestein, et al (2009) where simulations results (focusing on inflation and investment risks) show that hybrid plans (those in between traditional DB and individual DC) may entail more efficient and sustainable forms of risk sharing than either of the other two.

10.   Summary, Conclusion and Outlook

This study presents a comparative analysis of the Nigerian, Swedish and the Chilean Pension Reforms within the context of global pension reform debate. By situating pension reform within the context of the economics of Pension Scheme/Reform as a Social Security System, the study comparatively evaluated the pension reform models, goals, and by extension, the extent to which the Swedish, Chilean and Nigerian these three pension reforms would achieve the re-distribution, savings and insurance functions of

a Pension Scheme. Based on brief overview review of the relevant conceptual, theoretical and empirical literature and a focused comparative analysis of the Swedish, Nigerian and the Chilean Pension Systems using key relevant benchmarks, findings indicate that the Swedish system is likely to achieve the re-distribution, (poverty alleviation), savings (capital formation) and insurance (requisite resources to insure against old age risks) functions of a pension scheme. On the contrary, the Nigerian and the Chilean reforms have a relatively weak capacity to achieve the redistribution and insurance functions but are better placed to achieve the savings functions of a pension scheme. Given its welfare and poverty effects (which are central to developing countries in general), it is recommended that opportunities for enhancing the redistribution and social insurance functions of a pension scheme should be explored in subsequent amendments to the pension legislation in Nigerian and Chile. While the Ethiopian pension system is not directly in focus in this study, lessons could be drawn from its findings depending on Ethiopia's peculiar pension challenges, institutional environment, as well as overall objective of the social security system.

There are several ways in which this study could be extended. This comparative study could be further enriched by increasing the number of countries and increasing and, or completely altering the benchmarks for comparison (such as efficiency, sustainability and winners and losers of pension reforms). Since this study largely adopted a qualitative approach, a quantitative assessment could validate or invalidate the findings in this study hence extending the literature.

References

Aaron, H. J. and R. D. Reischauer. (1998). *Countdown to Reform*, Century Foundation Press, New York

Anderson, K. M. (2012). "The Politics of Choice: Occupational Pension Reform in Sweden, the Netherlands and Denmark" paper presented at ESPAnet conference, Edinburgh

Ando, A. and F. Modigliani. (1963). "The 'life-cycle' hypothesis of saving: aggregate implications and tests" *American Economic Review*, 53(1), 55–84.

ARMC-Assets and Resource Management Company Ltd. (2004). "Pension Reform in Nigeria: A Solution in Sight?" Lagos – Nigeria

Barrientos, Armando. (2002). "Comparing Pension Schemes in Chile, Singapore, Brazil and South Africa" IDPM Discussion Paper Series No.67

Blommestein, H., P. Janssen, N. Kortleve and J. Yermo. (2009). "Evaluating the Design of Private Pension Plans: Costs and Benefits of Risk-Sharing", OECD Working Papers on Insurance and Private Pensions, No. 34

Chinwuba, E. (2003). "Legal and Regulatory Framework for Pension Schemes in Nigeria" Paper Presented at all Nigeria Stakeholders Summit

Casey, B. H. and J. M. Dostal. (2008). "Pension Reform in Nigeria: How not to 'Learn from Others" Global Social Policy

Fapohunda, T. M. (2013). "The Pension System and Retirement Planning in Nigeria" *Mediterranean Journal of Social Sciences*, Vol. 4, No. 2

Federal Republic of Nigeria Official Gazette, Pension Reform Act 2014

Garba, A. G. (2006). "The New Pension Scheme and the Nigerian Worker", a paper presented at the Ahmadu Bello University (Nigeria) Staff Unions' Seminar

Gillion, C. and A. Bonvilla. (1992). "Analysis of a national private pension scheme: the case of Chile", *International Labour Review*, Vol. 131, No 2.

Goran, N. and D. J. Mitchell. (2000). "Pension Reform in Sweden: Lessons For American Policy Makers" The Heritage Foundation. No. 1381

Gora, M. and E. Palmer. (2004). "Shifting Perspectives in Pensions" IZA Discussion Paper Series No. 1369

Grech, A. G. (2010). "Assessing the Sustainability of Pension Reforms in Europe" Centre for Analysis of Social Exclusion (CAES)/140, London School of Economics

Gunu, U. and E. Tsado. (2012). "Contributory Pension System as a Tool for Economic Growth in Nigeria" *International Journal of Business and Behavioural Sciences* Vol. 2, No.8

Hobley, M. and D. Shields. (2000). "The Reality of Trying to Transform Structures and Processes: Forestry in Rural Livelihoods" ODI Working Paper, 132

Hyde, M. and J. Dixon. (2008). "A comparative analysis of mandated private pension arrangements" *International Journal of Social Economics* Vol. 35 No. 1/2

Lindbeck, A. and M. Persson. (2003). "The Gains from Pension Reform" *Journal of Economic Literature*, Vol. 41, pp. 74-112

Maiturare, M. N. (2006). "The New pension scheme: Administration and Actuarial Issues" ASSU Seminar on the New Pension Scheme, ABU, Zaria

McKinnon, R. and Charlton, R. (1999). "Mandatory Private Pensions: Cautionary Tales for DCs". Glasgow Caledonian University, Glasgow

Mesike, G. and A. Ibiwoye. (2012). "Pension Reform and Financial Market Development Nexus: Evidence from Nigeria" *International Journal of Academic Research in Business and Social Sciences* June 2012, Vol. 2, No. 6

Modigliani, F. and A. Muralidhar. (2004). *Rethinking Pension Reform*, Cambridge University Press, United Kingdom

Muller, K. (2008). "Pension privatization and economic development in Central and Eastern Europe: A political economy perspective" UNRISD project on Financing Social Policy: Pension Funds and Economic Development

NICON INSURANCE. (2005). "Outline of the Proposed Contributory Pension Scheme in Pension Administration"

Norman G. and D. J. Mitchell. (2000). "Pension Reform in Sweden: Lessons for American Policy Makers" The Heritage Foundation, No 1381

Odo, C. O., V. C. Igbeka and W. Ani. (2011). "Public Sector Pension Reform in Nigeria: A Historical Perspective" JORIND 9(2)

Odia, J. O., and A. E. Okoye. (2012). "Pensions Reform in Nigeria: A Comparison between the Old and New Scheme" *Afro Asian Journal of Social Sciences* Volume 3, No. 3.1 Quarter I 2012

Onifade, O. S. (2001). "An Examination of the Nigerian Public Service Pension System".

Palme, J. (2003). "The Great Swedish Pension Reform" Swedish Institute

_____. (2005). "Features of the Swedish pension reform". *The Japanese Journal of Social Security* Policy, Vol.4, No. 1

Palmer, E. (2002). "Swedish Pension Reform: How did it evolve, and what does it mean for the Future?" In Social Security Pension Reform in Europe, ed.: Martin Feldstein and Horst Siebert

_____. (2003). "The Swedish Pension Reform Model: Framework and Issues". Social Protection Unit, Human Development Network, the World Bank

Pensions Act 2004 of Nigeria

Provident Alliance Limited. (2005).

Selen, J. and A-C, Stahlberg. (2007). "Why Sweden's Pension Reform was able to be Successfully Implemented" *European Journal of Political Economy*, Volume 23, Issue 4, Pages 1175–1184

Schwarz A. M. and A. Demirgue-Kunt. (1999). "Taking Stock of Pension Reform around the World". HNDSP, DECRG, World Bank.

Shams, A. W. (2004). An Evaluation of the Pension Scheme of Ahmadu Bello University, Zaria an Unpublished Undergraduate Project Submitted to the Department of Economics, Ahmadu Bello University, Zaria-Nigeria

Singh, A. (1996). "Pension Reform, the Stock Market, Capital Formation and Economic Growth: A Critical Summary on the World Bank's Proposals" Centre for Economic Policy Analysis, Working Paper Series

Tanner, M. (1998). "Solving the Global Public Pension Crisis: Perspective from Four Continents" CATO Online Policy Report, Vol. XX Number 2

Turner, J. A. (1997). "Economic Analysis of Mandatory Defined Contribution Pension Systems", International Labour Office, Geneva-Switzerland, October, 31.

Uthoff, A. W. (1993). "Pension System Reform in Latin America" in Y. Akyuz, G. Held, ECLAC, UNCTAD, UNU (eds.). Finance and the Real Economy: Issues and Case Studies in Developing Countries, Santiago, Chile

World Bank. (1994). *Averting the Old Age Crises: Policies to Protect the Old and Promote Growth*, Oxford University Press, New York

Yusuf, I. M. (2006). An Evaluation of the Nigerian Pension Reform, An Unpublished Master's Thesis Submitted to the Department of Economics, Ahmadu Bello University, Zaria-Nigeria

Demand for Health Insurance:
A Study on the Feasibility of Health Insurance Schemes for Community Based Groups in Addis Ababa City

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Abstract

This study analyzes households' willingness to pay (WTP) for a new health insurance scheme. The data was collected from a random sample of 210 households from three community-based organizations, locally known as iddirs. These iddirs were purposively selected from areas that are believed to constitute largely of the penurious and also informally employed groups of the society in the capital Addis Ababa. The study employs a contingent valuation procedure to elicit data on households' WTP. Both descriptive statistics and econometric estimation techniques are applied to analyze the data. According to the descriptive analyses about 98% of the sample households are willing to pay a certain amount of money to the proposed health insurance scheme. These households on average are willing to pay a premium amounting to 11.56 birr per month to the scheme. However, the likelihood that households are willing to pay and the amount they will pay shows significant variation among the sample households. In this respect, Tobit regression analysis indicated that household income, household size, education, health status and formal employment, all have a positive and significant effect on a household's WTP. The paper suggests the introduction of health insurance by the Ethiopian government and its provision to the urban poor so as to meet their demand for health insurance.

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1.   Introduction

Ethiopia has one of the worst health problems in the world (Asfaw & Braun, 2005).The outpatient health care utilization rate is estimated to be 0.25 per person per year (Ethiopian Federal Ministry of Health [FMOH], 2013). The low utilization of health care services is determined by both demand-side and supply-side factors. On the demand side, high incidence of poverty, low levels of education, culture and religion are the main constraining factors of health care utilization. In fact, health care use is highly dependent on one's ability to pay and to access health insurance services. The access by the population is presently very low. As pointed out by FMOH (2008), the health financing practice in the country demands that part of the cost be covered through out-of-pocket user fees. This implies that the poor, who cannot afford to pay health care costs, are less likely to access needed health services to improve their health. On the supply side, the delivery of health care services in the country is restrained by limited resources. The national per capita health expenditure for Ethiopia is significantly low (16.1 USD in 2007/08) when compared to the US$44 per capita that is recommended by the World Health Organization for developing countries (FMOH, 2010 a; World Health Organization [WHO], 2010). This implies the need to add additional health resources.

In this respect, the Government of Ethiopia (GoE) has recently formulated a health insurance program to improve the functionality and performance of the health sector financing system in the country and ultimately improve the health status of the poor. In fact, several case studies from rural Ethiopia (Mariam & Brenzel, 1998; Mariam, 2002; Asfaw & Braun, 2005) indicate that there is high demand from rural households for health insurance services. In 2011 the GoE piloted community-based health insurance program in 13 rural districts located in Oromia, Amhara, SNNPR, and Tigray regions of the country and income is currently being generated from the pilot woredas. More recently, the GoE has also set a strategy to design and implement Social Health Insurance (FMOH, 2012b).

However, there is a dearth of knowledge about health insurance demand by the poor in urban areas of the country. Therefore, this study investigates households' health insurance demand using data collected from low income earning groups of the society in the capital city Addis Ababa. From the results, the amount that, these low income earning groups of the society are willing to pay shows that Community Based Health Insurance schemes *(*CBHIs) can help generate sufficient amount of resource that can finance the deficit of the health sector of the country without evicting the poor and those informally employed section of the population from the health care market.

The paper is structured as follows. Section 2 provides the related literature review followed by section 3 where the methodology is discussed. Results of the descriptive and econometric results are reported in section 4 while conclusion is given in section 5.

2.   Literature Review

In the absence of real world experience, economists gauge the WTP for health insurance by means of the contingent valuation method (CVM). The number of studies in this area is rapidly growing and they provide a consistent picture. A study conducted in India by Dror et al. (2006), using a CVM found income to be positively correlated with WTP but negatively correlated when WTP is expressed as percentage of income. Another study by Binam et al. (2004) on 471 rural households in the central region of Cameroon using an ordered probit model found that the level of revenue, gender, habit of frequenting the health center, and the associative experience of the person (being a member to a community club or association, which corresponds to the *iddir* variable of this study) as well as household health status, availability of basic drugs, and regular attendance of the physician have a significant impact on WTP value.

Although CBHIs are expected to develop more in cities with higher potential, studies made in Ethiopia mainly focus on the rural areas and

regional towns of Ethiopia. The surveys found that there is a higher willingness to pay than expected. For instance a study conducted in Oromiya region, and towns in SNNPR, by Haile Mariam and Brenzel (1998) revealed that 86.4% of households and 74.8% of exit interview patients were willing to join an *iddir* based health insurance scheme. In order to assess both the possible roles *iddirs* might play in providing insurance for health financing and the factors that determine willingness to join such a scheme, Damen (2002) conducted a study in 40 villages of the Amhara and Oromia regions. Results from a resulting logistic regression indicated that higher income was a determinant factor while education was not associated with willingness to join. Again another study by Asfaw and Brawn (2005) assessing the prospect of CBHIs in the rural areas of Ethiopia (Amhara, Oromiya, SNNP and Dire Dawa) selected 550 households and applied a bivariate probit model. It found being male head, larger family size, membership to iddirs and log income affect WTP positively. However, as it is demonstrated by Hanemann et al. (1984), estimating *ad hoc* expressions, such as replacing explanatory variables by their logarithms may result in a utility function which will not generate the estimated model. The calculation of mean WTP from such complicated models is also difficult in cases where the data used cannot measure the continuous risk attitude of the respondent. Irrespective of the growing consensus about the role that community based health insurance schemes can or should play in alleviating the financial crisis of the health sector in the country and in benefitting the poor, these studies did not focus on the low income earning groups which are most vulnerable to risky situations and inefficient health care services.

3. Methodology

3.1 *Conceptual framework*

Let us consider an individual who maximizes his/her expected utility. The individual's health status is assumed to be given. Similarly, income net of any taxes is taken to be fixed. The problem of utility maximization for the individual can therefore be written as follows:

$$Max\ U(x,\ z)$$
$$S.t.\ y - Px = 0 \qquad \qquad \textbf{(1)}$$

where x is consumption good and z is the health status, y is the fixed income; p is a price vector of order 1Xn. Setting the first order conditions for the utility maximization problem in (1) and solving these conditions for x in terms of prices, income and health yields demand functions for goods:

$$x = x(p,\ y,\ z) \qquad \qquad \textbf{(2)}$$

Substituting (2) into (1) yields the indirect utility function:

$$V = V(p,\ y,\ z) = U[x\ (p,\ y,\ z)\ z] \qquad \qquad \textbf{(3)}$$

Inorder to illustrate the meaning of risk attitudes it is useful to consider an individual who faces an uncertain income. There are just two states of the world: the individuals' income is either high or low. Let μ_1 denote the subjective probability that the high income state occurs. The probability that the low income state occurs is therefore $\mu_2 = 1-\mu_1$. Theindividual is assumed to be equipped with an indirect utility function: $V(p,\ y_i,\ z)$ for each possible state of the world where $i=1,\ 2$ and in this order, y_1 is a high income and y_2 is a low income state. The expected utility of the individual is:

$$E(V) = {}_i\mu_i V(p,\ y_i,\ z) \qquad \qquad \textbf{(4)}$$

Where, E is the expectation operator. Expected utility is thus a weighted average of the utility attained in the different states of the world with the probabilities used as the weights. Taking partial derivatives of the utility function $V(p,\ y_i,\ z)$ with respect to income yields:

$$\partial V(.)/\ \partial y = V_y \qquad \qquad \textbf{(5)}$$

$$\partial^2 V(.)/\ \partial^2 y = V_{yy} \qquad \qquad \textbf{(6)}$$

An individual is said to be risk-averse with respect to income risk if $V_{yy} < 0$ i.e. utility is depicted as an increasing function of income while all prices and health status are held constant. Assuming that $\mu_1 = \mu_2 = 0.5$ such an individual clearly prefers to get the expected income $y_E = 0.5(y_1 + y_2)$ rather than the 'gamble' since:

$$V(p,\ y_E,\ z) > E(V) = \sum_i \mu_i V(p,\ y_i,\ z) \qquad\qquad \textbf{(7)}$$

Such behavior of preferring the expected value of the gamble rather than the gamble is called risk aversion and the utility function is strictly concave in income. Conversely, an individual is a risk-taker if $V_{yy} > 0$. In this case the individual may prefer a risky prospect to a certain one even if the former gives a lower expected income. The risk-taker has a utility function which is strictly convex in income while the risk neutral individual ($V_{yy} = 0$) has a utility function which is linear in income. The cost of risk bearing is the amount of money a risk-averse individual is willing to forego in order to turn a risky prospect into a certain one.

The fundamental uncertainty driving the demand for health insurance arises from the desultory and precarious nature of health status. The response of a rational consumer to illness is to seek appropriate curative medical care. This entails consumer financial risk, which can be protected if the consumer has health insurance coverage (Phelps, 2002).In any insurance scheme, moral hazard and adverse selection are perennial problems and are the main challenges influencing the sustainability of a health insurance scheme. Moral hazard arises when there is a tendency to over-utilize health services as the policy-holder has already pre-paid for them (Besley, 1995). On the other hand, adverse selection arises when individuals with relatively higher risk are more likely to be enrolled into the scheme. These behavioral problems arise because of information asymmetry between the insurance policy-holder and the insurance provider (ibid).

3.2   Empirical approach
3.2.1   Constructing the CVM protocol

Contingent valuation method (CVM) is a technique for estimation of values of goods and services for which current markets do not exist or are functioning imperfectly. In this respect, CVM is widely used indifferent disciplines including environmental and resource economics, health economics, marketing, and agricultural economics. In CVM, needs to (1) describe the good or service which is of interest to the valuation exercise, (2) elucidate a hypothetical market through which the good or service can be bought and (3) ask the respondent to state the maximum amounts/he would be willing to pay for the good or service (Bärnighausen *et al*., 2007).A variety of different elicitation methods to measure WTP by CVM surveys exists, these are: open-ended questions, payment cards, bidding games, and the discrete choice approach: Take It Or Leave It (TIOL), each having their own strengths and weaknesses (Heinzen and Bridges, 2008). The central problem in a CVM study is to make the scenario sufficiently understandable, plausible, and meaningful to respondents (Asfaw and Braun, 2005). Johansson (1995) discusses the most well-known problems and pitfalls in using the CVM and many of the principal biases that may appear in a CVM. They are as follows:

The first is Free rider problem (strategic bias):If consumers have to pay according to their stated WTP, either they may have incentive to try to conceal their true WTP or may have an incentive to overstate their WTP in order to qualify for a lower price or secure a large supply of the (public) good.

The second bias i.e. incentives to misrepresented responses may occur if the respondent reacts positively or negatively to the fact that a particular institution is sponsoring the study. The respondent may also avoid reporting his/her true WTP in order to please the interviewer. In this study, following Johansson (1995), a question which asks what expenses the respondents' are

planning to reduce in order to be able to pay the amount of money they specified is also included. This is so that respondents will take a caution not to overstate their willingness to pay.

The third type of bias, implied value cues (Starting bid bias), is the case when a respondent may try to use some pieces of information provided by the researcher as cues to the projects correct value. This can lead to the occurrence of a starting bid bias but, this can also be controlled if care is taken at the time of the interview to let the respondents give their own maximum WTP.

3.2.2   Econometric Model Specification

In this study a single-bound, close-ended, discrete choice "yes" or "no" questions followed by open ended questions were presented to the respondents to elicit households 'WTP for the proposed health insurance scheme. Both the single bound and the open ended survey responses were analyzed by specifying the appropriate econometric models for the Probit and the Tobit model respectively.

The Tobit model

The survey responses of 197 respondents out of the 210 sample units are estimated using the Tobit model. From the excluded thirteen, six of them were invalid responses and the rest seven were incomplete responses. The willingness to pay amount is estimated under the proposed CBHIs using the Tobit model. The formulation of the model is as follows:

$$MWTP^* = \text{'}X_i + \epsilon_i \text{ where } \epsilon_i \sim N(0, \sigma^2) \qquad \textbf{(8)}$$

Where MWTP* is a latent variable which is observed when MWTP (the maximum willingness to pay) under the proposed scheme is greater than zero and unobserved if it is less than or equal to zero. X_i is a vector of

explanatory variables and ' is a vector of coefficients. The disturbance term $_i$ is normally distributed with mean 0 and variance ^{2}.

Probit Model Specification

Insurance works like a 'yes/no' question (Johansson, 1995). The 'closed ended' or 'discrete' (TIOL) approach, confronts each respondent with a single bid which s/he has to accept or reject. The respondent either agrees or declines to pay the specified insurance premium. We use this 'yes/no' data to arrive at a WTP measure for the proposed health insurance scheme. The typical formulation of the underlying choice problem as first presented by Hanemann *et al.*(1984) which was drawn on McFadden's (1973) random utility model ignores risk faced by the respondent. A slightly modified version incorporating risk is presented here following Johansson (1995). The indirect utility function of the respondent is assumed to be of the form:

$$V=V(\mu,y,z,e) \tag{9}$$

Where μ is the exogenous survival probability, y is income and z is the health state of the respondent and e is a random variable whose expected value is equal to zero. This equation is the same as the one specified in equation 3. The particular assumption behind this formulation is that the respondent knows his or her utility function with certainty, but from the point of view of the investigator it contains some unobservable elements. Say the respondent is offered a measure which changes the survival probability from μ_0 to μ_1 in exchange for a payment of 'A' amount of birr (the premium).

$V_i=V_i(\mu_0,y_i,z_i,e_{i0})$, the ith respondent's indirect utility before the provision of insurance,

$V_i =V_i(\mu_1,y_i-A_i,z_i,e_{i1})$ the ith respondent's indirect utility after the provision of insurance.

Where e_{i0} and e_{i1} are random components of the indirect utility of individual *i* before and after the provision of a health insurance respectively.

The response probabilities related to the underlying WTP distribution are:

$$Pr(WTP = 1) = pr(WTP^* \quad A) = pr(\text{'}X_i + e \quad A)$$
$$Pr(WTP = 0) = pr(WTP^* < A) \qquad \qquad \textbf{(10)}$$

Where Pr (WTP = 1) is the probability of saying yes to the initial bid and Pr(WTP = 0) is the probability of saying no to the initial bid. Again here ' is the vector of coefficients and X_i is a vector of explanatory variables.

Working Hypotheses

The choice of explanatory variables was guided by economic theory, empirical literature and field observation. Economic theory postulates that demand for health insurance is a function of the price of the premium, income, risk aversion, perceived risk of injury/illness, and extent of perceived loss caused by illness/injury of the person (Santerre & Neun, 1996). In addition to the socio-demographic factors that affect one's attitude towards risk, predisposition factors generally arise from the socio-cultural environment of the respondent. This is concerned with the local mutual help tradition (associative experience) (Binam et al., 2004). Using insurance theory, assuming a decreasing marginal utility of income, it follows that the higher the degree of risk aversion, the higher will people tend to pay when all else is equal. This is also the case for the perceived extent of the loss incurred by illness or injury. Some of the factors that are expected to determine the WTP amount, the effect on the degree of risk aversion and the perceived extent of the loss incurred by illness with the other predisposition factors are explained below.

Monthly income of the household: it is hypothesized that, the higher the income of a household, the higher the households' WTP for the proposed health insurance scheme. While results of interval regression from randomly

selected households in Vietnam by Lofgren et al.(2008) showed a positive and significant effect of income on WTP for a health insurance, only nominal income was positively correlated with WTP in the case of Dror et al.(2006). WTP decreased as a percentage of income in the latter case. Similarly, Asfaw et al.(2009) using the Double Bounded Contingent Valuation method (DBCV) found income being statistically insignificant although those in the richest quintile were willing to pay more than double as compared to those in the poorest quintile.

Sex of the respondent: Females are regarded to be more vulnerable to diseases than men because of burdens such as child bearing and other needs for healthcare. Therefore, female household heads are expected to pay more than their male counterparts.

Age of the respondent: Age is one of the variables that will affect risk aversion. It is assumed that the degree of risk aversion increases with age, as does the perceived extent of the loss. Thus, the older the respondent is, the higher the perceived risk will be for him/her, causing an expected higher WTP for older respondents.

Education of the respondent: education is the other variable that will affect risk aversion. The more educated a person is the more value that they will assign for their and their family's health. The education dummy is categorized into four parts. The first category represents those who can only read and write or are illiterate. The second represents those who had a primary education, which is grade1- grade 8.Those with education of grade 9 to grade 12 are categorized under secondary education and above that are categorized under tertiary education. Donga et al.(2003) analyzed the feasibility of CBHI in the rural areas of Burkina faso and found age, sex and education have a positive and significant effect on WTP. While education also has a significant and positive effect in many studies, including Lofgren et al., 2008,Asfaw et al.,2009, and Onwujekwe *et al*., 2009the effect of age

differs as it is the younger who are willing to pay more (Lofgren et al., 2008; Asfaw et al.,2009).

Respondent's status in the household: the decision of the household's WTP is affected by the one who is regarded as the household head. The household head is the breadwinner in the family and has a greater decision making power. Thus household heads are expected to be more willing to pay than the other members. Interviewers restricted themselves to interviewing the head of the household if this person was at home at the time of the interview and the spouse if he/she was not.

Household size: The proposed scheme is the one which covers the health care cost of each and every member in the household. Thus, households with a larger size are expected to be willing to pay more for the proposed scheme since the scheme will insure more members in the household.

Case of chronic diseases in the household: The presence of one or more family members in the household with chronic diseases is assumed to increase the perceived extent of the loss, as well as the perceived risk of sickness in the household. This should increase the WTP.

Health care need within the last one year: Utilization of health care within the last year can be an indicator of greater awareness of what might happen in case of illness/injury. A study from Cameron by Binam et al.(2004) found health status a determining factor for WTP.

Marital status of respondent: People are likely to be more risk averters by the time they start a family than they were single and thus are expected to be more willing to pay for the proposed scheme than unmarried people.

Occupation of the head: Informally employed heads usually earn a more unstable income than formally employed groups, thus the higher the

probability that they will be reluctant to be involved in schemes that require fixed and continuous payments.

Any type of insurance coverage in the household: It is expected that household heads with any insurance coverage will have a better awareness about the benefits of the scheme and thus will be willing to pay higher amounts. Dror et al., 2006; Onwujekwe et al., 2009 found higher WTP among insured while those with a prior experience of out of pocket expenditure were willing to pay less.

Number of *iddirs*: many respondents in the pre survey gave their membership for more than one *iddir* as a reason for their reluctance in accepting the proposed bid since they would be obliged to additional payments. Consequently, the variable indicating membership to more than one *iddir* is included in the model with the expectation of decreasing WTP. In this regard, Lofgren eta al. (2008) point out the importance of social determinants in the form of social capital as they significantly affect households' preferences for health insurance. Binam et al. (2004) found the variable representing the associative experience (having membership to a community club or association) positively related to the WTP amount.

Starting bid: the starting bid is the monthly fee proposed to the respondents for them to accept it as a premium price. This variable is included in the regression to check if a starting bid bias exists. The setting of starting bids was revised for the main survey after a pilot survey which used the market premium prices that prevailed at the time. Later, the bids were revised according to the WTP of the majority of the households of the pilot survey who regarded the market premiums unaffordable. Consequently the starting bids used in the main survey are 10 birr, 15 birr and 20 birr and these prices were distributed equally and randomly among respondents.

Sampling procedure and data

This study was conducted in Addis Ababa. The surveyed households were members of indigenous funeral associations found in Ethiopia which are known as *iddirs*. Although these are traditional associations which use indigenous voluntary assurance schemes to cope with financial shocks associated to funerals, their functioning resembles that of insurance schemes (Dercon, 2004).Three *iddirs* were purposively chosen from Arada and Kirkos sub districts of Addis Ababa. These districts are known for constituting the low income and informally employed groups of the society. In particular, the sampled *iddirs* included '*Hibrete Selam Yemeradaja iddir*' from *Kirkos* sub-district; '*Adawa Godana Afewerk Menged Yemot Meredaja iddir*' from *Arada* sub-district and '*Wereda 14 Kebele 07 iddir*' from *Arada* sub-district. At the time of field survey of this study *Hibrete Selam Yemeradaja iddir, Adawa Godana Afewerk Menged Yemot Meredaja iddir and Wereda 14 Kebele 07 iddir had* 204, 99, and 400 members, respectively. The members in the three *iddirs* add up to 703 members.

In each *iddir the* up-to-date list of the total 703 members were obtained from *iddir* leaders. Using a systematic random sampling procedure, 30% (210) respondents were selected out of the total population. The first household was randomly picked and then each nth household was selected from the membership list of each iddir. Allocating the 30% proportionately for each sampling frame of the three *iddirs* resulted in 61, 30 and 119 households to be selected from the *iddirs* that constituted 204, 99 and 400 members respectively. The empirical data used for this paper were thus obtained from these 201householdswho were chosen using a systematic random sampling procedure, with sample sizes proportional to the membership size of the *iddirs*.

The primary data collection was conducted in 2010 using a structured household questionnaire and face-to-face personal interviews with heads of sampled households or their spouses. Four enumerators and two supervisors

including the researcher participated in the data collection process. The employed enumerators and supervisor were given the appropriate training for the survey. The survey instrument was pre-tested to improve its clarity and content prior to the main survey. Adjustments to the bid prices and restructuring of the questionnaire were done accordingly.

The household questionnaire was structured into three main sections. The first section was devoted to eliciting data on respondents and their households' socioeconomic and demographic characteristics. The second section was designed for recording data on health status and health care seeking behavior of respondents and their households. The third section described a hypothetical health insurance scheme for which respondents were asked whether they would be willing to pay premiums for the scheme. The proposed amount of annual coverage of health expenses (1500 birr)in the following hypothetical scenario was the minimum coverage available by the side of the insurance companies.

The CBHIs hypothetical scenario:

Let us assume that there is an insurance company which can cover the health care expenses of each family member in a household whenever one or more family members are faced with sickness. The annual insurance coverage of health care expense of a member amounts up to 1,500 birr. And the provision of such a scheme would require a monthly fee (premium) that would be contributed by the household.

Following this, the respondent's willingness to join the scheme, willingness to accept the proposed bid and their maximum willingness to pay were elicited.

4.   Results and Discussion

4.1.   *Descriptive Analysis of the Survey Data*

Out of the total 210 sampled households who were asked whether they would be willing to participate in the study, 197 of them consented to participate. The numbers of questionnaires that were incomplete or unacceptable for data analysis were 13.Seven of these were classified as incomplete responses, and the remaining six were protest zeros due mostly to respondents giving up in the middle of the survey. This left us with a response rate of 93.8%.

The respondents from the three *iddirs* have a total of 855 household members. Table 1 presents descriptive characteristics of the sample households. On average, sampled households have 4.3 household members (minimum=1, maximum=12). Of the total respondents, 130 (66 %) were females and nearly 61% were household heads. The mean age of respondents was 57 years (minimum= 28 years; maximum=90).

Among the surveyed households, about 56.8% were male headed and the remaining (43.2%) were female headed. The sample households have limited access to formal employment - only 23.85 % of the heads of households in the sample have formal employment whereas the remaining (76.14%) are workers in the informal sector.

About 98 % of the respondents reported that they would be willing to pay some amount of money to the proposed health insurance scheme. Those unwilling to join the scheme preferred to face financial risks that may arise due to the precarious nature of health, than to be insured. More specifically, households who responded affirmatively to the CVM question were willing to pay an average of about 11.56 Ethiopian birr (minimum=3birr; maximum=40birr) per month to the scheme.

Table 1: Socio-Economic, Demographic Characteristics and Health Status of Households.

Socio - economic status	Mean/Percent	Std. dev
House hold size	4.34	0.17
Age	56.72	0.83
Household head (% male)	56.80	0.03
Respondents sex (% female)	65.98	0.03
Respondents status (% head)	60.91	0.03
Primary education	44.67	0.03
Secondary education	21.32	0.03
Tertiary education	13.71	0.02
Occupation (% formal employment)	23.85	0.03
Monthly income (in birr)	634.04	24.5
WTP amount (in birr)	11.59	0.51
Accepted the bid (%)	50.25	0.03
Bid price (in birr)	14.97	0.29
Insurance member is affected by chronic diseases=1)Household head (male = 1)	4.56	0.01
Health status		
A household member needed a health care at least once in last 12 months (%)	61.42	0.08
Chronic disease (% - at least one member is affected by chronic diseases)	57.36	0.03

Source: own survey, 2010

Of the sampled households 61% of them had one or more members who sought and utilized a health care service within the last 12 months prior to the survey and 57% of the respondents reported either one or more family members with chronic diseases. The chronic diseases reported by respondents mainly included heart related problems, diabetes, blood pressure, mental problems and similar illnesses. Regarding the management of health care financing, the majority (66%) of the households asserted that they had borrowed the last two or three times they needed a health care service while 30% of them used their own income. The remaining 4%

claimed they used free health care provision. Unsurprisingly, it was only 9 of the household heads (5%) that had health insurance coverage (either provided by employer companies, due to participation in the Korean War or from a local insurance provider).

4.2.   *Estimation results*

All estimations were carried out using Stata software. Before estimation of the models, the problem of multicollinearity was tested and no variables were highly correlated. To account for problem of heteroskedasticty, standard errors of the parameter estimates are computed based on the Huber-White "Sandwich" estimator. The starting bid was also included as an explanatory variable in the model to check if a starting bid bias exists.

The estimated results of the Tobit and Probit models are presented in Table 2. Results from the Tobit model regression (column 1); show that the household average monthly income approximated by household expenditure has a significant positive impact on how much the household is willing to pay. The provision of such schemes by any insurance companies thus should consider the paymentability of the low income earning households while setting premiums. Education has a significant effect on the understanding of the safety and security that insurance brings into one's life. This is shown as households with better educational status were willing to pay more than those with no or little education and this is indicated by the significance of the secondary and tertiary education dummies. Being the head of the household has also a significant and positive impact on WTP amount. This may be because household heads are more concerned about their families health status as much of the responsibility falls on them when a member of the family gets sick.

WTP is higher for households that have at least one member with a chronic disease and this is a significant positive relation. This might be due to the fact that these households have a greater perception of the extent of the loss whenever a health care service is needed by a member with a chronic

disease. This results in their higher WTP for the proposed CBHIs. This result may indicate the existence of adverse selection in the surveyed area. However, if the risk can be pooled, adverse selection would not be as much of a severe problem. The size of the household is positively and significantly related to willingness to pay amount. The proposed scheme covers the health related expenses of each and every member within a household. So, because larger households will have larger number of members to be covered, they will likely be willing to pay more. The occupation of the head is a significant determinant as those formally employed are willing to pay more. Indeed having unsustainable income was one of the reasons given by respondents for their lower amount of willingness to pay during the survey. The bid variable is positively related with the households' willingness to pay but insignificant at 10%. Thus the bid price is not a major determinant of the household's willingness to pay amount and a starting bid bias is not a problem. This could be due to the caution given at the time of the interview to let the respondents give unbiased answers.

The estimated results of the Probit[2] model from (Table 2) show that income has a strong positive effect on the probability of accepting the bid. Being older also increases the chances of accepting the bid. In addition to this, those households who needed health care within a year prior to the survey by one or more of their members also had a higher probability of accepting the bid. The existence of one additional member in the household and occupation of the household head were also significant factors in affecting acceptance of the bid. Consistent with the theory of demand, the response of households is sensitive to the bid levels as shown by the negative and significant coefficient of the bid.

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[2]The computed value of the LRI for the Probit model shows that 75.74 percent of the variation in the dependent variable is explained by the variation in the explanatory variables of the model

Table 2: Estimation Results of the Tobit and Probit Models.

Explanatory variables	Tobit model (1) Coefficient	Probit model (2) Marginal effects
Sex	0.2901643(0.7377)	0. 206787(0.13596)
Age	0.00488(0.02995)	0.017720***(0.00633)
id price	4845 0.123594(0.09018)	-0.141429***(0.02866)
Primary education	1.565948(0.99582)	0.019627(0.23097)
Secondary education	2.398193**(1.25143)	0.203554(0.2222)
Tertiary education	3.766015**(1.73353)	0.081891(0.30756)
Married	1.100423(0.729086)	0.309118**(0.16645)
Household head	1.515736**(0.760975)	0.263111*(0.15942)
Income	0.007602***(0.001768)	0.001550***(0.00043)
Health care need	0.7142254(0.795511)	0.342216***(0.14155)
Chronic diseases	1.545296*(0.84813)	0.172848(0.14697)
Any insurance coverage	0.101465(1.32637)	0.251938(0.24113)
Household size	0.594064***(0.18170)	0.0842133***(0.02972)
Occupation	1.851789**(0.82829)	0.489424***(0.125420)
Associative experience	-0.6950974(0.69768)	-0.0650484(0.14797)
Constant	-2.997346	
Number of observations	197	197
	LR chi2$_{(15)}$ = 202.84	LR chi2$_{(15)}$ = 205.76
	Prob> chi2 = 0.0000	Prob> chi2 = 0.0000
	Pseudo R2= 0.1574	

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

Figures in bracket are standard errors.

Source: Own survey, 2010

4.3.   *Feasibility of the scheme*

One of the ways that poor communities manage health risks, in combination with publicly financed health care services, are community based health insurance schemes. These schemes can bring an equitable and efficient

health care service provision for those who are informally employed and mainly in the low income earning groups of the society. However, the effective introduction and implementation of such schemes cannot be achieved if the current pricing system is going to be employed without considering the paying ability of these low income and informally employed groups of the society.

In Table 3 total WTP amount from the survey is compared with the total amount of revenue that should be collected if the scheme is to be provided based on the average premium prices that prevailed in the insurance market at the time of the survey. While the surveyed households are willing to pay 11.56 birr on average for the hypothetically proposed insurance scheme, the average individual premium price in the market calculated after gathering data from the insurance companies was 18 birr per person. Accordingly, taking the average number of members among the surveyed households (4.3 members) and multiplying it by the individual market premium price set by the insurance companies (18 birr), will give us the average premium price for a household which is 77.4 birr. Thus, these low income earning households are willing to pay only 15% of what is required by the insurance companies.

Table 3: Comparison of Households WTP Amounts to that of Premium Price charged in the Insurance Market

	Premium Price(in birr)
Average WTP from the survey (per household)	11.56
Average premium price in the market (per household)	77.4[*]

Source: Survey data and data from insurance companies, 2010.

This means that the remaining 85% of the cost should be subsidized either by the government or donors if the provision of CBHIs is to be introduced and implemented for these low income earning groups. Tabor (2005) underlines that government, and its development partners, should support the growth of CBHIs by ensuring that there is a satisfactory supply of appropriate health services and by subsidizing start-up costs and the

premium costs of the poor. This can also be done by assisting CBHIs to build technical and managerial competence, by helping to foster development of CBHI networks, and by assisting CBHIs to establish and strengthen links with formal financial institutions and health care providers to better manage covariate shocks and catastrophic health risks. However the actuarial premium price of insurance companies also needs a revision since subsidy by itself cannot provide perpetual support for the scheme.

5.   Conclusion

To assure sufficient coverage and reasonable quality of health service it is necessary to introduce a system that will spread the financial burden arising from higher health service costs. Such a risk sharing system is expected to make health service affordable at the time of sickness, thereby reducing the financial barrier associated with higher user fees. In this regard the provision of community based health insurance for the majority of urban residents in the informal sector as well as the majority of Ethiopians in the rural farming and livestock rearing economy has a manifold benefit. This comes by financing the health sector and raising affordability of the service at the same time diminishing the precarious health care costs. In the meantime, the setting of premium prices should include consideration of the ability and the willingness to pay of households so as to assure the sustainable provision of the scheme. The premium price that prevailed in the insurance market at the time of survey was beyond the ability to pay for the majority of the poor. While many of the surveyed respondents' accede to participate in the proposed CBHIs, income was a significant determinant of WTP. Many of the respondents (78%) lacked conception on how a health insurance scheme functions. Thus public awareness should be adequately enhanced on the functioning of the schemes and also the benefits that can be gained from it so that the service can insure a wider coverage. There is a need to create awareness on the use of insurance to protect against expenditure fluctuations. What is tantamount is the creation of managerial and technical efficiency of

the scheme so as to be able to mitigate potential problems such as adverse selection and moral hazard once it is established.

References

Akalu, T. (2008). "Economic Burden of Health Care at Household Level: Examination of Out of -Pocket Expenditure on Sexual and Reproductive Health Care including HIV/AIDS in Butajira District", MPH thesis, School of Public Health, Addis Ababa University.

Allegri, M. D., Sauerborn, R., Kouyate, B. and Flessa, S. (2009). "Community health insurance in sub-Saharan Africa: What operational difficulties hamper its successful development?" *Tropical Medicine and International Health*, 14: 586- 596.

Asfaw, A., and Braun, J. V. (2005). "Innovations in Health Care Financing: New Evidence on the Prospect of Community Health Insurance Schemes in the Rural Areas of Ethiopia", *International Journal of Health Care Finance and Economics*.

Asfaw, A., Gustafsson, E., and Gaag, J. V. (2009). "Willingness to Pay for Health Insurance: An Analysis of the Potential Market for New Low Cost Health Insurance Products in Namibia", *Amsterdam Institute for International Development.*

Bärnighausen, T., Liu, Y., Zhang, X. and Sauerborn, R. (2007). "Willingness to pay for social health insurance among informal sector workers in Wuhan, China: a contingent valuation study", *BMC Health Services Research*.

Besley, T. (1995), "Nonmarket Institutions for Credit and Risk Sharing in Low-Income Countries", *Journal of Economic Perspectives*, 9(3): 115-127.

Binam, J. N., Nkama, A. and Nkendah, R. (2004). "Estimating the willingness to pay for community health prepayment schemes in rural area: A case study of the use of contingent valuation surveys in Central Cameroon", http:// www.csae.ox.ac.uk/conferences/2004-GPRaHDiA /papers/4h-Binam-CSAE2004.pdf (accessed December 21, 2010).

Dercon, S. (2009). "Designing Insurance for the Poor", in Braun, J. V. and Hill, R. V. (eds.), *The Poorest and Hungry: Assessments, Analyses, and Actions,* International Food Policy Research Institute, pp.321-328.

Dercon, S. and Krishnan, P. (2000). "Vulnerability, Seasonality and Poverty in Ethiopia", *Journal of Development Studies*, 36(6).

Donga, H., Kouyate, B., Cairns, J., Mugisha, F., and Sauerborn, R. (2003). Willingness to-pay for community-based insurance in Burkina Faso", *Health Economics*, John Wiley and Sons, Ltd, 12: 849–862.

Dror, D. M., Radermacher, R. and Koren, R. (2006). Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, *Health Policy.*

FMOH. (2006). "Ethiopia's Third National Health Accounts 2004/05", Planning and Programming Department, The Partners for Health Reform plus Project, Abt Associates Inc.

_____. (2008). "National Strategy for Health Insurance in Ethiopia", Planning and Programming Department, Addis Ababa: Federal Ministry of Health.

_____. (2010a). "Ethiopia's Fourth National Health Accounts 2007/08", Addis Ababa: Federal Ministry of Health, April, 2010.

_____. (2012b). HSDP IV Annual Performance Report 2011/2012, Version 1. Addis Ababa: Federal Ministry of Health.

_____. (2013). Health sector: Fact sheets, http://www.moh.gov.et/English/Pages/index.aspx, (accessed August 20 2013).

Gaag, J. V. (2009). "Health Care for the World's Poorest: Is Voluntary (Private) Health Insurance an Option?", in J. V. Braun, R. V. Hill, and R. P. Lorch, *The Poorest and Hungry: Assessments, Analyses, and Actions, IFPRI,* pp. 584.

Haile Mariam, D. (2002). "Ethiopia: Potential of Traditional Social Insurance for Supporting Health Care", Washington DC: IK Notes.

Haile Mariam, D. (2003). "Indigenous social insurance as an alternative financing mechanism for health care in Ethiopia (the case of iddirs)", *Social Science and Medicine*.

Haile Mariam, D. and Brenzel, L. (1998). "Study on the Feasibility of Community-based Health Insurance in Ethiopia", Addis Ababa.

Hanemann, M., Loomis, J. and Kanninen, B. (1984). "Statistical Efficiency of Double-Bounded Dichotomous Choice Contingent Valuation" *American Journal of Agricultural Economics*, 1255-1263.

Heinzen, R. R. and Bridges, J. F. (2008). "Comparison of four contingent valuation methods to estimate the economic value of a pneumococcal vaccine in Bangladesh" *International Journal of Technology Assessment in Health Care.*

Johansson, P. O. (1995). *Evaluating Heath Risks: An Economic Approach,* Cambridge University Press.

Lofgren, C., Thanh, N. X., Chuc, N. T., Emmelin, A. and Lindholm, L. (2008). "People's Willingness to pay for health insurance in rural Vietnam", *Cost Effectiveness and Resource Allocation.*

Onwujekwe, O., Okereke, E., Onoka, C., Uzochukwu, B., Kirigia, J., Petu, A. (2009). "Willingness to pay for community-based health insurance in Nigeria: do economic status and place of residence matter?" *Health Policy and Planning*, Oxford University Press in association with The London School of Hygiene and Tropical Medicine.

Phelps, C. (2002). *Health Economics.* New York: Addison Wesley.

Santerre, R. and Neun, S. (2004). *Health Economics: Theories, Insights and Industry studies,* Thomson South - Western.

Tabor, S. R. (2005). "Community-Based Health Insurance and Social Protection Policy", the World Bank, Washington DC.

WHO. (2010). "Exploring the thresholds of health expenditure for protection against financial risk",World Health Report, Background paper, 19, Health System Financing. World Health Report, Health systems finacing"

The Economic and Political Cost of Not Integrating[1] Indigenous Knowledge in Agrarian Policy Making in Ethiopia*

Tenkir Bonger[2]

abatua laygedel	Since her father cannot kill
wendimua laygedel	nor can her brother
arsew yabluat inji	let them feed her
hodua endaygodel	by cultivating so that her
	stomach will not be empty

[From a popular Ethiopian melody]

When the property and the knowledge of a people increases, the government's policy and wealth parameters also increase. As the knowledge and wealth of people develop, the governments' instruments of policy implementation acquire additional strength [effectiveness]".

Negadras Gebrehiwot Baykedagn.
Written in 1917, Translated as *State & Economy in Early 19th Century Ethiopia,*
Karnak House & Red Sea Press, 1995. pp 53-54

Key words: Agrarian reform; Ethiopian revolution; Peasantariat; Agrarian crises; Agrarian classes; Feudalism; Distress surplus; Gultegna; Neftegna; Peasantization; Retail Price Index.

Abstract

This paper examines the pitfalls of an otherwise well intentioned agrarian reform which formed the centre piece of the 1974 Ethiopian Revolution. It is contended that most of the non-anticipated negative consequences emanated from the adoption of Euro-centric model not sufficiently interfaced with the specificity of rural Ethiopia. The paper focuses on the implication of the reform for rural migration, the related problem of famine, redistribution of rural incomes and the impact on the welfare of the rural and the urban poor and accumulation. Finally, it brings to the fore the gist of an indigenous knowledge source on the political economy of Ethiopia which may have provided better policy reform base for the Agrarian Reform.

In the search to compress the agrarian structure of Ethiopia into the social trajectory of European societies, it has been variously conceptualized as part feudal, part capitalist or wholly feudal or capitalist by writers and different political protagonists. The term feudo-bourgeoisie was the common theme which informed the political tract of analysts and activists alike on the eve and during the course of the Ethiopian Revolution of 1974.

Informed by the fuedo-bourgeoisie paradigm, exempting tenants from the payment of land rent, the Reform of 1975 abolished 'land-lordism', to contain 'relation of exploitation', it prohibited the hiring in and the hiring out of labour. Similarly, it set a maximum of 10 hectares of land per peasant which could be operated without hiring labour and attendant exploitation. While most large farms were converted into State farms, those more than 10 hectares in peasant areas were apportioned to the nearby households.

The great agrarian reform of Ethiopia provided an unfettered access and security of tenure especially to those who were tenants in the pre-reform period and opened up the prospect for new institutional and technological set up to unleash a dynamic process of agricultural development. However, possible gain from such a potential were constrained by setting cultivation ceiling at 10 hectare in one season rain-fed agriculture, the curtailment of open and competitive channels of marketing, undue bias in favour of State farms and the inefficient operations of the AMC. In the face of increasing

population and declining per capita output of food, these contributed towards the creation of a new crisis manifested in very low producer and very high consumer prices, vastly increased imports, dependence on food aid and drastic reduction in the welfare of the urban and the rural poor.

*One of the root causes of the agrarian crises was the wrong conceptualization of the agrarian problem and the attendant uncritical application of statist policies in the form of State farms, marketing corporations and compulsory delivery of grain all copied without innovative adaptations from the social experiences of other societies. The policies led to mis-allocation of resources and failed to establish prices, which, while being sufficient to motivate peasants, would have been affordable by the rural and urban poor. The stifling of the movement of labour had a devastating effect on the drought prone agriculture. In the end, the institutions of the State provided comfort to the State elite at the expense of the welfare of the disadvantaged in society. By curtailing the trend towards accumulation, it stifled the medium and long-term growth prospect of the national economy. The political cost to the **Derg** has been obvious.*

GHB's conceptualization of State and peasants, defining the parameters of the role of the State in development in general and agriculture in particular and the articulation of the relation between agriculture and industry and the policy implications therein could have gone a long way in drawing more down to earth realistic agrarian policy measures at the historical moment when Ethiopia was on the threshold of radical change. Alas! as the Amharic saying goes "bej yale worq ende medab yekoteral": "that gold in one's own hand is undervalued as if it were copper"

1.   Introduction

It is now a common knowledge that there is an agrarian crisis in Africa's agriculture[3]. Minor regional variations notwithstanding, the abysmal failure of African agriculture to raise land and labour productivity to meet the needs of the rapidly growing population is well documented for individual countries and for sub-Saharan Africa as a whole[4] . Hunger and malnutrition afflict a large segment of the population, even in those with sizeable levels of non-agricultural exports, massive external aid and only limited debt. More than any other continent, the vast majority of the populations are directly engaged in agriculture to earn their living. Food prices are essential elements of urban welfare.

In such circumstances, the poor performance of agriculture does not only have profound implications for the growth of the economy and general welfare, but also political overtones contributing to the crises of the state in a number of countries in the post-independence period. Among others, at the root of Africa's food problem are development models copied from outside without much creative adaptation.

At the level of problem identification and resolution, both neo-liberals and Orthodox Marxists (how could Marxist ideologues call for the development of capitalism in Agriculture? It should be noted that in some socialist countries, state farms, which were based on mechanized large scale production were the dominant form of agricultural production, while in others, communal agriculture were the major ones. In Africa, state farms were developed on the Soviet Russia format. That is to say, outright call for capitalist development, which is private ownership, was not the main focus for Marxists)

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[3] This is notwithstanding improvements in Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda and Zambia.
[4] See World Bank. *World Development Report.* Various Years.

consistently called[5] for the development of capitalism in agriculture. Neo-liberals emphasize the need to get internal and external prices right. Radical dependency theorists located the root of the agrarian crises in the poor countries in the formation of the law of motion of capital as a world phenomenon and its stunting effect on the periphery of the world system. Although challenged by the upsurge of capital accumulation in the Newly Industrializing Countries in East Asia, their powerful critique of the marginalists and Orthodox Marxists contention of the development of capitalism as a necessary condition for transition had gained momentum especially in Latin America[6].

With few exceptions, most African countries based their agrarian policies on the paradigms and theories mostly informed by the social and cultural histories of European societies. Nearly 40 years after independence, it is a disservice to our societies if we continue to churn out theories and practice which have very little interface with the pre-colonial history, current life conditions and future visions for African peoples. Apart from anything else, the Africanization/Ethiopianization of the understanding of the agrarian crises should at least be able to challenge the latest form of control which passes as consultancy.

This paper examines the pitfalls of an otherwise well intentioned agrarian reform which formed the center piece of the 1974 Ethiopian Revolution. It is contended that most of the non-anticipated negative consequences emanated from the adoption of Euro-centric model not sufficiently interfaced with the specificity of rural Ethiopia. The paper focuses on the implication of the reform for rural migration, the related problem of famine, redistribution of rural incomes and the impact on the welfare of the poor and accumulation.

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[5] In the light of the post-industrial condition of the contemporary developed world, whose watershed has perhaps been marked by the fall of the Berlin Wall, and the de-constructions of paradigms that ensued, a past tense is used for the earlier debate.

[6] For the then contemporary debate see Carter: 1979, 1973; Frank, A: 1967; Palma, G.: 1978; Banaji J. 1977; Arnin. S: 1974; Bernstein. H.:1979: Carter, A.: 1973, 1978. Laclau E.:1974

Finally, it brings to the fore the gist of an indigenous knowledge source on the political economy of Ethiopia, which may have provided better policy reform base for the Agrarian Reform.

2. Agrarian Structure at the onset of the 1974 Revolution and the Main Features of the Agrarian Reform of 1975[7]

The agrarian structure on the eve of the Ethiopian Revolution of 1974 consisted of very few but an increasing number of Ethiopian capitalist farmers, absentee proto-landlords, resident rich peasant cum land renters, a small stratum of rich peasants, middle peasants, at country level the vast majority, poor peasants and an emerging peasantariat[8]. Nearly 1/3 of the peasantry, almost *equally distributed by strata,* were tenants with more concentration in the southern part of the country[9]. Making up 12% of the rural households, the landless consisted mainly of pauperized peasants, married and unmarried young households dependent on their families, occupational castes engaged in non-farming activities and others without access to land due to the pressure of population on land following the respite from war-lordism during the largely country-wide peaceful era of 1941-1974[10].

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[7]For an excellent exposition and early evaluation of its performance see Dessalegn Rahmeto: 1985 and aspects of its implementation Aster Akalu: 1982; and various articles in Pausewang & Eshetu Chole: 1990. The bases of the analysis and statistical figures cited in this section are found in Tenkir Bonger: 1996. & 1992, 1987; The post-reform [1975-80) price data is from Shifferaw Gurmu: 1980.

[8] This is a term coined by scholars to denote the dual nature of African migrants and semi-migrants to urban and semi-urban areas with access to land in their areas of origin for actual and potential cultivation. See Saul: 1979 & Saul & Wood: 1973.

[9]Although there was more land dispossession under the *neftegna* system in the south, the *gultegna* in the north were also encroaching upon the traditional rights of the *ristegna.* However, due to the availability of more and better land on the one hand and the religious and cultural separations and subsequent alienation between the *neftegna* and the peasantry, in most part of the south, higher rates of tenancy were registered

[10] That is notwithstanding low level brief military conflicts in Gojjam, Bale, the Ogden and the more protracted one in Eritrea.

Considering the low level of the commoditization of Ethiopian agriculture, the agricultural labour class among the landless households was largely formed neither by their marginalization by rich peasants nor due to a large scale formation of agrarian capitalism. Rather than in the south of the country where the country entered the world market via the production of coffee, proportionately, more of the landless strata was to be found in the mainly contemporaneously *rist regions* of the North. Making up nearly 60% of the rural population, the poor households had a per capita holding of less than a hectare of land under single cropping and rain-fed agriculture. About 1/3 were indebted, half of them for food. The poor peasants meet their subsistence requirements partly by buying back in the market during the lean season when prices are very high[11]

The rich peasant class made up 3.7% of the rural households but operated 20% of the holdings and owned 13% of the reported oxen. They were the vital sources of credit and full and part-time employment to the poor and landless peasantry. The proto-landlords consisted of the hitherto tributary warlords and patriots manning the modern civil and military apparatus of the State. Some emergent petty bourgeoisie anchored in trade and civil service were also making their way as 'owners' of land as per Civil Code in the post 1941 period which provided the legal foundation for the privatization of land.

By and large, the proto-landlord stratum had neither the calculating and hence, the motivation and skills to restructure the mode of production in the European feudal[12] model nor did it possess the enterprising and paternalistic

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[11] This poses a policy dilemma in balancing between reasonable prices for the producer to motivate increased production on the one hand and to enhance the welfare the rural and urban poor through cheaper prices on the other. Given their social location, smaller size, high level of articulation and the consequences of the political risk they carry, only the urban poor usually enjoy food.

[12] On feudalism in Ethiopia and elsewhere see Addis Hiwot. 1975; Banaji, J. 1978/79; Bauer D. 1977; Bernstein, H. 1979; Bloc, M. 1978; Cliffe, L. 1974; Cohen, J. 1974; Crummey, D. 1980; Dessalegn Rahmeto. 1984; Dobb, M. 1981;

attributes of the Japanese feudal class in the transition to capitalist agriculture in the respective regions. The small class of incipient capitalist farmers emerged from the use of green revolution technology strategies introduced in the mid-sixties. Joint venture agro-industries [producing cotton, sugar, tobacco, citrus fruits, etc.,] were also in the process of expansion.

Due to the small size of holdings, use of traditional technology, predominantly one season cropping based on rain-fed agriculture on the one hand and the rapid growth of population in the post-war period on the other, most of the marketed surplus was *obligatory* to pay rent and tax [about 50%] which could be construed as *distress surplus*. Only a limited amount was disposed as *commercial surplus* to purchase urban made goods - an important link as a home market for the fledging industrial sector. The latter surplus mostly emerged from the rich peasants and not from the proto-landlord class, which largely received rent directed towards the consumption of imported goods and invested in speculative urban land & buildings.

In the search to compress the above agrarian structure into the social models of European societies, it has been variously conceptualized as part feudal, part capitalist or wholly feudal or capitalist by writers and different political protagonists. Both in political discourse and academic studies of the political, economic and social trajectories of the Ethiopian experience, the term feudo-bourgeoisie was the common theme which informed the political tract of analysts and activists alike on the eve and during the course of the Ethiopian Revolution of 1974[13].

Given the social relation of production, the size and the source of surplus and the mode of production implied, it can be categorically asserted that

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Ellis, G. 1976; Gebru Tareke 1991; Gilkes, P. 1975; Hoben, A. 1973; Hultin, 1977; Kay, C. 1974; Lapisso G. Dilebo 1991; Perham, M. 1968; Pausewang, S. 1977.
[13] For academic designations, see Bondestam: 1975, Stahl, 1974; Halliday, 1980 and various student publications and political discourses of the period.

agrarian capitalism could not capture the true essence of pre-revolutionary rural Ethiopia. The use of feudalism as in the European and Japanese models cannot adequately describe the defining characteristic and dynamics of rural Ethiopia in the period[14]. The feudal mode of production encompasses an articulated combination of the relation and forces of production. Under the feudal model, the largely landless peasantry was subject to the whims and economic calculation of the lordly class[15]. The latter had the juridical ownership of the land enabling it to restructure production. It is the outcome of the interaction and the dynamic logic of these class relations with the market, technology, ecology, demography and the tempo of the non-agricultural sector which laid the social foundation and propelled the feudal mode towards agrarian capitalism and social change.

In Ethiopia under the ***gultegna*** and ***neftegna*** [Political-Military tributary agrarian relations in the North and South respectively] systems, the peasantry exercised considerable autonomy in the labour process. Except for the short interregnum of 1941-74, the peasantry both in the North and South had a secure access to land mediated by traditional institutions which had existed for thousands of years. With the instability of the ***gultegna*** system and the stagnant technology that accompanied it.

Land ownership in the European juridical sense of the term was not a necessary condition for the reproduction of the Ethiopian tributary state. In so far as the static characteristic of the feudal mode of production are conceptualized to locate the dynamics of its social economy, its application to infer a policy for radical change appears

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[14] A very detailed exposition of this issue reviewing available literature is found in Tenkir Bonger: 1992 & 1996. For an excellent debate with respect to India and Europe respectively, see Mukia: 1981 and Dobb: 1981.

[15] This is very critical to reorganize as per the requirement of technical and social change in the process of maximizing rent incomes. For its decisive role in the transition to agrarian capitalism and industrialization in the context of Europe, see Anderson, P. 1978.

to have been a misnomer[16].

Informed by the feudo-bourgeoisie paradigm, exempting tenants from the payment of land rent, the Reform of 1975 abolished 'land-lordism'[17], to contain 'relation of exploitation', it prohibited the hiring in and the hiring out of labour. Similarly, it set a maximum of 10 hectares of land per peasant which could be operated without hiring labour and attendant exploitation. While most large farms were converted into State farms, those more than 10 hectares in peasant areas were apportioned to the nearby households.

To implement the radical reform policy, peasant associations were set up to see to it that members obtained a fair share according to the size of their families. However, ultimate jurisdiction on both rural and urban lands resided with the State. The reform encouraged the formation of cooperatives and subsequently established the Agricultural Marketing Corporation [AMC] to protect farmers from the perceived exorbitant exploitation by traders. Together with peasant associations, it became the main channel of grain collection at fixed prices which were much lower than the prevailing parallel market prices[18].

On the positive side, redistribution of holdings was perhaps one of the most radical in modem times. Given the weak political position of the Ethiopian peasantry, no amount of half-hearted reform such as ceilings on ownership tried elsewhere, for example in India, could not have restored the dignity and inalienable traditional right to land enjoyed by the southern peasantry prior

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[16] For an expanded debate on the subject see Tenkir Bonger: 1992, 1996 and Tenkir Bonger 1997 Eth. Cal). *Yezaraitu ethiopa edgetna limat keyet wedet endet* in Amharic, Addis Abeba.
[17] For details of its provisions, see PMGSE, 1975.
[18] Detailed quantitative analysis is found in Tenkir Bonger: 1987 & Shifferaw Gurmu1980.

to the expansion of Menelik and the installation of the ***neftegna*** system[19]. The reform put an instant break on the rapid erosion of the eights of the northern peasantry.

Nevertheless, from the anti-bourgeoisie and anti-feudal *political* programme of the period, but without an in-depth examination of their implications for the generation of surplus towards growth, development and equitable distribution of incomes, the above provisions in 'he reform were enacted in order to curtail and/or destroy feudalism and what has been perceived as the adverse consequences of capitalist relation, of production. These were the implicit and explicit assumptions that informed the agrarian policy of the Mengistu regime.

3. Some Adverse Outcomes of the Reform
3.1. *Migration*[20]

Prior to the Revolution, thousands of peasants from the labour surplus north and the ***enset***[21] complex areas seasonally migrated to the land surplus[22] coffee producing areas, taking with them their beasts of burden. They took part in the collection, transport, processing and trading in coffee and urban-made goods. In the performance of such duties, they penetrated the interior districts which were not accessible by motorized transport. The southward trek from Shewa, Tigray, Wello provinces and the *enset* complex began at the onset of the dry season but after the heavy agricultural tasks had been undertaken in the areas of out-migration. On their return journey around March/April, just before soil preparation in their home areas, they took with

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[19] This is the territorial seizure by Menelik of southern Ethiopia and the governance system of northern overlords on the peasantry. It has been is variously described as expansion, conquest and even colonialism by political protagonists.

[20] The discussion here is generated from recollection growing up in the major transit route of migration, Welkitte Town, and observations and data collection while working as a coffee marketing research officer with the Coffee & Tea Development and Marketing Authority in 74-79, during and immediately after the reform.

[21] Banana like staple food plant in southern Ethiopia.

[22] These are relative and static given the state of the art of current technology.

them returns from their labour-, animal power, entrepreneurship and trading in the form of cash, grain and coffee for sale. With the transport of coffee to the north, the domestic demand for coffee was expanded stimulating future output[23].

As voluntary movement of people, this peasant to peasant migration attracted the able, the needy and the ambitious. When there were shortfalls in cereals the families of the migrants could mitigate the effects of drought with the cash and grain thus obtained. Given social reciprocity in rural societies', the return from migration benefited a multiple number of the migrants. Apart from short-term hunger alleviation, the process also enhanced accumulation. This is because as most poor peasants and the peasantries had few or no oxen, income from migration was used to purchase them and by doing so bring more land under cultivation and undertake agricultural operations in a more timely and intensive manner. Having learned the languages, sometimes marrying locally, some settled permanently easing pressure on land in the supply areas but also meeting extra demand for labour in the settlement areas.

This form of people to people interaction unmediated by the state, had less social tension compared to the large-scale government sponsored north-south settlement programmes in the aftermath of the 1984/85 famine. Instead, the pre- reform period migration facilitated a human to human contact between peoples of different languages and in some cases varying cultures without the direct intervention of chauvinistic and inferiority complex laden approaches set in motion by vested political interest groups at State, regional or local levels. By using animal and human power with low opportunity cost in the agriculturally slack period, the process decreased the demand for extra resources in the alleviation of human distress such as famine. In the coffee areas, where there is relative labour shortage, the rich peasants supplemented hired labour to expand coffee output which showed a

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[23] In the interest of maximizing foreign exchange in the short lean such movement, was, however, officially prohibited

phenomenal growth of output and exports in the post-War period[24].

The prohibition of the hiring in and the hiring out of labour and with it the deceleration of the tempo of seasonal migration dis-articulated the spontaneous, efficient and mutually beneficial peasant to peasant exchange. This component of the otherwise well intentioned radical reform contributed towards the stagnation of coffee output[25], a fall in the income of actual and potential migrants with a very high marginal utility from incomes. Among some households and in some drought periods, it had amounted to life-saving measure from drought and attendant famine. It is a tragic irony that during the most severe famine of 1984/85, the Ethiopian Government was chanting many anti-imperialist slogans while at the same time extending begging bowls to the same countries, albeit directed mostly to their respective civil societies.

3.2   *Peasantization*

Following the agrarian reform, the trend towards the social differentiation of the peasantry was reversed while the process of peasantization proceeded at an increasing rate. By 1978/79, four years after the proclamation of the reform, nearly all of the marginal peasants and the peasantries obtained some holdings. With redistribution, the rich peasants' share of total holdings declined to only 1.4%. Apart from collective and State farms, since the reform put a ceiling of 10 hectares both for access and cultivation by peasants, the re-distributive measure lacked in-built mechanism to increase size of holdings by enterprising peasants.

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[24]Despite abundant supply of land in some coffee producing areas, in the 17 year post-reform period, export of coffee remained almost in the same position. While the causes may include other than the discontinuation of migrant labour, given the labour intensive nature of its production and processing, it is more likely that it was a contributory factor.

[25] See Statistical Abstract, various years.

Middle peasants became the most important segment of the peasantry in number [50%], size of holdings [75%] and as important venues of the marketed surplus, innovation, the institutional, political and economic framework of rural society. The remission of rent, which was in most cases a *distress surplus* paid by middle and poor peasants in the pre reform period, transferred about 17% of the agricultural output from absentee proto-landlords and resident renter rich peasants to the poorer section with a much higher propensity to consume own incomes[26]. Following the reforms, the effective demand of peasants increased from 65% to 75% of cereal output. In the event of the stagnation and decline of per capita agricultural output, such redistribution, not countered by rapid diffusion of agricultural technology and markedly improved terms of trade, reduced the flow of the marketed surplus of cereals.

Furthermore, the agrarian structure dominated by middle peasants, which emerged in the post-reform period, changed the supply of the marketed surplus from being obligatory to one of being commercial. Tenants needed to generate surplus at least to pay land rent and the worker to obtain means of subsistence under the capitalist modes of production. The social position of both compel them to operate outside of the household economy for survival. On the contrary, the dominant social class in the post-reform agrarian structure in Ethiopia, the middle peasants could, to a large extent, have the potential to give their back to the market and to some extent to the state too. Low procurement prices, very slow diffusion of a agricultural technology and ceiling on holding led middle peasants towards the option of survival but constricted motivation for extended production towards the market, putting an upward pressure on prices.

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[26] This, however, should not be construed as accumulation foregone at least in the early stages since a well fed peasant *household* is more likely to increase the productivity of labour.

3.3. *Impact on Prices*

Between 1975 and 1980, the real Addis Ababa Retail Price Index, of which food carried a weight of 57%, increased by an average of 17% per annum from 2-3% in the previous 5 years .Within this trend, the price of cereals and those of the coarse ones purchased by the poor increased even more rapidly On the other hand, the composite price paid to the producers lagged behind the pre-agrarian reform period suggesting that the effect from increased retail prices did not trickle down to the producers. The mean differential between producer and wholesale prices in the post reform period increased by nearly five times[27] On the other hand, the parity of the cost of production and producer prices remained almost the same. The most affected in this price build-up were the surplus producing peasantry, the rural and the urban poor. Not only were the latter two adversely affected by price rises of the deficit in their subsistence, but by the lower level of their wage income as well. The total supply of rural wage employment declined because of lower demand by the now independent middle peasants and due to the legal prohibition of the hiring of labour[28] on the supply side. In the same period, rural wage levels increased much slower than cereal prices. Hence, the poor, in general, were adversely affected not only by the astronomic rise in prices of goods on which they depended for their subsistence, but also from a fall in their absolute real incomes.

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[27] The balance was a trading surplus by AMC, the state marketing agency. In 1981/82, it was estimated that its gross margin made up 5% of the value of all cereal output in the country i.e. including home consumption. Since its main marketing function was changing the place of the commodities rather than the more cost incurring changes in form and time utilities, the wide trading gross margins cannot be justified on cost grounds.

[28] Given the dispersed nature of rural areas, the central government may not have had full capacity to enforce the law; but its eyes, the peasant associations, could have served as deterrents.

3.4. Accumulation

It could be argued that part of such a wide margin between consumer and producer can be channeled towards accumulation in agriculture and non-agriculture in the medium and long term interest of the national economy. In fact, the officially stated aim of the AMC was to meet the objective of paying reasonable prices to the producers and the delivery of adequate supply of food to the urban consumers to cushion the strategy of industrialization. However, apart from short-term storage and transport, the wide gap between the producer and consumer prices was neither because of value added, nor net surplus for accumulation, but due to higher marketing cost of the State Corporation compared to traders. In 1980/81, 60% of the AMC's Addis Ababa retail price was marketing cost including salaries, imported equipment, inefficient use of transport vehicles etc. The equivalent ratio in the pre-reform period was only 10% of the retail price[29].

The massive inefficiency resulting in high marketing cost and low producer prices by the State trading agency served as a deterrent for increased output by the then potentially commercial marketable surplus producing middle peasants while simultaneously contributing towards a rise in food prices[30]. This drastically reduced the purchasing power and with it the welfare of the poor without contributing towards net accumulation strategy as in the collectivization model of the Soviet Union which the agrarian reform proclamation appeared to have emulated.

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[29] Shifferaw Gurmu: 1980; Tenkir Bonger: 1996

[30] It is said that to reach the parallel market which nearly doubled prices in some instances, the logical response by the peasants was to moonlight by transporting cereal on pack animals leaving the main roads to evade checkpoints.

3.5. *Institution Building*

(It is better to distinguish between institutions as organizations and institutions as laws/constraints on social, political and economic interactions. According to Douglas North, institutions are rules of the game, constraints on human actions and interactions, impose incentives and penalties. Institutions include both formal and informal laws, rules and regulations see North, 1990.)

Among the State institutions and associated regulations thereof which came into being in relation to the agrarian reform, those with relevance with the issues at hand were the AMC[31], state farms and peasant associations and cooperatives and resettlements. How about resettlements? In some years, State farms gobbled up about 80% of the new inputs to agriculture, displaced some peasant farmers and used invaluable foreign exchange in their drive towards mechanization. Overall, they have been consistent loss-makers even by financial appraisal criteria let alone on a social cost benefit analysis using the shadow prices of their inputs and outputs. While their share of the marketed surplus rose to as high as 20% in some years, their employment creation and self-enhancing effect was minimal. Since they delivered food to the huge military establishment and the politically sensitive urban wage earners, they were of course of strategic importance.

The other grass-root institutions, peasant associations and cooperatives lacked autonomy and instead became subservient to the interest of the State which were not always congruent with their own. Consequently, they could not perform their potential role as bastions of expression of pluralism in rural society reflecting its economic, ecological and cultural diversities. The contrast with the other State institution, the relatively efficient, profit making and expanding Ethiopian Airlines, is very telling[32].

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[31] Regarding the AMC, comments were made under section 3.4 above.

[32] There is of course a vast difference in the nature of the operating environment, the incentive system, the inputs and outputs, etc. But with its requirement of operational

4. Alternative Conceptualization of Relation Between State, Peasants and Agrarian Development Policy

In the foregoing sections, it was argued that deriving policies from the theories of foreign social formations without interfacing them with the specificity of the Ethiopian case have resulted in some serious adverse consequences. Gripped as it was in revolutionary fervor in 1974, the country could have derived more realistic policy pointers from the works of the great Ethiopian political economist, *Nagadras* Gebrehiwot Baykedagn[33] [hereafter GHB]. Gebrehiwot's point of departure is his consideration of Ethiopia as a subject in itself and in its own terms. In his work, Ethiopia's belated incorporation into the world political, economic and cultural system is problematized in so far they help to illuminate the critical questions regarding its constraints and opportunities.

GHB begins his theory of the state and peasants with a review of the causes and consequences of conflicts between and within agrarian societies. His theory of the State posited in the framework of this conflict and change in agrarian societies points to the formation, oscillation, rise, decline and fall of the Ethiopian State(s) resulting in non-development. ***The reproduction of the ruling group is located in militarism often couched with religious underpinnings rather than on any economically articulated relations of production.***

The latter is central to the Marxist analysis of conflict in class societies and

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sophistication at the global level, it is run entirely by an all Ethiopian management and technical team. Given the right policy and operational autonomy from political interference, this implies that the country has the potential to set up institutions performing at international standards including in the realm of rural development. The failure of the State institutions set up in conjunction with the reform is a failure of political management which in turn was at least partly a function of a development model which did not interface the national with the international.

[33] Gebrehiwot Baykedagn 1924, 1960. *Mengistna Yehizb Astedader* in Amharic Addis Ababa; or the English version 1995. Translated as *State & Economy in Early Twentieth Century Ethiopia,* Karnak House & Red Sea Press, London & Trenton.

to some extent in the liberal meditative role of the state. GHB demonstrates that even in the late 19th century, the imperial throne was attained by fighting one's way upwards from a very lowly political position, that of *koro*. In such a conjecture, it is not conceivable to have stable articulated social classes within the peasantry and building a continuous economic nexus with the state[34].

Since all the echelons of the hierarchy of the tributary State were under continual change and surplus pillage via militarism does not necessitate any formal or informal contract, *land ownership as a means of the reproduction of the tributary warlords became necessary only in the post-War period.* Since the hitherto agrarian relations imply undefined level of booty by the warlords [except perhaps limits set by some religion and other moral values], there was a very limited social space for enterprise and overt accumulation. The policy implication from GHB proposition is, save some parts of the South where privatization and expropriation of the hitherto *rist* lands were affected, *policy ought to have focused on production and reproduction via the diffusion of agricultural technology and its linkages with the demand from and supply to industry rather than on distributive and exploitation safeguarding measures elaborated in the agrarian reform of 1975*[35].

In order to dynamize the home market and the accumulation of surplus, GHB spurned tribute in labour service, grain and tax to the government. According to him, the first was instantly exhausted in the field[36] Tribute in grain was consumed by those who did not work. In the then condition of Ethiopia, the money tax collected by the State was spent on imported goods

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[34] For an illustration of GHB's thesis as late as 1935 in Northeast Ethiopia, see McCann: 1987 and in other parts of the country Mclellan 1978; & Caulk 1978 & 1972.

[35] For a formal [mathematical] treatment of GHB's vital contribution, see Alemayehu Geda: 1998.

[36] This of course is very literal since the equivalent extra output could be appropriated as free labour by the tributary lord.

produced by foreigners who did not purchase the produce of the Ethiopian peasantry[37]. His favoured strategy was a broadly based agrarian development firmly erected ***on the prosperity of an independent peasantry able to purchase*** urban-made goods thereby speeding up industrialization, increasing government taxation [via industries], employment and saving foreign exchange

He also cautions the government to get prices right, both to maximize the incomes of the producers and to hedge against the risk of a fall in price arising from the imbalance between supply and demand. The case for agricultural insurance and price policy are clearly laid down. GHB cautions against lending for agricultural development to small farmers without the necessary supporting measures such as education, the production and availability of urban-made consumer goods and a market in land. In the absence of these measures, the consequences of agricultural credit will result in the eviction of indebted peasants and the concentration of land in the hands of few landlords. The latter is dis-favoured because it does not have built in incentives for land productivity.

5.   Conclusion

The great agrarian reform of Ethiopia provided an unfettered access and security of tenure especially to those who were tenants in the pre-reform period and opened up the prospect for new institutional and technological set up to unleash a dynamic process of agricultural development. However, possible gain from such a potential were constrained by setting cultivation ceiling at 10 hectare in one season rain-fed agriculture, the curtailment of open and competitive channels of marketing, undue bias in favour of State farms and the inefficient operations of the AMC. In the face of increasing population and declining per capita output of food, these contributed towards the creation of a new crisis manifested in very low producer and

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[37] Cf with the- final destination of the surplus accruing to the functionaries of the State and institutions which were meant to channel surplus for industrialization.

very high consumer prices, vastly increased imports, dependence in food aid and drastic reduction in the welfare of the urban and the rural poor.

Instead of obsession with the elimination of feudalism and the policy prescriptions derived from it, given the very low level of agricultural surplus under the process of petty commodity production in the realm of tributary agrarian relations, the restoration of the political and land right of the peasantry infringed upon by the post - 1941 State could have unleashed the forces of production[38]. If only the policy derivatives of the great agrarian reform were predicated *on the specificities of the Ethiopian agrarian structure,* the severity of the famine and the adverse consequences of escalating prices could have been competently dealt with from internal resources.

One of the root causes of the agrarian crises was the wrong conceptualization of the agrarian problem and the attendant uncritical application of statist policies in the form of State farms, marketing corporations and compulsory delivery of grain all copied without innovative adaptations from the social experiences of other societies.

The policies led to mis-allocation of resources and failed to establish prices sufficient to motivate peasants and affordable by the rural and urban poor. The stifling of the movement of labour had a devastating effect on the aggravation of the effect of drought. In the end, the institutions of the State provided comfort to the State elite at the expense of the welfare of the disadvantaged in society. By curtailing the trend towards accumulation, it stifled the medium and long-term growth prospect of the national economy. The political cost to the Derg has been obvious.

GHB's conceptualization of State and peasants, defining the parameters of the role of the State in development in general, and agriculture in particular

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[38] Subject to the limits of the negotiating space between the peasant cultivator and association leaders on the one hand and that with state on the other.

and the articulation of the relation between agriculture and industry and the policy implications therein, could have gone a long way in drawing more down to earth realistic agrarian policy measures at the historical moment when Ethiopia was on the threshold of radical change. Alas! as the Amharic saying goes *"bej yale worq ende medab yekoteral:* "that gold in one's own hand is undervalued as if it were copper".

References

Addis Hiwot. (1975). "Ethiopia: From Autocracy to Revolution", Occasional Paper No 1, *Review of African Political Economy.*

Alemayehu Geda. (1998). 'The Gebre-Hiwot Model: A Pioneer African (Ethiopian) Development Macroeconomist", Working Paper Series, Dept. of Economics, Addis Ababa University.

Amin, S. (1974). *Accumulation in a World Scale,* 2 vols., Monthly Review Press.

_____. (1980). *Class & Nation Historically & in the Current Crises,* Monthly Review Press

_____. (1989). *Eurocentrism,* London.

Anderson. P. (1978). *Lineages of the Absolutist State,* New Left Books.

Aster Akalu. (1982). *The Process of Land Nationalization in Ethiopia,* Bloms Boktryckevi, Sweden.

Banaji, J. (1978/79). "The Peasantry in the Feudal Mode of Production: Towards an Economic Model", *Journal of Peasant Studies,* VI.

Bauer, D. F. (1978). "For Want of an Ox ... Land, Capital and Social Stratification in Tigre" in Proceedings of the Fifth International Conference on Ethiopian Studies, Chicago. pp 13-16.

Bernal, M. (1987). Black Athena. *The Afro-astatic Roots of Ancient Greece,* vol. I, Free Association, London.

Bemstein, H. (1979). "African Peasantries: A Theoretical Framework", *Journal of Peasant Studies,* VI (4), pp 421-423

Bloch, M. (1978). *Feudal Society,* 2 vols. Chicago.

Bondestam, Lars. (1975). People and Capitalism in the Awash Valley. *Journal of Modern African Studies.*

Carter, A. F. (1973). "Neo-Marxist Approach to Development & Under-development", *Journal of Contemporary Asia,* Ill, (1), pp 457-493.

_____. (1978). 'The Modes of Production Debate", *New Left Review,* No 107, pp 7-33.

Caulk, R. (1972). "Firearms & Princely Power in Ethiopia" *Journal of African History* XXXXIIl, (4), pp 609-630

_____. (1978). "Armies as Predators: Soldiers & Peasants in Ethiopia c1850-1935" *International Journal of African Historical Studies,* II, (3), pp 457-493.

_____. (1978). "A Biography of Gebrehiwot Baykedagn", in the Proceedings of the Fifth International Conference on Ethiopian Studies, pp 569-581.

Central Statistical Office CSO/CSA. Various years.

Cliffe, L. (1974). "Capitalism or Feudalism: The Famine in Ethiopia". *Review of African Political Economy,* I, (1), 1974, pp 34-40.

Cohen, J. M. (1974). Ethiopia: A Survey of the Existence of a Feudal Peasantry", *Journal of Modern African Studies,* XII, (4) pp 665-675.

Cohen, J. M. & D. Weintraub. (1976). *Land & Peasants in Imperial Ethiopia: The Social Background to a Revolution.* Can Gorcum & Compo B. Y. Assen, Netherlands.

Crummey, D. (1980). "Abysinnian Feudalism Past & Present"*,* No 89, pp 113-138. 1980. "State & Society in 19th Century Ethiopia" in *Modes of Production in Africa. The Pre-colonial Era,* D. Crummey & C. C. Stewart, eds., pp 237- 249.

Diop, C. A. (1974). *The African Origins of Civilization,* Connecticut.

Dessalegn Rahmato. (1984). "Political & Social Formation in Ethiopia under the Old Regime", Proceedings of the Eighth International Conference on Ethiopian Studies. Addis Abeba. *1985. Agrarian Reform in Ethiopia.* Scandinavian Institute of African Studies, Uppsala.

Dobb. M. (1981). *Studies in the Development of Capitalism,* Routledge.

Ellis, G. (1976). 'The Feudal Paradigm as a Hindrance to Understanding Ethiopia", *Journal of Modern African Studies, XN,* (2), 275-295.

Eshetu Chole. (1990). "Agricultural Surplus Extraction", in *Ethiopia: Development Options,* pp 34-40, Pausewang, S. & Eshetu Chole (eds.)

Frank, M. A. (1967). *Capitalism & Underdevelopment in Latin America,* Monthly Review Press, New York.

Gebrehiwot Baykedagn. (1995). *State & Economy in Early Twentieth Century Ethiopia* (original 1917, *Mengistina Yehizib Astedader* -Government & Public Adminstration), Karnak House & Red Sea Press, London & Trenton. Translated, annotated and introduced by Tenkir Bonger.

Gebru Tareke. (1991). *Ethiopia: Power & Protest: Peasant Revolts in the Twentieth Century,* Jilkes, P. 1975. *The Dying Lion*

Halliday. (1980). *The Ethiopian Revolution,* Verso.

Hobben, A. (1973). "Family, Land & Class in North-west Europe & the Northern Highlands of Ethiopia", Proceedings of the First United States Conference on Ethiopian Studies.

Hultin, J. (1977). *Man & Land in Wollega,* Working Paper of the Dept of Sociology & Anthropology University of Gothenberg.

Lexander, A. (1970). *Land Ownership. Tenancy & Social Organization in the Waji Area,* CADU Publication No 50.

McLellan, C. (1978). "Reaction to Ethiopian Expansion: The Case of Derassa 1895-1935", Ph.D Thesis, Michigan State University.

McCann, J. (1987). *From Poverty to Famine in Northeast Ethiopia.' A Rural History 1910- 1935*

Mukia, H. (1981). "Was There Feudalism in Indian History", *Journal of Peasant Studies,* VIII. (3), 273-210.

Niecko, M. (1980). *The Role of Land Tenure in the System of Imperial Ethiopian Government.*

Palma, G. (1978). "Dependency: A Formal Theory of Underdevelopment or a Methodology for the Analysis of Concrete Situation in Under-development, *World Development,* VI, pp 881-924.

Pausewang. S. (1973). Peasant Society & Development in Ethiopia, *Sociologia Ruralis,* XIII, (2), pp 173-192.

Pausewang. S. & Eshetu Chole. (eds.) (1990). *Ethiopia: Rural Development Options.* Pausewang. S. 1990. *"Meret Larashu",* in *Ethiopia: Rural Development Options,* Pausewang. S. & Eshetu Chole (eds.).

Provisional Military Government of Socialist Ethiopia [PMGSE]. (1975). *A Proclamation to Provide the Nationalization of Rural Land,* Government Gazette.

Saith, A. (1985). "Distributional Dimension of Revolutionary Transition: Ethiopia", *Journal of Development Studies,* XXII, (I), pp 150-159.

Saul, T. (1979). *The State & Revolution in Eastern Africa.* Heinneman.

Saul & Wood. (1973). "African Peasantries" in *Peasants and Peasant Societies,* Theodore Shannin, ed., Hazel Watso & Finey Ltd.

Shannin, T. (1971). "The Nature and Logic of Peasant Economy: A Generalization" in *Peasant & Peasant Societies,* T. Shannin, ed., pp 186-206.

Shifferaw Gurmu. (1980). "An Empirical Analysis of Recent Price Trends in Ethiopia", *Ethiopian Journal of Development Research,* IV, (2), pp 13-39.

Stahl, M. (1974). *Ethiopia: Contradictions in Agricultural Development,* Liber Tryck, Stockholm.

Tenkir Bonger. (1987). "Agrarian Structure, Agrarian Reform, Agricultural Technology in Ethiopian Agriculture With Special Reference to the Arsi Region". PhD thesis, London University.

_____. (1992). "The State, the Peasantry & Rural Class Formation in Pre-revolutionary Ethiopia" *Africa Development,* XVII, (2), pp 89-115.

Tenkir Bonger. (1996). The Interface of Agrarian Structure. Agrarian Reform. Agricultural Technology & the Problems of Accumulation in Ethiopian Agriculture. CODESRIA Monograph Series, No 2.

_____. (2005). *Yeitiopia edgetina Limat Keyet? Wedet? Endet?*.in Amharic, Addis Abeba.

Tigabe Asres. (1972). *"Yenegadras Gebrehiwot Baykedagn Accir Yehiwot Tarik* - A Short Biography of *Negadras* Gebrehiwot Baykedagn", Senior Essay [B.A.], Dept of Ethiopian Language, Haile Sellasie I University, Addis Abeba.

Thorner, D. (1973). "Peasant Economy as a Category in Economic History" in *Peasants & Peasant Societies,* T. Shannin, ed. pp 202-218.

World Bank. World Development Report, Various years.

Zewge Aye1e. (1981). *"yegebrehiwot baykedn poleticawi astesasib*- The Political Thoughts of Gebrehiwot Baykedagn", *Meskerem,* 2 parts [March & June], pp 36-63, 84-96.

Determinant of Poverty in Ethiopia

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Abstract

Poverty has turned out to be a great global social and economic problem. In Ethiopia, it is multifaceted and deep rooted. This study attempts to analyze the impact of socioeconomic and demographic characteristics of households on poverty in Ethiopia, using the latest Household Income, Consumption and Expenditure Survey (HICES) 2010-11. The study employs a logistic regression model to identify determinants of wellbeing of the household by considering per capita consumption as a dependent variable. Different households are classified as either poor or non-poor on the basis of absolute per capita consumption of Birr 3781. Results show owner of agricultural land, head (self-employed or employed in formal sector) are more likely to exit from poverty line. The results also reveal that female headed households, large family size and high dependency ratio are adversely affected.

Keywords: Poverty, Household, Per Capita Consumption, Determinants, Logistic Regression.
JEL classification: C8

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1.   Introduction

Achieving sustainable economic growth with a focus on combating poverty has become the key development goal for governments around the world, as reflected in the Millennium Development Goals, Goal 1; *"eradicate extreme poverty and hunger"*. In this objective, analysis of poverty aroused the interest of researchers, public authorities and international organizations. The specificities of developing economies, in particular the dualism between the urban and rural areas incites to identify the determinants of poverty with a view of designing policies and strategies to alleviate poverty that persists in most of these countries. Poverty in Ethiopia has many manifestations. The Human Development Index (HDI) for 2014 (based on estimates of 2013), which takes life expectancy, adult literacy, primary schooling and per capita income is 0.435 which is low in comparison of Rwanda, Uganda and Sub-Saharan Africa and rank of Ethiopia is 173 out of the 177 countries. According to most recent multidimensional poverty index estimation, 88.2% of the populations of Ethiopia are multi-dimensionally poor while an additional 6.7% are near multidimensional poverty. The MPI, which is the share of the population that is multidimensional poor, adjusted by the intensity of deprivations, is 0.537. Rwanda and Uganda have MPI is of 0.352 and 0.359 respectively.

By any standard, the majority of people in Ethiopia are among the poorest in the world (Dercon and Krishnan, 1998; IMF, 1999; Rahmato and Kidnanu, 1999; World Bank, 2001). Poverty seems to persist in large sections rural society as well as urban sections with little hope for a substantial improvement of the living conditions of the rural poor as well as urban poor in the near future. In order to combat such debilitating poverty considering very scarce financial resources available to be allocated for the purpose, we have to understand the determinants of poverty in rural and urban Ethiopia. For this, the poor must be properly identified and an index taking the intensity of poverty suffered by the poor into account needs to be constructed.

Analytical work that scrutinizes poverty profiles is best scanty. Even the available ones are mostly descriptive focusing on explaining the extent of poverty and mostly associated with studies that relate to food entitlement failure (see Webb *et al.*, 1992; Webb and Von Braun, 1994). Among those studies, Beevan and Joireman (1997) adopt a sociological approach towards the measurement of poverty on the meaning and use of different measurements.

Using micro level panel data from villages in rural Ethiopia, Dercon (2001) analyses the determinants of growth and changes in poverty during the initial phases of the economic reform (1989-1995) making use of a standard decomposition of income and poverty changes. His empirical results indicate that overall, consumption grew and poverty fell substantially during the period under consideration and that on average the poor have benefited more from reforms than the non-poor households, even though the reforms did not deliver similar benefits to all the poor. He argues that the main factors driving changes are relative price changes, resulting in changes in the returns to land, labour, human capital and location. Bogale et al. (2005) investigated the determinants of rural poverty in Ethiopia on the basis of survey data of three districts namely Alemaya, Hitosa and Merhabete and found that nearly 40% of the sample households live below poverty line with an average gap of 0.047.

The Ethiopian Ministry of Finance and Economic Development (MoFED) assessed the 1999/2000 Household Income and Consumption Expenditure (HICE) and welfare Monitoring Survey results and concluded that the incidence of poverty is higher in rural than in urban areas with poverty head count ration of 45.4 and 36.9%, respectively (MoFED). However, as compared to 1995/96 level, poverty incidence increased by 11.4% in urban areas and declined by 4.42% in rural areas in 1999/2000.

Most of these studies aim to assess the extent of poverty and explain relative changes which occur in the incidence of poverty due to policy changes. The article aims to add discussion by examining the socio- economic and demographic characteristic of households on poverty in rural and urban

Ethiopia. We analyze the latest Household Income, Consumption and Expenditure Survey (HICES) 2010-2011 and estimate determinants of poverty using a maximum likelihood binary logistic regression model considering whether a household is poor or non-poor as a response variable. This allows us to derive further meaningful insight about various poverty – generating factors that determine the persistence of poverty in Ethiopia and the relevance those specific policies can play in alleviating poverty.

2.   Data Source and Research Methodology
2.1.   Data Source

The data used in this study has been taken from the 2010-11 Household Income, Consumption and Expenditure Survey (HICES) for Ethiopia. The survey covered both rural and urban areas of the country which was conducted from 8 July 2010 through 7 July 2011.

For the purpose of representative sample selection, the country was divided into three broad categories, i.e., rural, major urban centers and other urban areas categories. Therefore, each category of a specific region was considered to be a survey domain for which the major findings of the survey are reported. However, Harari and Dire Dawa have rural and urban categories, only; while Addis Ababa has only urban areas divided into10 sub-cities considered as survey domain or reporting levels.

2.2.   Poverty Line

Large literature exists on approaches to assess poverty. However, the question still remains as where to draw the poverty line. Ideally, the poverty line should be based on a basket of goods and services including food and nutrition, as well as clothing, housing and health care and education that can be considered basic needs (Baffoe, 1992). Greer and Thorbecke (1986) apply the cost of food consumption corresponding to the recommended daily

allowance of calories and provide the profile and decomposition of food poverty among Kenyan smallholders.

Economic theories suggest that per capita expenditure is the best indicator of welfare, but this presupposes that households, as consumers, maximize a continuous utility function defined over commodities (Glewwe, 1987). Bevan and Joierman (1997) employed personal wealth ranking, community wealth ranking and consumption poverty, and concluded that none of the indicators applied identifies the poor on a convincing way.

The most popular method of poverty measurement have used the nutritional norm and defined poverty in terms of minimum calorie requirements (Dandekar and Rath, 1971; Osmani, 1982; Greer and Thorbecke, 1986; Ahmed *et al.*1991; Ercelawn, 1991; Ravallion and Bidani, 1994).

In the absence of an invariably acceptable national poverty line for Ethiopia, we decided to use the official poverty line constructed by MoFED in 2010/2011. That is, a household is deemed as living in poverty if the per capita consumption is less than equal Birr 3781 otherwise the household will be considered as non-poor.

2.3.   *Definitions of Variables Used in the Study*

The dependent variable of our study is binary variable i.e it takes value 1 for poor and 0 for non-poor. To know the impact of independent variables on poverty we have considered the following socio- economic and demographic variables i.e independent variables.

Table 1: List of Variables and their Description

Independent (Explanatory) Variables	
SEX	Sex of the Household Head (0 = Male, 1 = Female)
AGE	Age of the Household Head (in year)
FSZ	Number of Household Members (Family Size)
FSZSQ	Family Size Squared
AREA	Place of Residence of Household (0 = Urban, 1 = Rural)
NWOR	Number of Working Members/Productive Age (between 15 and 64 years inclusive)
AGRL	Household Having Agricultural Land (0 = No, 1 = Yes)
DEPR	Dependency Ratio $= \dfrac{\text{People of (Age 14 and Below + Age 65 and Above)}}{\text{People Above Age of 15 and Below Age of 64}}$
EDLEV	Head of the Household Has No Education (NSCH = 0)[**] Head of the Household Completed Elementary School (CMPE = 1) Head of the Household Completed Secondary School (CMPS = 2) Head of the Household Completed College/University & Above (CCUA = 3)
MARST	Head of the Household is Single (SINGLE= 0)[**] Head of the Household is Married (MARRIED = 1) Head of the Household is Divorced/Widowed (DIVSEW = 2)
EMPST	Head of the Household is Employed in Informal Sector (INFOE = 0)[**] Head of the Household is Employed in Formal Sector (FORME = 1) Head of the Household Head is Self-Employed (SELFE = 2)

Note: ** implies reference category

2.4. Method of Data Analysis

The data set was analysed using bivariate and multiple logistic regression analyses. Bivariate analysis was done in order to identify which characteristics independently related to socioeconomic status (poverty level) were using Pearson's chi-square tests of associations as given below.

$$t^2 = \frac{\sum_{i=1}^{r} \sum_{j=1}^{c} (O_{ij} - E_{ij})^2}{E_{ij}} \sim t_r^2 (r-1)(c-1) \tag{1}$$

Where: O_{ij} is the observed value in the ith row and j^{th} column

E_{ij} is the expected value of the ith row and j^{th} column cell

r = is number of row and c = is number of column.

Given the dependent variable of main interest that a household may be classified as poor or non-poor, a binary Logistic regression model is useful when the outcome (dependent) is binary, meaning zero or one, with one being success. Suppose in multiple logistic regression case, a collection of p explanatory variables be denoted by $\mathbf{x'} = (1, x_1, x_2, ..., x_p)$. Furthermore, let f_i denotes the conditional probability that the ith household is below the poverty line. Thus, the model for which the outcome variable is binary, can be written as:

$$y_i = f_i + \vee_i ; i = 1, 2, ..., n \qquad \text{(2)}$$

Where:

$$f_i = \frac{\exp(z_i)}{1 + \exp(z_i)} \qquad \text{(3)}$$

with $z_i = \mathsf{S}_0 + \mathsf{S}_1 x_{1i} + \mathsf{S}_2 x_{2i} + ... + \mathsf{S}_p x_{pi} = \mathbf{X'\beta}$. Here *y* is n×1 vector of response having $y_i = 0$ if the household is not-poor and $y_i = 1$ if the household is poor, $\mathbf{X}$ is an n× (p+1) design matrix of explanatory variables, is a (p+1) ×1 vector of parameters, $\boldsymbol{\varepsilon}$ is also an n×1 vector of unobserved random errors. The quantity f_i is the probability for the ith covariate satisfying the important requirement $0 \le f_i \le 1$. Then, the log-odds of having *y* = 1 for given *x* is modeled as a linear function of the explanatory variables as:

$$E(\mathbf{y}/\mathbf{x}) = \ln\left(\frac{f_i}{1 - f_i}\right) = \mathsf{S}_0 + \mathsf{S}_1 x_{1i} + \mathsf{S}_2 x_{2i} + ... + \mathsf{S}_p x_{pi} \qquad \text{(4)}$$

The function $f_i = \dfrac{\exp(\mathbf{X'\beta})}{1+\exp(\mathbf{X'\beta})}$ is known as logistic function. The most commonly used method of estimating the parameters of a logistic regression model is the method of Maximum Likelihood (ML) instead of Ordinary Least Square (OLS) method.

3. Results and Discussion

3.1 Model Selection for National Data

The model at National level with all variables is shown in the Table 2.

Table 2: Logistic Estimate of Poverty at National Level (Full Model)

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Odds Ratio
INTERCEPT	-7.245	0.1527	2250.574	0.0001	
DEPR	0.186	0.0368	25.706	0.0001	1.205
NWOR	-0.095	0.0384	10.878	0.0010	0.910
FSZ	1.017	0.0384	702.694	0.0001	2.766
FSZSQ	-0.050	0.0025	389.424	0.0001	0.951
AGE	-0.007	0.0011	48.636	0.0001	0.992
SEX	0.471	0.0401	137.893	0.0001	1.602
AGRL	-0.297	0.0503	34.925	0.0001	0.743
AREA	1.655	0.0359	2128.093	0.0001	5.234
DIVSEW	0.443	0.0789	31.521	0.0001	1.557
MARRIED	0.409	0.0448	83.274	0.0001	1.505
CMPE	-0.168	0.0400	17.724	0.0001	0.845
CMPS	-0.413	0.0650	40.342	0.0001	0.388
CCUA	-0.669	0.0860	60.528	0.0001	0.515
SELFE	-0.445	0.0495	81.040	0.0001	0.640
FORME	-0.208	0.0820	6.350	0.0120[**]	0.812

** Significant at 5% level of significance

The calculated value e of the likelihood ratio test statistic is

$$G^2 = 32854.561 - 23431.280 = 9423.281$$

For $r = 0.05,$ we have $t^2_{0.05}(15) = 24.996$, since $G^2 = 9423.281 > 24.996$ and the *p*-value for the test is $P(t^2(15) > 9423.281) = 0.000$ which is significant at the $= 0.05$ level. Thus, we reject the null hypothesis and conclude that at least one and perhaps all 15 coefficients are different from zero.

The Table 3 exhibits AIC, SC, R-Square and number of parameters to be estimated for null and full model, respectively.

Table 3: Model Selection Criteria

Model	AIC	SC	R-Square	No. of Parameters
Null	32855.561	32859.005	-	1
Full	23463.280	23502.392	0.3991	16

The Table 3 reveals that the full model have the lowest value in both criterion (AIC and SC) which is the indication of a better fit model by adjusting for the number of explanatory variables and the number of observations. The R-square value for the full model is 39.91%. The estimated logit model for household level determinants of poverty at National level is as given below:

$$logit(\hat{}_i) = -7.25 + 0.186depr - 0.095nwor + 1.02fsz - 0.05fszsq - 0.007age + 0.471sex$$
$$- 0.297agrl + 1.66area + 0.443divse\ w + 0.41marrie\ d - 0.168cmpe - 0.413cmps - 0.669ccua$$
$$- 0.4376self\ e - 0.21forme \qquad\qquad .Model - I'$$

Another way to analyze the effects of independent variables to know the probability of being poor is the change of odds ratio as the independent variables change. The odds ratio is defined as the probability of being poor divided by the probability of not being poor. Table 2 (the last column) shows the odds ratios for each independent variable at National level.

As it is evident from Table 2 that the variables dependency ratio (DEPR), family size (FSZ), household head being female (SEX), marital status (DIVSEW and MARRIED) and living in the rural area (AREA) have odd ratios greater than one, which means that these variables are positively correlated with the probability of being poor. On the contrary, the variables number of working members (NWOR), agricultural landholding (AGRL), family size squared (FSZSQ), age of household head (AGE), having completed elementary education (CMPE), having completed secondary education (CMPS), having college education and above (CCUA), being self-employed (SELFE) and being household head employed in formal sector (FORME) all have odd ratios lower than one, which means that these variables are negatively correlated with the probability of being poor.

3.4. Model Diagnostics

In model diagnostics we are concerned with goodness fit of the model.

3.4.1 Goodness-of-Fit of the Models (H-L Tests)

The goodness-of-fit measures how effectively the model describes the response variable. Now, we can test the reduced model to see if it is a good fit. The following table gives H-L test Statistics (2000) (summary for Model (National)).

Table 4: Hosmer and Lemeshow Goodness-of-Fit Tests

	National
H-L test statistic ($\hat{C}$)	2.223
P-value	0.9734
No. of observations	27827

For $r = 0.05$, we have $t^2_{0.05}(8) = 15.507$.

Since $\hat{C}_{National} = 2.223$ are all less than the tabulated value 15.507, we do not reject H_0, and conclude that the fitted models fit the data adequately well. Thus, the goodness-of-fit test with *p*-values 0.9734 indicates that there is insufficient evidence to claim that the models do not fit the data adequately. If the *p*-value is less than our accepted -level (5% in this case), the test would reject the null hypothesis of an adequate fit. So our models fit the data well.

3.4.2   *Classification Table*

In order to assess the predictive power of the models, a classification table of correct and incorrect predictions was constructed, based on the predicted probability of being poor for each data. A probability equal or greater than 0.5 was interpreted as a prediction of a household being poor, while a probability lower than 0.5 was interpreted a prediction of a household being non- poor. Table 5 shows the classification for the models. In this table, "D" represents the number of poor households in the sample while "~D" represents the number of non- poor cases in the sample. The symbol "+" represents the number of households predicted as poor by the model while " " represents the number of no- poor cases predicted by the model.

As it can be seen in the Table 5, the models sensitivity rate (percent of poor cases correctly predicted by model) are 55.3%, 27.26% and 77.79%, while the models specificity rate (percent of non-poor cases correctly predicted by the model) are 90%, for National.

The false positive rate for households classified as poor by the model at National level is 31.6 percent, which means that 31.6 percent of the number of households predicted as poor by the model are in fact non-poor. The false negative rate for households classified as non- poor by the model is 15.95 percent, which means that 15.95 percent of households predicted as non-poor by the model are in fact poor.

Table 5: Classification Table of Correct and Incorrect Predictions for National [Urban] Rural

Classified	True		
	D	~D	Total
+	4272 [613] 4252	1974 [1001] 1859	6246 [1614] 6111
-	3443 [1636] 1214	18138 [14257] 2995	21581 [15893] 4209
Total	7715 [2249] 5466	20112 [15258] 4854	27827 [17507] 10320

	National
Sensitivity	55.30%
Specificity	90.10%
Positive predictive value	68.40%
Negative predictive value	84.05%
False + rate for true ~D	9.82%
False – rate for true D	44.63%
False + rate for classified +	31.60%
False – rate for classified -	15.95%
Correctly classified	80.53%

The positive predictive value rate of the National model is 68.4 percent, which means that 68.4 percent of the total number of predicted poor households is in fact poor. Negative predictive rate is 84 percent, meaning that 84 percent of the total number of non-poor cases predicted by the model is in fact non-poor. As a whole, the National model correctly predicts 80.53

percent of cases. Sensitivity and specificity rely on a single cut point to classify a test result as positive.

3.5   *Diagnostic Plots*

One way of looking at the model adequacy is to graph studentized Pearson and deviance residuals against predicted probabilities. The studentized Pearson residuals and deviance residuals are plotted against the estimated logistic probability respectively and in all case, the lower smooth approximates a line having zero slope and intercept. Any significant departure from this suggests that the model may be inadequate and potential outliers may have dramatic impact on the fit of the model (Sarkar et al 2011).

It is to be mentioned here that the reduced model also passes the model checking procedure.

4.   Discussions of the Results

The data has been analyzed at National level.   Ethiopia, like other developing countries is subject to the threat of high population growth rate. This high growth accompanied by the high unemployment rate and low female labor force participation rate poses a serious threat to the households. High dependency ratio (DEPR) and larger family size (FSZ) contribute positively to the probability of becoming a poor household for national level. The coefficients for both of these variables are positive and significant at 5% level of significance. The coefficient of family size squared (FSZSQ) is however negative and significant, controlling for the fact that very large families can also have potential earners and can reduce the poverty through larger participation in the work force. However, this situation is not highly desirable due to the fact that the odds ratio are at a very low level of less than 1% in reducing the probability of being poor for national level. The odd ratio of the variable dependency ratio (DEPR) shows a contribution of 20.5%

in increasing the likelihood of being poor where as family size (FSZ) contributes 76.6%.

Number of working household members/productive age (NWOR) has a potential in reducing the probability of remaining in the poor household category. Sex of household head i.e being female (SEX) positively affects the likelihood of remaining poor. Several studies have discussed the phenomenon of the feminization of poverty, which is said to exist if poverty is more prevalent among female-headed households than among male-headed households. This situation might be due to the presence of discrimination against women in the labor market, or it might be due to the fact that women tend to have lower education than men and they are paid lower salaries. Using a probit model, Meron (2003) found that female-headed households are poorer and more vulnerable to poverty than male-headed households in Urban Ethiopia.

Looking at the results of logistic regression estimated national level; we reach at the same conclusion as Meron (2003) since the sign for sex of the head (SEX) is positive and statistically significant at 5% level of significance. Moreover, the odd of being poor for female-headed households are 1.602 (OR = 1.602 with *p*-value = 0.0001) times in comparison to male-headed households. Conversely, we can say that the odd of being poor for those male-headed are 0.6242 (OR = 0.6242, given by the reciprocal of 1.602) times for those headed by female.

It is argued that poverty increases at old age as the productivity of the individual decreases and the individual has few savings to compensate for this loss of productivity and income. This is more likely to be the case in developing countries like Ethiopia, where savings are low because of low income. However, the relationship between age and poverty might not be linear, as we would expect that incomes would be low at relatively young age, increase at middle age and then decrease again. Therefore, according to

life-cycle theories we would expect to find that poverty is relatively high at young ages, decreases during middle age and then increases again at old age.

For the case of Ethiopia based on 1999/00 Household Income, Consumption and Expenditure Survey (HICES) and Welfare Monitoring Survey (WMS), Tassew (2008) finds that age of the household head (AGE) is relevant in explaining poverty. Using the 2010/11 HICES and the methodology developed above we reach at the same conclusion as Tassew (2008) and age of the head is statistically significant in explaining poverty at National level. Various researchers have identified the linkages between education and poverty. A base hypothesis is that higher education negatively affects poverty. That the coefficients on the educational attainment of household head (CMPE, CMPS and CCUA) are all negative and statistically significant at 5% level of significance for the three models.

The level of education is grouped into four categories ranging from illiterate to higher education (college and above). The odds of being poor with education level elementary school (CMPE), secondary school (CMPS) and college and above (CCUA) was found to be 0.845, 0.388 and 0.515 times that of illiterate (no schooling-reference category) respectively, implying that household head with higher educational attainment (CCUA) exhibited a lower chance to be poor as compared to the illiterate household head for National.

The result of marital status for national level indicates that divorced/widowed and married clients are 55.7% and 50.5% more likely to be poor respectively than single (never married-reference category) clients, implying clients whose marriage ended because of death of a partner or due to some disagreement are found to have a significantly high likelihood of being poor in Ethiopia.

Employment status of the household head is one of the determinants of household's poverty status. Self-employed household head (SELFE) are

about 64% less likely to be poor than those employed in informal sector (INFOE) which is the reference category. Household's which are headed by the one who is employed in formal sector (FORME) are about 81% less likely to be poor than those works in informal sector (INFOE) at country level (Model-I).

Last but not certainly the least, the ownership of agricultural land of household (AGRL) significantly help in lowering the possibility of being poor. The results show that households having agricultural (farming) land have 74.3%, 89.3% and 63.2% less chances to be remain as a poor. The possible reason might be that the most of the population majorly employed in agricultural sector; the agricultural sector therefore is a big sector of employment in rural area especially as compared to urban area of the country.

References

Ahmed, A. U., H. A. Khan and R. K. Sampath. (1991). Poverty in Bangladesh: Measurement, Decomposition and International Comparison. In: *Journal of Development Studies* **27 (4)** : 48-63.

Baffoe, J. K. (1999). Change in poverty in Uganda 1992-1997. Working Paper No. 99.22. Centre for Study of African Economics, University of Oxford, Oxford.

Bevan, P. and S. F. Joirmann. (1997). The Perils Profile in Ghana 1987-1988. In: *African Development Review* **4(1)**: 1-28.

Central Statistical Agency [Ethiopia] and ICF International. (2012). *Ethiopia Demographic and Health Survey 2011.* Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International.

Dandekar, V. M. and Rath. (1971). *Poverty in India. Indian School of Political* Economy, Pune.

Dercon, S. (2001). Economic Reform, Growth and the poor: Evidence from Rural Ethiopia. Working Paper Series 2001-8. Center for study of African Economics, Oxford.

Ercelawn, A. (1991). Absolute Poverty as Risk of Hunger: Norms, Incidence and Intensity for Rural and Urban Pakistan. Applied Economics Research Centre, University of Karachi.

Greer, J. and E. Thorbecke. (1986). Food Poverty Profile in Applied to Kenyan Smallholders. In: *Economic Development and Cultural Change* **35(1)**: 115-141

Hosmer, D. and Lemeshow, S. (2000). *Applied Logistic Regression,* 2nd Edition, John Wiley & Sons Inc., New York.

IMF (International Monetary Fund). (1999). *Ethiopia: Recent Economic Development. IMF Staff Country (Eds.). Hand book of Development Economics (Vol.3)*, Elsevier Ecience, Amsterdam.

Meron Assefa. (2003). Female-Headed Households and Poverty in Urban Ethiopia, MA Thesis, Addis Ababa.

Ministry of Finance and Economic Development (MoFED). (2012). *Ethiopia's Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11),* Addis Ababa.

Sarkar, S., Midi, H. and Rana, S. (2011). Detection of Outliers and Influential Observations in Binary Logistic Regression. *Journal of Applied Sciences* **11** (1): 26-35.

Tassew Woldehanna. (2008). Correlates of Poverty in Urban and Rural Ethiopia. *Ethiopian Journal of Agricultural Economics*, 7 (1): 49-81.

Webb, P., J. von Braun and Yishak Yohannes. (1992). Famine in Ethiopia: Policy Implications of Policy Failures at National and Household Level. Research Report 92. International Food Policy Research Institute, Washington, D.C.

Webb, P. and J.von Braun. (1994). *Famine and Food Security in Ethiopia: Lessons for Africa.* John Wiley and Sons, Chichester.

World Bank. (2001). "*World Development Report 2000/01: Attacking Poverty*", New York: Oxford University Press.