Economic Significance of Specific Export Promotion on Poverty Reduction and Inter- Industry Growth of Ethiopia

By:

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I. Introduction

Ethiopia is an ancient country with rich history and culture. Despite being endowed with abundant natural resources, hard working people and a suitable ecology for agriculture, its history is associated with recurrent famine and poverty. The situation was particularly acute when the country was ruled under a socialist-oriented political system from 1974 to 1991. During that period, the real per capita income, which was among the lowest in Sub Saharan standard, had declined by an average of 1.6 percent per year (Figure 1). Purchasing power was at a lowest level due to inflation as high as 35 percent (World Bank, WDI, 2008).

Since 1993, markets and prices have been deregulated, state owned businesses have been privatized, fiscal and monitory policies have been revised, and trade barriers and subsidies have been gradually removed (Sustainable Development and Poverty Reduction Program – SDPRP (2002)). Following these policy reforms, economic progresses were registered. As shown in Figure 1, real GDP per capita between 1992 and 2006, grew on average by 3.5 percent (World Bank, WDI, 2008). Foreign Direct Investment (FDI) inflow, which was below $500 million before 2005, has increased sharply to $3.5 billion by 2006 (Ethiopian Investment Authority Report, 2009). The share of total trade in the GDP grew from 6 percent in 1990 to 16 percent in 2006 (World Bank, WDI, 2008).

Until recently, coffee was the major primary commodity and made up about one third of the total export value (EIU, 2008). But since 1997, trade policy reforms have encouraged flowers, vegetables and leather products to grow, which has changed the export structure of Ethiopia. Coffee exports are still growing but, as presented in Figure 2, their share in foreign currency earnings has declined by an average annual rate of 5.1 percent while non-coffee exports in the economy have increased by an average rate of 7.1 percent. Specifically, as compared to all non-coffee export commodities, the cut-flower exports share has grown at an annual average rate of 46 percent since 2004. Government officials, horticultural and flower producing associations are even projecting that in the near future, the cut-flowers share of export will exceed that of coffee.

Even if there were some macro economic improvements in recent years, the poverty situation of the country is still dire. Between 2002 and 2007, more than 39 percent of the population lived below a $1.25 poverty line and more than 77 percent lived below an income level of $2.00 per day (United Nations Human Development Report, 2009). Assuming other factors remained constant; the export structural shift is believed to have made little contribution to economic growth and poverty reduction. Such minimal achievement can be attributed to a selective export promotion policy which favored certain sectors but restricted other more important ones.

The coffee industry which still supports the livelihood of more than 12 million households is being replaced by the labor intensive flower and vegetable industries. Foreign investors in horticulture and floriculture have been supported with a number of export promotion policies among which the major ones : (1) no minimum capital requirement if investors are exporting more than75 percent of their outputs; (2) Full exemption from paying import duties of capital goods and construction materials; (3) full exemption of FDI projects which export at least 50 percent of their production; (4) full exemption from income tax for 2-6 years; and (5) opportunity to fully repatriate capital, and remit profit and dividend (Joosten, 2007 and Weissleder, 2009). But the coffee industry, which is mainly operating with unskilled labor, scarce capital and technology, is not getting all of these special policy treatments. Business in this industry is restricted to domestic economic operators and the export policy is limited only to exemption of customs duties and import tariffs.

Had the flower and horticulture industries efficiently reallocated a large amount of the unemployed and under employed labor from the traditional coffee and subsistence agriculture sectors, it would have been a plus to the country's poverty reduction endeavor. But since they are expanding with less intensive land and capital outlay, their allocative efficiency is negligible hence their contribution to poverty reduction is trivial. Furthermore, the supply side constraints of the existing coffee industry might have been improved if it had benefited from external capital flows and technology transfers. Under the present conditions in which many countries in these markets have greater capital and innovative capabilities, the competitiveness of Ethiopia is limited. Unless this commodity becomes competitive in the world market soon, its economic contribution could further deteriorate.

Several studies have assessed the impacts of exports, trade liberalization, and other policies on economic growth and development. To date, however, there has been limited quantitative evidence in favor of or against industry - specific export promotion as currently being implemented in Ethiopia. This study, therefore, assesses the economic significance of an already-implemented export promotion policy on poverty reduction and economic growth of the country. Specific objectives are to:

(1) Measure the change in prevalence of poverty at the household level with increased FDI inflows and subsequent growth of non-coffee agricultural exports as a result of special treatment they receive from the export promotion;

(2) compare the changes in poverty that would have occurred had FDI also increased in the coffee industry as a result of receiving the same export policy treatment as other agricultural exports; and

(3) Analyze the extent of inter-industry and overall growth that could be achieved under the above two scenarios.

II. Literature Review

Many previous studies have assessed the likely impacts of exports, trade liberalization, and other policies on economic growth and poverty reduction. The impact of both industrial and agricultural exports on economic growth, have been evaluated. Referring to the works of Balassa, 1985; Jung & Marshall, 1985; Fosu, 1990; Lusier, 1998; Lee & Cole, 1994; Al-Yousif, 1997; Isam, 1998 and others, Madina-Smith (2001) reported mixed results about the influence of exports on economic growth. While some of these studies support positive causality of exports on economic growth, others find a negative relationship.

There are also empirical studies which have incorporated various measures such as trade openness and convergence among countries with and without trade liberalization (Sachs and Warner, 1995; Edwards, 1995 and Ben-David, 1993). All these studies agree on the positive role of openness to trade on economic growth. But many of them were criticized by other researchers. Rodriguez and Rodik (2000) for instance argue that explanatory variables of openness are also correlated with other sources of poor economic performance (in health, education and other social institutions, migration, war and poor natural endowment, etc.). Hence, estimation in this situation could result in a problem of endogeniety. Moreover, policy variables such as degree of openness, tariffs, terms of trade and export performance used by Edward (1998) to compare closed versus liberalized economies are criticized in Winter et al (2004) as being highly correlated. When all these variables are included in the empirical analysis, it may be difficult to identify their separate effects. Many studies are also criticized for their use of a head count poverty index to measure the direct and spillover effect of exports. As explained by Ravallion (1996), a head count index can not identify inter-household income differences because it aggregates all heterogeneous socio economic characteristics.

To empirically analyze the direct effects of trade liberalization in developing countries, it is crucial to assess whether it encourages more labor intensive output; whether it creates a relative wage gap between demographically varying labor forces and whether the export industry is dominated by primary products or not (Winters et al, 2004).Winter el al (2004) pointed out that such complexity of econometric prediction has forced many researchers to prefer a Computable General Equilibrium (CGE) approach.

Thorbecke (1991) used a CGE model to assess the impacts of conservative and voluntary monetary, fiscal and expenditure reforms on income distribution in Indonesia. This model was built by incorporating previously established Social Accounting Matrix (SAM) of Indonesia. Parameters and coefficients for production and consumption equations were calibrated from this SAM. The income effects in this model were evaluated by looking into the changes in employment and farm household returns from domestic and exportable production. A similar approach to Thorbecke (1991) was used by de Janvry, Sadoulet and Fargeix (1991) and Morrison (1991) to analyze the effect of structural adjustment on equity for Ecuador and Morocco respectively.

CGE modeling is also used in the Global Trade Analysis Project (GTAP). The GTAP model is developed to analyze the impacts of bilateral and multilateral trade reforms (through GATT, WTO, etc.) on multiple-countries' economic growth and welfare (Hertel (ed.) 1997). This model uses Input-Output (IO) tables of 37 trade and intermediate outputs, factor prices, support and protection data collected from 37 countries by United Nation Commodity Trade Statistics Database (UN COMTRADE).

All of the above discussed CGE models have constructed a representative household when they measured changes in income distribution. But within a representative household setting, all rich and poor, rural and urban households are aggregated as one entity. This approach can not provide explicit and sufficient information about the role of policy interventions on reducing the magnitude and dimensions of poverty at disaggregated level. Therefore, to evaluate policy reforms and external shocks at micro level, we need to identify different categories of households living with different income levels.

A micro simulation CGE model (Decaluwe et al., 1999) has overcome the limitation of the standard CGE model by directly incorporating disaggregated household income and expenditure data from a sample survey into a national SAM. In Decaluwe et al. (1991), for example, six intra-group income distribution households were specified and linked to the CGE model. To accommodate flexibility, a Beta type functional form of income distribution was chosen. The model defined the poverty line and converted it into a monetary value using endogenously determined prices. Then it simulated the effects of a fall in export price and import tariff on households' income. Finally, using the average income of household groups and endogenously derived poverty line, the incidences of poverty based on head count, poverty-gap, and severity levels were estimated using the Foster, Greer and Thorbecke (1984) additively decomposable class of poverty measures. Such estimation is finally used to compare the extent of poverty before and after policy interventions. A similar methodology was used in an impact assessment of eliminating all import tariffs on poverty reduction and inter and intra household inequality in Nepal (Cockburn, 2002); in evaluating the impacts of total removal of import tariffs on income distribution, poverty, and sectoral growth in Zimbabwe (Chitiga et al, 2005); and in measuring the likely impacts of trade liberalization on the incidence of poverty and the structure of domestic and export production in Ethiopia (Fekadu, 2007).

From the above review, the CGE model appears to be the most accepted and effective method of assessing the impact of an exogenous shock on economic growth, income distribution and poverty reduction. More specifically, the micro simulated CGE model has become a robust technique for studying the effects of policy changes or trade shocks on poverty reduction at a heterogeneous micro level. But to the best of our knowledge, very little work has been completed to analyze the impacts of FDI inflows and subsequent growth in exports of primary commodities on rural and urban households' welfare and their multiplier effects on other sectors of the economy in

Ethiopia. There are only a few econometric studies which analyzed FDI inflow in industrial and service sectors. In these studies, changes in economic or outputs were analyzed by introducing FDI capital as an exogenous variable along with domestic capital and labor (Ramirez, 2006; Contessi and Weinberger, 2009). Therefore, this study will extend this type of experiment with a micro simulation CGE approach.

The novelty of this study is the way it fills a knowledge gap that exists between export promotion of primary commodities and its role in economic growth and poverty reduction in Ethiopia. This study specifically concentrates on assessing household level economic impacts of policy stimulated FDI capital changes made on export agriculture (with and with out inclusion of coffee industry). It is an *ex-ante* policy evaluation which will provide information to policy makers for reviewing achievements of their interventions. Furthermore, the results of this study could provide new information to the ongoing discussion about the effect of trade on development. Because the role of trade in economic growth is under scrutiny and the impacts of primary exports on poverty reduction are still debated, this study will shade considerable light on these debates.

III. Methodology

The CGE model is designed to explain the impacts of exogenous shocks on outputs, factor payments, income and consumption in an economy. It explains the SAM accounts through behavioral characterization of activities, factors of production, and economic actors. Economic behavior in SAM accounts is explained through a number of simultaneous and non-linear equations that were developed based on the theory of firms, consumers and the macroeconomics of saving, investment, fiscal and current accounts.

The CGE model used in this study is built on a framework developed by Cockburn, Decaluwe and Robichaud (2008) and Decaluwe et al (2009) for an archetype small and open economy.

As a small open economy, each producer (activity) is assumed to operate under a competitive market environment. At the top level of the production process, outputs QX_i are produced by combining complementary factors of production VA_i and intermediate inputs $TINTRM_i$ with Leontief production technology. At the next lower level of production, primary factors of composite labor LLD and capital KKD of agricultural activity (AGR); and composite labor LD and capital KD of non-agricultural activity (NAGR) are combined with constant elasticity of substitution (CES) technology:

$$VA_{agr} = A_{agr}^{kkl}[\alpha_{agr}^{kkl} LLD_{agr}^{-\rho^{agr}} + (1-\alpha_{agr}^{kkl})KKD_{agr}^{-\rho^{kkl}}]^{-1/\rho_{agr}^{kkl}} \quad (1)$$

$$VA_{nagr} = A_{nagr}^{kl}[\alpha_{nagr}^{kl} LD_{nagr}^{-\rho^{kl}} + (1-\alpha_{nagr}^{kl})KKD_{nagr}^{-\rho^{kl}}]^{-1/\rho_{nagr}^{kl}} \quad (2)$$

Where VA_{agr} and VA_{nagr} are value added for AGR and NAGR activities; α_{agr}^{kkl} and α_{nagr}^{kl} are the share parameters for CES between labor and capital in AGR and NAGR activities, A_{agr}^{kkl} and A_{nagr}^{kl} scale parameters, ρ_{agr}^{kkl} and ρ_{nagr}^{kl} are substitution parameters between capital and labor in AGR and NAGR. The superscript kkl stands for substitution between AGR capital and labor and that of kl stands for substitution between NAGR capital and labor. The substitution parameter is derived from the constant elasticity of substitution free parameter $\sigma_i = 1/(1-\rho_i)$ with a given value between 0 and infinity. Due to data limitations, composite agricultural capital (which includes land, draft animals and farm tools) is treated as an aggregate factor, but composite labor of agricultural and non-agricultural sectors are combined with CES technology to utilize optimum unskilled and skilled labors.

Household income is generated from factor payments, transfers from households, government and the rest of the world (ROW). The most important factors payments are return from capital and wages of skilled and unskilled labors. Households spend their income for minimum requirements and other discretionary expenditures. Under such a setting, a household's demand is derived through maximizing the Stone-Geary Utility function $\prod_{TR}(CONSMK(H,TR)-CMIN(H,TR))^{\gamma(H,TR)}$ subject to a budget constraint to arrive at the following Linear Expenditure System (LES) equation:

$$CONSMK(H,TR)=CMIN(H,TR)+\frac{\gamma(H,TR)*(YHD_h-\sum_i CMIN(H,TR)*PC(TR))}{PC(TR)} \quad (3)$$

Where $CONSMK(H,TR)$ is demand for consumption of good TR by each household H; and $CMIN(H,TR)$ minimum good requirements or subsistence expenditure of TR goods committed by household H; $YHD(H)$ household disposal income, $\gamma(H,TR)$ is household H's marginal budget share for consumption of commodity TR above the subsistence level $(YHD_h-\sum_i CMIN(H,TR)*CP(TR))$ also called discretionary income. If a household does not have discretionary income, the second term of equation (3) will be zero such that the household will consume only its minimum requirement.

The government is the other institution which receives income. Government receives income from households' direct taxes, indirect taxes of domestic commodity sales and import tariffs. It also gets income from ROW in the form of financial aid and loan. On the other hand, government allocates expenditures for public consumptions, aggregate imports and household transfers.

At the activity level, domestic demand $DD(TR)$ is total outputs $QX(TR)$ less the exported $EX(TR)$ amount. At the commodity level, in addition to household consumption $CONSMK(H,TR)$, outputs are domestically demanded by government $G(TR)$, intermediate inputs $INTRM(TR,J)$, investments $INV(TR)$ and transaction/ trade margins $MARGIN(TR)$.

Under a competitive market, both activities and institutions are price takers. Markets of goods and factors, therefore, are assumed to respond to changing demand and supply conditions which in turn are affected by government policies and external shocks. Hence in this model, all prices are endogenously determined from the model simulation. On the other hand, due to the small country assumption, world price of imports $PWM(TR)$ and exports $PWE(TR)$ are exogenously determined.

In an open economy, aggregate domestic outputs $QX(TR)$ are traded by activities as domestic $DD(TR)$ and export $EX(TR)$ commodities with an assumption that firms maximize their revenue subject to a constant elasticity of transformation (CET) of goods. This is based on the Armington (1969) assumption that producers imperfectly substitute their output sales between domestic and export markets depending on relative prices they received. This relationship is represented by the following functional form:

$$QX(TR) = B_{TR}^{E}[\beta_{TR}^{E} XE_{TR}^{\kappa_{TR}^{E}} + (1-\beta_{TR}^{E}) XD_{TR}^{\kappa_{TR}^{E}}]^{\frac{1}{\kappa_{TR}^{E}}} \qquad (4)$$

Where B_{TR}^{E} is scale parameter; β_{TR}^{E} is a share parameter and κ_{TR}^{E} is a CET parameter for domestic and exported goods imperfect substitution. The parameter κ_{TR}^{E} is derived from a given elasticity transformation parameter $\rho^{E} = 1/(\kappa_{TR}^{E} - 1)$. On the consumption side, composite commodities $QQ(TR)$ are domestically satisfied through purchases from domestic sales $DD(TR)$ and imported commodities $M(TR)$. This behavior also follows the Armington assumption that domestic consumers minimize their costs subject to imperfect substitutability of domestic and imported goods expressed by the following CES function:

$$QQ(TR) = A_{TR}^{M}[\alpha_{TR}^{M} DD_{TR}^{-\rho_{TR_i}^{M}} + (1-\alpha_{TR}^{M}) M_{TR}^{-\rho_{TR}^{M}}]^{-\frac{1}{\rho_{TR}^{M}}} \tag{5}$$

Where A_{TR}^{M} is a scale parameter; α_{TR}^{M} is a share parameter and ρ_{TR}^{M} is a CES parameter for domestic and imported goods imperfect substitution. Parameter ρ_{TR}^{M} will be derived from a given elasticity transformation parameter $\text{sigma} = 1/(\rho + 1)$ which is a constant value between zero and infinity.

The Rest of the World (ROW) in this model receives income from domestic payments for imports and Foreign Direct Investment (FDI). On the other hand, it spends by making payments to local institutions exports, factors and transfers. Therefore, the difference in aggregate value of ROW income and expenditure in foreign currency unit (FCU) gives us the current account balance (CAB) of the country.

In order to ensure supply and demand equilibrium, macroeconomic closures are specified in the CGE model. Equilibrium conditions and other closures made in this model are presented Table 1.

IV. Data and Procedures

The 2006 Ethiopian SAM, obtained from Ethiopian Development Research Institute (EDRI), was organized into two categories: Agricultural and Non-Agricultural. The former contained activities and commodities of (1) food crops, (2) cash crops, (3) coffee, (4) oil seed, (5) livestock and fish. The cash crops mainly include flowers, vegetables, fruits and stimulant plant called “kat”. The latter consisted of activities and commodities of (6) mining, (7) food and beverages, (8) textiles, papers and woods, (9) leather and leather products, (10) fertilizers, chemicals and equipments, (11) service 1- utility services like electricity, water, constructions, (12) service 2- distributive services like hotels, transport communication, financial services (13) service 3- public services like education and health. Primary factors used by the agricultural activities are (1) skilled labor, (2) unskilled labor, (3) composite capital and those used by non-agricultural activities were (1) skilled labor, (2) unskilled labor and (3) capital. The AGR capital is composite because it aggregates land, draft animal and agricultural tools. Based on the Ethiopian Statistics Authority classification, households were categorized into (1) rural (2) small urban and (3) big urban households. Government, saving and investment, margins of transactions and ROW were other institutions in the SAM. The detail of outputs, value added used, export and import shares and intensities in the base year period are presented in Table 2.

The second dataset was the 2004/05 household income and expenditure sample survey (HIES) information obtained from the Ethiopian Central Statistics Authority (CSA). Out of 21,600 samples in the survey, 17,761 observations found consistent with the 2006 SAM were finally selected. Demographic description of household groups' income and distributions by sources; shares of primary factors in total value added of activities are presented in Tables 3,4,6,7. According to these tables, the major sources of income for rural households were composite agricultural capital and labor, where as for urban households labor and non agricultural capital were the major income sources. The mean income of rural and urban households ranged from 1600.00 to 2399.00 Ethiopian Birr. On average, 34-39 percent of people in rural and urban area were living below the poverty line. The incidence of poverty, however, was more pronounced in rural and small urban areas than big urban.

The third major type of data were behavioral parameters and constants used in the simulation. These are shares of value-added and I-O coefficients used in the Leontief production function; share parameters, scale parameters and substitution parameters used in CES equations of outputs production and market. These parameters were derived in the model calibration process. The model calibration was initialized by introducing CES free parameters for substitution between capital and labor factors and between that of domestic and traded commodities. Due to the limitation of time series input, output, and price data, free parameters were borrowed from econometric estimations in GTAP (2006) and Lofgren (2001) for countries with related economic characteristics to Ethiopia. Tax rates were also estimated during the calibration process.

Elasticity of income parameters for each commodity was obtained from Regmi et al (2001) and Ethiopian Economics Association (2008). The rate of growth of FDI inflow in Ethiopia was estimated based on the data and additional information obtained in Weissleder (2009). The Frisch parameter for sub Saharan Africa used in calibrating minimum consumption requirement was obtained from econometrical estimation in Dervis, De Melo and Robinson (1982) and Hetel (1997).

Before the model simulation, the micro data of 17,761 observations was directly incorporated into the national SAM by replacing the representative household income and expenditure data. During the integration process, discrepancies in income and expenditure balance of the SAM accounts surfaced. These discrepancies were corrected through undertaking a re-balancing procedure. This procedure was carried out using an entropy balancing method developed with GAMS program in Lofgren, Harris, Robinson (2002).

Once the CGE model was defined and the household data was integrated into the Ethiopian SAM, parameters were derived through calibration. This calibration process was also used to check the validity of the CGE model. Model validity was ascertained through testing its capacity to replicate the base year data.

Following Decaluwe et al (1999) and Boccanfuso et al (2003), this model postulated Beta type income distribution functions for each household group. The poverty line (Z) defined in Ravllion (1994) as a basket of basic commodities was a benchmark value introduced as a vertical line in the Beta type of income distribution functions. Based on the Poverty Profile of Ethiopia MOFED (2002) and PASDEP (2005/06-2009/10) document, Z value is USD 141.00/year in 1995/96 prices (equivalent to 1226 .00 Ethiopian Birr).

The model hypothesized minimum attainment of economic growth and poverty reduction under the prevailing selective export promotion policy. This hypothesis was tested by undertaking two simulations: (1) A 15 percent increase in FDI endowed capital of exportable agriculture excluding coffee; (2) A 15 percent increase in FDI endowed capital of all exportable agricultural including coffee.

Income distributions before and after the model simulations were used to demonstrate the gainers and losers of FDI endowed agricultural capital changes. The statistical significance of changes in income distributions during two simulations were also checked by undertaking Analysis of Variance (ANOVA) tests. Finally, using the income distribution functions and defined poverty line, the incidences of poverty at head count, poverty-gap and severity levels were evaluated by using the Foster, Greer and Thorbecke (1984) additively decomposable class of poverty measures. These estimations were carried out using the Distributive Analysis Software developed by Jean-Yves Duclos, Abdelkerem Araar and Carl Fortin (2004).

V. Study Results

Results are presented in the following order. First the impacts of FDI endowed agricultural capital changes on the volume and prices of outputs and inputs, income distribution and poverty incidences in two simulations are reported. Then, over all economic change and inter industry growth achieved under the two scenarios are reported.

a) Impacts on Outputs, Prices, International Trade

In *simulation 1*, with more capital outlay in agriculture, increased outputs of food and cash crops (14 percent) and livestock (23 percent) were observed. Excess supply of agricultural outputs caused domestic prices to fall by one to three percent. Lower domestic prices in turn enhanced domestic market sales by 14-33 percent. Excess domestic supply also boosted exports of food crops, cash crops, and oil seeds by 12 and

20 percent. Due to more competitive domestic prices, imports of food and cash crops declined by 67 and 40 respectively.

Increased agricultural outputs also provided cheaper intermediate inputs to food/ beverage and leather product industries hence they respectively achieved 16 and 18 percent output increases. Besides, with expanded production, utilization of service1 utilities rose by 20 percent. Service2 activity also grew by 3.4 percent due to a higher demand for transportation of agricultural produce from the farm gate to domestic and international markets. But due to the lower price competitiveness of the non agricultural sector, most of the domestic demands for textiles, fertilizers/ chemicals, machineries, transportation and communication facilities were satisfied from imports.

In *simulation 2*, agricultural expansion included the coffee industry. Since coffee has a higher export share and intensity, its expansion was transmitted into a larger output increase (50 percent), domestic sales (50 percent) and exports (49 percent) than the base period and *simulation 1*. Increased income from being employed in the expanded coffee sector boosted food consumption. As a result, outputs of agricultural activities increased by three to eight percent more than in *simulation 1*. Moreover, food/ beverage and leather product industries obtained cheaper intermediate products to intensify their outputs above 20 percent. Increase in agricultural production also stimulated the service 2 activity to transport 9 percent more outputs than in the first experiment.

With growth in consumption, higher domestic markets of agricultural outputs were observed. Besides, domestic markets for food and beverages, leather products, and chemical fertilizers improved by 7 to 20 percent. With international competitive prices, imports for some of these products grew compared to the first simulation.

In general FDI capital that included the coffee industry was observed to raise the volume of many of the agricultural and some of the non agricultural outputs and their respective domestic and international markets compared to the first simulation. Details can be found in Table 8.

b) Impacts on Primary Factors and Inputs Prices

With growth of export agriculture, the wage rate paid increased by 18 percent compared to the base year rate. Growth in the wage rate raised the value of labor used in the agricultural sector by 16-31 percent. This increase was made possible by reallocating more labor from coffee and other non agricultural activities. Furthermore, with access to more labor, the rate of return of agricultural capital grew up by 7 to 20 percent while the rate was reduced for non agricultural and coffee activities by 2 to 11 percent. The wage rate in non agricultural activities has declined by 5 percent since the overall sector suffers from under investment of new capital.

Larger capital intensification, in *simulation 2*, attracted more labor. Coffee expansion included establishment of more coffee processing and marketing facilities which attracted more volume of labor at a higher wage rate (19.5 percent) than base period and the first experiment. Consequently more under and unemployed labor from subsistence agriculture and small urban areas were reallocated to this industry. The rate of return on agricultural capital, due to utilization of more labor, grew up by 12-21 percent compared to the base year, which is even higher than scenario 1 (Table 9).

Increased intermediate inputs from agriculture also encouraged the food and beverage, leather and service2 activities in the non agricultural sectors to utilize more labor (6-15 percent) at a higher wage rate (12 percent) than in the base period. Capital return rates in this sector also grew by 9-33 percent.

c) Impacts on Household Income

As discussed in the preceding section, following selective agricultural expansion, only agricultural wage and capital rate of return were increased. Accordingly, in *simulation 1*, average rural household income increased by 14 percent, where as only marginal increase of 1.5 and 0.4 percent were registered for small and big urban households.

Based on the base year data, agricultural capital (KKD), non agricultural capital (KD) and wage (WAGE) respectively constituted 76, 12 and 4 percent of rural household income. For small urban households, on the other hand, the largest income sources came from non agricultural capital (50 percent) and wages (34 percent).

A higher average income growth for rural households, therefore, was attributed to increased income shares of their major sources, KKD and WAGE. About 18 and 24 percent increases in income originated from KKD and WAGE raised their shares in total income by about 1.5 and 42 percent respectively. But for small and big urban households, the share of income from their major sources, WAGE and KD, dropped by 9 and 10 percent. As a result, increase in income from KKD by 15 and 17 percent for both households did not transfer into a significant change of their average income.

In *simulation 2*, the average income of rural households increased by 18 percent; and that of small and big urban households by 14 and 8 percent respectively. In this experiment, the income effect of WAGE moved beyond rural households. Enhanced income especially to the urban households was attributed to efficient labor resource reallocation made in the coffee industry and its interaction with other industries. Since more urban households were able to be employed in the coffee industry, the share of the major income source, WAGE, was increased by a range of 11 to 16 percent (Table 10).

d) Impacts on Income Distribution

The Beta distribution graph shown in Figure 3 represents the income distribution of rural households. In this graph, the blue curve represents the situation in the base year, where as the red and the green curves represent situations in *simulations 1* and *2*. As a result of higher mean income increases for the rural groups both in *simulations 1* and *2*, the red and green curves were visibly shifted to the right of the blue line of the distribution. These shifts imply significant income changes for rural households in both experiments. But in Figures 4 and 5, which represent small and big urban households, different situations were observed. In both graphs, the red lines of the curves explaining *simulation 1* were superimposed on the blue lines of the base year curve implying that no visible intra-group distributional shift were observed with a change in mean income. However, in *simulation 2*, the green lines of the curve were visibly moved to the right of the blue line implying a significant income increase in the second experiment.

The statistical significance of the above observations was checked by undertaking ANOVA testing. The ANOVA test for mean income variation with-in all household groups was found to be significant (p<0.001 at $\alpha = 0.005$confidence interval). Further ANOVA testing was also made to check for the presence of between groups' mean income variations following the two experiments. Based on this test, rural households were found to have statistically significant mean income differences in both experiments.

Where as, small and big urban households were found to get statistically significantly mean income differences only in the second experiment.

e) Impacts on Incidence of Poverty

As Table 11 shows, in the base year, the incidence of poverty using the *head count ratio* was 38.5 percent for rural households, 38.6 percent for small urban and 34.4 percent for big urban households. After *simulation 1*, the head count poverty index of rural households showed a 10 percent decline. This implies that 10 percent of the rural populations slipped out of poverty due to changes in agricultural capital. Despite being low in magnitude, 1.7 and 0.5 percent households from small and big urban population were escaped poverty. In *simulation 2*, besides the rural area, the poverty index in the urban area was also declined because about 9 and 5 percent of small urban and big urban population were drawn out poverty.

The extent of poverty compared to the poverty line is also measured with a *poverty gap index*. *Simulation 1* results indicated that on average 3.4 percent of the rural households' income gap from the poverty line was reduced, but only 0.6 and 0.2 percent of the gap for small and urban households. This implies that more poor households in rural group were raised closer to the poverty line than the other two groups. But this situation changed in *simulation 2*. Beside rural households, 3 and 2 percent of small and big urban households' poverty gap were contracted.

The extent of poverty among poor households was further evaluated by using *poverty severity index.* According to the first experiment, vulnerability for 1.4 percent rural households to sever poverty risk was reduced, but comparable reduction were only by 0.2 and 0.1 percent for small and big urban households. But in *simulation 2*, the vulnerability of about 2 percent of all rural and urban households to sever poverty risk was eliminated.

In general, the results suggest that the rural households were the sole gainers of selective export policy interventions where as all household groups were beneficiaries of equal policy treatment measures. The first experiment, in general, indicates a reduction in pareto efficiency with rural households made better off while the situations for urban households were made worse off. The second experiment, on the other hand, finds that both rural and urban people gain from policy intervention.

f) Inter-Industry Growth

FDI capital inflows for export agriculture caused changes to certain macro economic indicators. Compared to the base year, for example, the Gross Domestic Product (GDP) at market prices grew by 8 and 11 percent for first and second experiments respectively. Intensities of exports to the GDP have rose by 3 and 5 percent and that of imports by 0.3 and 2 percent compared to the base period.

The reasonableness of the growth trend based on aggregate information is indicated if it can be rationalized with trends at the disaggregated level. Trends at the disaggregated level were rationalized by reviewing input-output linkages between industries.

Industrial Linkages

Since value added and intermediate inputs are complementary in the production process, they were combined in fixed proportions. Therefore, with increased agricultural capital in *simulation 1*, the proportions of intermediate inputs used by agricultural and non agricultural activities were augmented.

In these input-output exchanges, two-way industrial linkages were established. With provision of more intermediate inputs from agricultural activities to non-agricultural sectors, forward linkages were created. Due to such linkages, food/ beverages and service 2 activities obtained cheaper intermediate inputs for their production processes. The lower cost of production consequently assisted these industries to attain 12-20 percent output growth than the base period. Output growth, particularly in service2, in turn created backward linkages with the agricultural activities. With backward linkages, the agricultural activities obtained more access to trade, transport and communication services which contributed to 14-23 percent output growth compared to the base period (Table 12).

The extent of forward and backward linkages in *simulation 2* was more pronounced than in the first experiment. The exchange of intermediate inputs between food crops and food/ beverages for example was 5 percent more than in *simulation 1*; and between livestock and leather industries it was 1-4 percent more. Moreover, fertilizer/ chemicals used in agricultural production grew by more than 4 percent and service 2 by more than 20 percent compared with *simulation 1*. In the final analysis, improved linkages among industries in *simulation 2* paved the way for a higher output level of all agricultural and some non agricultural sectors (such as food/ beverage, leather, service1 and service2).

VI. Conclusions and Recommendations

In this paper, we offer a micro-simulated general equilibrium approach to analyze the economic significance of an export promotion policy on economic growth and poverty reduction of Ethiopia. Our simulations indicate less economic growth, inter-industry linkages and poverty reduction under the selective export promotion policy. We show equal policy treatment of the coffee industry will encourage more efficient resource allocation and achieve more output, exports and income and a lower incidence of poverty.

In selective export promotion, only rural households were able to gain higher income and reduced poverty. But these achievements were transmitted to rural and urban household members when export promotion was assumed to be implemented across the board for all agricultural activities.

The structure of exports was similar to the base year situation in the first experiment. Under the selective policy scenario, the coffee industry did not benefit from the external capital flow and hence its export share declined by 3 percent while the non-coffee export share rose by 3 percent. But in the alternative policy scenario, the export share of coffee was augmented by 3 percent where as the non-coffee export share declined by 2 percent. It was in the later alternative that many rural and urban households were drawn out of absolute poverty. Coffee still represented the largest export share and supports millions of people, and its growth was proven to benefit the country the most.

Due to data and methodological constraints, FDI in this study was directly incorporated into the domestic capital as an endowment. This approach could not consider other most important features of FDI. First, as a foreign owned firm, FDI has distinct production and demand characteristics, which should have been programmed as a separate activity in the CGE model. By excluding these characteristics, the study could not explicitly show the amount of outputs, income and consumption that should have been accounted for the rest of the world. Second, FDI’s technological spillover effects could not be captured in this study. Hence, it was not possible to show the magnitude of new technical and managerial skills transferred into the host country. Future researches should consider developing this research through incorporating the above mentioned important FDI features.

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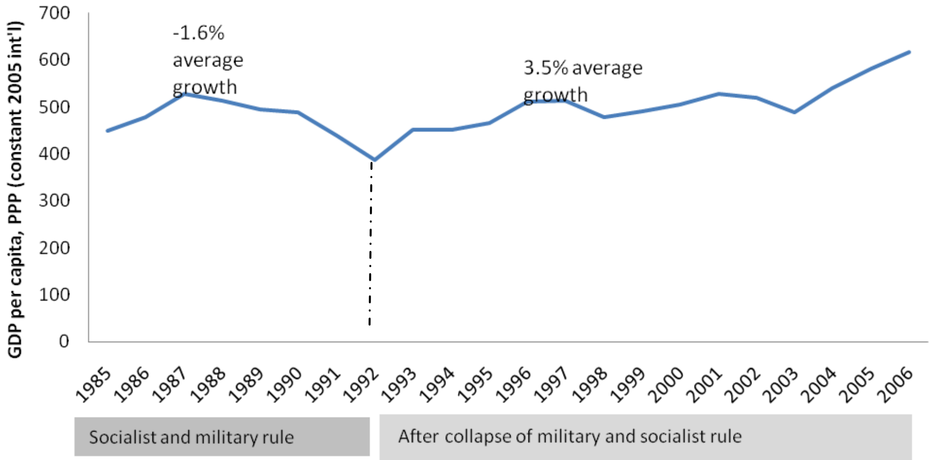
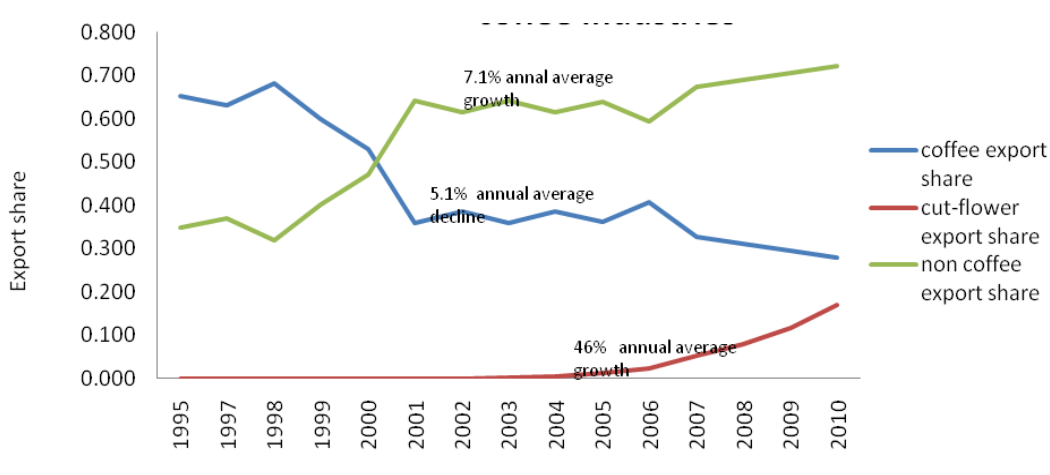
Tables and Figures

Figure 1: Trend in Per Capita Income



Source: Personal drawing using World Bank, World Development Indicators WDI, 2008, Ethiopia data.

Figure 2: Trend in Export Share of Coffee and Non-Coffee Industries



Source: Personal drawing using COMTRAD (2008) statistical data and publication

Table 1: Summary of Model Equilibrium Conditions and Other Closures

Composite goods supply balanced with the sum of domestic consumption, investments and margins.
Aggregate labor supply balanced with the sum of flexible labor demand in each sector.
Total investment equals aggregate of household and government savings and CAB.
Government consumption and transfer payments to households are exogenous.
CAB, FDI and exchange rate e are exogenous to the model.
In the base period, transfer from the ROW in the form of FDI is assumed to be zero.
Export (Pwe) and import (Pwe) prices are exogenous to the model.
Capital factors are fixed and exogenous.
Full labor employment except unskilled labors in coffee and food crop industries.
Wage rates are fixed across AGR and NAGR activities hence labor reallocation is possible.
Rates of return to capital are specific to activities hence reallocation is not possible.
Aggregate labor supply and investment are fixed.

Table 2: Value Added, Domestic and International Outputs Shares in the SAM data

Activity	Total output	Value Added	Total Intermediates	Export share	Domestic sale	Import share	Export intensity	Import penetration
foodcrp	10.17	13.28	0.15	0.51	11.85	0.02	0.01	0
cashcrp	13.73	17.5	1.61	25.74	11.64	0.02	0.28	0
coff	10.31	12.47	3.36	37.33	5.6	0	0.54	0
oils	2.95	3.48	1.22	11.83	1.4	0	0.6	0
livfshfor	18.74	24.23	1.06	20.04	18.51	0	0.16	0
mining	0.18	0.24	0	0.01	0.21	0.08	0	0.08
foodbev	6.45	1.68	21.79	0.52	7.48	10.9	0.01	0.25
txwdpp	2.07	1	5.49	0.02	2.42	33.44	0	0.76
leath	2.96	0.21	11.81	0.03	3.47	2.52	0	0.14
fertchemcheq	1.26	1.02	2	0.44	1.4	42.1	0.05	0.88
serv1	12.58	6.04	33.61	0.01	14.77	0.04	0	0
serv2	12.22	10.99	16.18	3.44	13.75	10.66	0.04	0.15
serv3	6.4	7.85	1.71	0.09	7.5	0.23	0	0.01

Table 3: Income and Demographic Characteristics of Households

Household group	sample	Mean(Birr)	Min	Max	% below poverty
Rural	8733	1606.47	36.31	18839.5	38.5
Small Urban	3584	2016.01	97.19	67851.3	38.6
Big Urban	5444	2399.12	118.65	81095.4	34.3

Table 4: Factorial Source of Household Income

Household Group	KKD	KD	TRG	TRROW	TRH	Wage
Rural HH	0.76	0.12	0.00	0.06	0.01	0.04
Small Urban	0.09	0.50	0.01	0.05	0.01	0.34
Big urban	0.02	0.29	0.01	0.10	0.01	0.57
All	0.63	0.18	0.01	0.07	0.01	0.11

Variable (KKD) is agricultural capital; (KD) is non - agricultural capital; (TRG) is government transfers to households; (TRROW) is transfer from the rest of the world to households and (TRH) is transfers between households.

Table 5: Household wage income by skill differences

	LLNQ	LLQ	LNQ	LQ
Rural	0.57	0.00	0.14	0.29
Small urban	0.03	0.01	0.31	0.64
Big urban	0.00	0.00	0.36	0.63

Variable (LLNQ) is non - qualified agricultural labor; (LLQ) is qualified agricultural labor; (LNQ) is non qualified non -agricultural labor and (LQ) is qualified non agricultural labor.

Table 6: Share of Primary Factors in Agricultural value added

	foodcrp	cashcrp	coff	oils	livfshfor
LLNQ	0.25	0.26	0.08	0.08	0.33
LLQ	0.22	0.23	0.14	0.14	0.27
KKD	0.19	0.25	0.18	0.05	0.34

Variable (foodcrp) is food crop; (cashcrp) is cash crop; (coff) is coffee, (oils) is oilseed and (livfshfor) is livestock, fish and forest.

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Table 7: Share of Primary Factors in Non agricultural Value Added

	mining	foodbev	txwdpp	leath	fertchemceq	serv1	serv2	serv3
LNQO	0.02	0.08	0.03	0.00	0.04	0.45	0.03	0.36
LQO	0.01	0.07	0.09	0.01	0.05	0.13	0.25	0.40
KDO	0.01	0.05	0.02	0.01	0.03	0.19	0.48	0.21

Variable (foodbev) is food and beverage; (txtwdpp) is textile, wood and wood; (leath) is leather and leather products; (fertchemceq) is fertilizer, chemical, petroleum, machine and equipments; (serv1) is service 1; (serv2) is service 2 and (serv3) is service 3.

Table 8: Changes on Output, Domestic and Foreign Trade and Prices in Simulation 1 and 2

	Simulation 1							Simulation 2						
Activity	Total output	Producer price	Domestic sale	Domestic price	Export volume	Import price	Import volume	Total output	Producer price	Domes tic sale	Domestic price	Export volume	Import price	Import volume
foodcrp	0.145	-0.013	0.146	-0.013	0.126	0.000	-0.667	0.239	-0.014	0.240	-0.014	0.135	0.000	-0.833
cashcrp	0.145	-0.012	0.199	-0.012	0.200	0.000	-0.400	0.247	-0.012	0.336	-0.012	0.229	0.000	-0.600
coff	0.081	0.000	-0.008	0.000	0.157	0.000	0.000	0.497	-0.001	0.500	-0.001	0.494	0.000	0.000
oils	0.141	-0.002	0.333	-0.002	0.116	0.000	0.000	0.175	-0.001	0.418	-0.001	0.151	0.000	0.000
livfshfor	0.237	-0.025	0.172	-0.025	0.577	0.000	0.000	0.254	-0.024	0.180	-0.024	0.648	0.000	0.000
mining	0.019	0.016	-0.019	0.026	0.000	0.000	-0.958	-0.026	0.023	-0.026	0.027	0.000	0.000	-0.958
foodbev	0.156	0.099	0.154	0.083	0.333	-0.001	0.534	0.211	0.033	0.209	0.011	0.386	-0.013	0.552
txwdpp	0.055	0.096	-0.054	0.097	-0.300	-0.023	0.026	-0.086	0.097	-0.086	0.097	-0.367	-0.026	0.056
leath	0.177	0.115	0.177	0.110	0.500	-0.002	-0.101	0.201	0.054	0.176	0.051	0.567	-0.011	-0.259
fertchemch	0.071	0.007	0.001	0.003	0.031	-0.004	0.055	0.156	0.003	0.002	-0.001	0.010	-0.008	0.168
serv1	0.200	0.128	0.200	0.031	0.200	0.000	-0.891	0.202	0.130	0.202	0.032	0.200	0.000	-0.891
serv2	0.034	-0.011	0.016	-0.011	0.050	0.000	0.059	0.130	-0.011	-0.018	-0.011	0.031	0.000	0.289
serv3	0.166	-0.114	0.167	-0.115	0.001	0.000	-0.563	-0.181	-0.125	-0.183	-0.126	0.001	0.000	-0.563

Table 9: Change in Volume and Remuneration of Primary Factors in Simulation 1 and 2

	Simulation 1						Simulation 1					
	Labor demand		Factor price				Labor demand		Factor price			
	LLD	LD	ra	r	wa	w	LLD	LD	ra	r	wa	w
foodcrp	0.164		0.195		0.18		0.764		0.214		0.195	
cashcrp	0.312		0.198		0.18		0.876		0.121		0.195	
coff	-0.221		-0.005		0.18		0.327		0.074		0.195	
oils	0		0.075		0.18		0.186		0.168		0.195	
livfshfor	0.024		0.135		0.18		0.879		0.154		0.195	
mining		-0.157		-0.027		-0.05		-0.343		-0.035		0.12
foodbev		-0.004		-0.089		-0.05		0.147		0.336		0.12
txwdpp		-0.021		-0.047		-0.05		-0.036		-0.051		0.12
leath		-0.011		0.091		-0.05		0.058		0.096		0.12
fertchemcheq		-0.14		0.01		-0.05		0.012		0.136		0.12
serv1		-0.003		-0.115		-0.05		-0.002		0.364		0.12
serv2		-0.069		0.097		-0.05		-0.039		0.1		0.12
serv3		-0.156		-0.002		-0.05		-0.06		-0.033		0.12

(LLD) is composite agricultural labor; (LD) is composite non agricultural labor demand; (ra) is rate of return of non - agricultural capital; (r) is rate of return of non - agricultural capital; (wa) is wage rate of agricultural labor and (w) is wage rate of non - agricultural labor.

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Table 10: Changes in Factorial Source of Income in Simulation 1 and 2

Change in share of factors to total income				Change in factors income		
Simulation 1						
Household group	KKD	KD	Wage	KKD	KD	Wage
Rural	0.015	-0.132	0.422	0.175	-0.05	0.238
Small Urban	0.147	-0.019	-0.004	0.096	-0.11	-0.089
Big Urban	0.175	0.008	-0.009	0.075	-0.139	-0.095
Simulation 2						
Rural	0.015	-0.178	0.628	0.189	-0.063	0.255
Small Urban	0.099	-0.11	0.159	0.115	-0.125	0.156
Big Urban	0.046	-0.15	0.105	0.084	-0.156	0.079

Figure 3: Change in Rural Household Income Distribution in Simulation 1 and 2

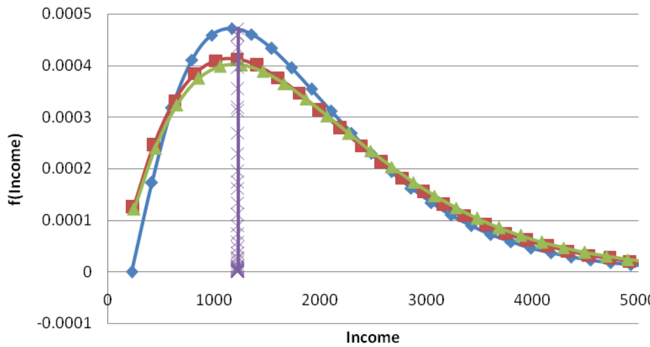

Figure 4: Change in Small Urban Household Income Distribution in Simulation 1 and 2

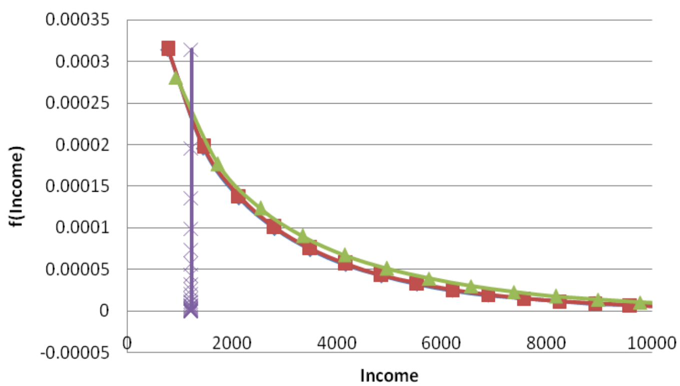

Figure 5: Change in Big Urban Household Income Distribution in Simulation 1 and 2

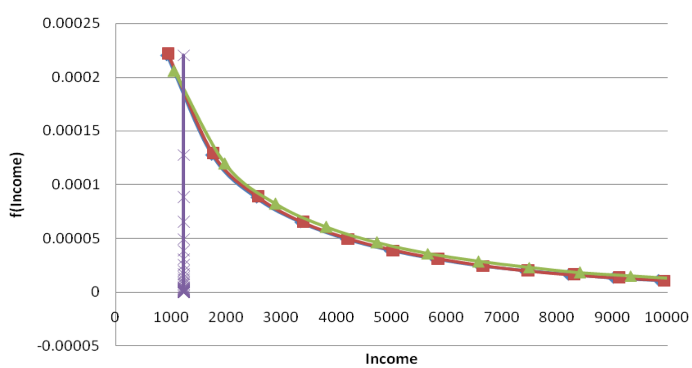

Table 11: Change in Incidence of Poverty in Simulation 1 and 2

	Simulation1			Changes		
Household group	α=0	α=1	α=2	α=0	α=1	α=2
Rural	0.284	0.074	0.03	-0.101	-0.034	-0.014
Small Urban	0.369	0.122	0.057	-0.017	-0.006	-0.002
Big Urban	0.339	0.097	0.041	-0.005	-0.002	-0.001
	Sim2			Changes		
	α=0	α=1	α=2	α=0	α=1	α=2
Rural Households	0.266	0.069	0.028	-0.119	-0.039	-0.016
Small Urban Households	0.301	0.095	0.043	-0.085	-0.033	-0.016
Big Urban Households	0.292	0.079	0.033	-0.052	-0.02	-0.009

Poverty was measured using a poverty aversion measure α which varies from 0, 1 and 2.

Table 12: Growth in Output and Intermediate Inputs in Simulation 1 and 2

Activity	Output Sim 1	Output Sim 2	*TINTRM sim1	TINTRM sim2
foodcrp	0.145	0.239	0.132	0.302
cashcrp	0.145	0.247	0.145	0.158
coff	0.081	0.497	-0.003	0.148
oils	0.141	0.175	0.142	0.163
livfshfor	0.237	0.254	0.144	0.182
mining	-0.019	-0.026	-0.020	-0.026
foodbev	0.156	0.211	0.152	0.207
txwdpp	-0.055	-0.086	-0.041	-0.040
leath	0.177	0.201	0.177	0.186
fertchemcheq	0.071	0.156	0.005	0.049
serv1	0.200	0.202	0.200	0.203
serv2	0.034	0.127	0.052	0.249
serv3	-0.166	-0.181	-0.168	-0.183

*TINTRM stands for total intermediate inputs used