The role of Micro and Small Scale Enterprises in Ethiopian Economy; Government Intervention and Alternative Strategies: CGE Analysis

Final Report

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1. Abstract

Given the fact that Micro and Small scale enterprises (MSEs) are put to be high on the agenda of the Ethiopian government’s mid-term growth and transformation plan (GTP), this study aims at investigating the major contributions and the potential of the sector to the Ethiopian economy. We assess the role of MSEs to reduce unemployment and poverty using CGE modeling approach. Three simulation scenarios were designed based on the current MSE development plan but different on the strategy of implementation. The strategy that the government is currently following to implement the MSE development plan is found to be doing best on expanding the overall production but failed to answer the very critical questions of poverty and unemployment reduction. Whereas, the other alternative strategies are found to give best solutions on the major issues; especially on reducing poverty and unemployment and also increasing investment. Female unemployment also reduces the most in these alternative scenarios. This shows that the MSE sector has the potential to come up with the envisaged developmental goals in Ethiopia.
2. Introduction

In developing countries, the development of MSEs is taken as a key strategy for job creation, poverty alleviation and more generally support economic development. According to some studies, for example, the contribution of MSEs along with medium enterprises account for about 30% of employment and 17% of GDP in developing countries (Beck & Demirguc-kunt, 2005). In developed countries, the share of the enterprises is even larger accounting, on average about 50% to GDP and 60% to employment. Thus, naturally, as economies grow, the share and contribution of these enterprises in the economies of developing countries will improve. In these economies, the expansion of these enterprises is doubly important as they are closely associated to the relatively poor and especially so with disadvantaged groups of women and youth (Robu M., 2013).

The role of MSEs to employment creation and overall economic growth is strongly emphasized in the literature (See for example Daniels, 1999; Beck et al 2005). For instance, MSEs enhance competition and entrepreneurship and hence have external benefits on economy-wide efficiency, innovation, and aggregate productivity growth. Since they require relatively less financial and human capital, and are more labor intensive, they especially appeal more to the poor and the vulnerable. Hence the expansion of these enterprises could serve as a powerful tool to reduce poverty and spur economic growth without worsening income inequality.

The growth of MSEs also serves as a link between financial development and poverty reduction. There is a high correlation between the degree of poverty, unemployment, economic wellbeing/standard of living of the citizens of countries and the degree of vibrancy of the respective country’s MSEs.

Micro and small enterprises are playing significant role in the Ethiopian economy also. According to the 2002 nationwide survey of the Central Statistics Authority (CSA), in Ethiopia there were 974,676 cottage/handicraft manufacturing establishments engaging more than 1.3 million people. The Small Scale
Manufacturing Survey (CSA 2003) also shows that there were 31,863 small-scale manufacturing industries (of which, 62.8 per cent were in urban areas) engaging 97,782 persons (91.3 per cent male, and 8.7 per cent female). Value added share and labor-capital composition of the MSE sector is hardly available in the literature. Thus, we managed to come up with this important information using the three manufacturing sector surveys of the CSA\(^1\) and the SAM documentation of EDRI. We found that MSEs contribute 31.8% of the total non-agricultural value addition in Ethiopia. Since these enterprises are more of labor intensive, then their labor share in the entire economy is larger than their capital share. They contribute 18.5% of the labor and 13.3% of the total capital in the country excluding the agriculture sector.

Even if this sector is creating job opportunities for women, there is still gender bias in the major cities of the country. Based on MUDC 2012 survey report men take the upper share of being employed in the MSE sector nationwide. 56% of the job created by MSEs is filled by men and 60% of the owners and/or managers of these enterprises are men. CSA (2015) indicates that urban unemployment rate of women is 23.8% while that of male is 10.4%. This shows us that female unemployment is a big problem and the MSE sector has significant gap to be filled. However, it is still the biggest absorber of the female labor force which we have to think of when the question of how to reduce female unemployment, come to the table.

The government of Ethiopia has placed considerable importance to the role of these enterprises in the economy’s commendable performance as well as the potential of the sub-sector to transform the economy. The 2010/11-2014/15 Mid-term plan of the Ethiopian government which is called the Growth and Transformation Plan (GTP, 2011/12), for instance, envisages that, during this period, MSEs create employment opportunities for about three million people and thereby enhance income and domestic saving, so as to reduce unemployment and poverty; particularly to benefit women from the sector (MoFED, 2014).

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\(^1\) These are; 1. Small scale manufacturing industries, 2. Handicraft and cottage manufacturing industries survey, and 3. Large and medium scale manufacturing and electricity industries survey.
3. Significance and Objectives

This research work is significant both due to its relevance and the novelty of the technique applied. This study is very timely, because the government of Ethiopia is giving a lot of emphasis to and expecting a lot from the MSE sector which is not yet developed. This study also recommends policy options which can help to improve growth and efficiency of the sector so that it can live up to the envisioned goal.

The technical contribution comes from special features of and modifications in the SAM and the CGE model. This gives us the luxury to come up with robust results which gives very original and unique analysis that meets the intended objectives of this research work.

In Ethiopia, there are few studies that rigorously examined the role of MSEs on employment, economic growth and poverty. Moreover, we couldn’t find any economy wide assessment of the role of MSEs in Ethiopia; may be it is not yet done. We therefore, attempt to critically examine the role of MSEs in the Ethiopian economy employing appropriate data and technique.

The major objective of this study is to assess the role of MSEs in the Ethiopian economy amid of government’s intervention to the sector.

Specifically, this study addresses the following research question:

A. What is the role of MSEs - on reducing unemployment and poverty in Ethiopia?

The study tries to assess the impact of public investments through MSE sector development plan on unemployment and poverty. This development plan is being implemented through giving training and better access to working capital that can improve MSEs’ productivity and competitiveness.

B. Is there any alternative strategy to implement the MSE development plan which can bring better effect on poverty and unemployment reduction goals?
4. Methodology

In order to address the aforementioned objectives, we use CGE model. CGE model is found to better fit the research question given the availability of data. Therefore, CGE modeling approach is mainly used to investigate the role of MSEs’ development on reducing unemployment and poverty in Ethiopia, specifically for disadvantaged sections of the society: mainly women. It tries to look into the overall effects of the public spending which is intended to finance the MSEs’ development plan.

4.1. CGE Model

A static PEP version CGE model is employed in the CGE part of this study. In the model a multi stage production function is used. Producers are assumed to maximize profits subject to production technologies, taking prices (to output and intermediate inputs) and factor wages as given. Producers in the model make decisions in order to maximize profits subject to constant returns to scale, with the choice between factors being governed by a constant elasticity of substitution (CES) function. This specification allows producers to respond to changes in relative factor returns by smoothly substituting between available factors so as to derive a final value-added composite. Profit maximization implies that the factors receive income where marginal revenue equals marginal cost based on endogenous relative prices (Thurlow, J., 2008).

Our model uses labor and capital as factors of production. For our purpose, we disaggregate labor by gender and skill level. The production in each activity starts with a gender function where we used CES specification to combine gender disaggregated labor of the same skill level in each activity. This makes the model substitute male and female labor if and only if they are of the same skill level. Then skilled and unskilled labor types are made to combine less substitutably. This technically means, the manager first decides labor at what skill level to hire and then decides whether male or female in that particular skill level. But not vis versa. Then
the composite labor force and (the only) capital combine at the top level of the value addition. All these stages in the nested value addition function use CES specification. Finally, at the top level, the sectoral output of each productive activity $j$ combines value added and total intermediate consumption in fixed shares (with Leontief specification). The use of fixed-shares reflects the belief that the required combination of intermediates per unit of output, and the ratio of intermediates to value added, is determined by technology rather than by the decision-making of producers (Thurlow, J., 2008).

As it is clearly seen in the chart below, the different types of labor are first aggregated into the two skill levels before the final aggregation in the labor value addition. This is the first value addition or contribution of this research work into the original model.

![Chart 4.1: Nested structure of production](chart)

Equation 1 and 2 below illustrates how men and women employed in the same activity combine to form a composite labor force both skilled and unskilled at the beginning of the production line. We opt for CES specification at this stage, to enable
the composition of male and female labor at each skill level to vary as needed. In order to maximize its profit each activity uses a set of factors (including male and female labor) up to the point where the marginal revenue product of each factor is equal to its wage or rent. In unskilled labor market, assuming the work is more of physical rather than technical, male and female workers are made to be less substitutable. However, in the skilled labor market, since it is more of technical and mental work we assume that female workers have better chance to get job than in unskilled labor market. Thus male – female substitutability is greater in skilled labor market than unskilled.

\[
LDC\_U\_j = B\_LDU\_j \times [\sum_{l2} \beta\_LDU_{l2,j} \times LD_{l2,j}^{\rho\_LDU\_j}] - \rho\_LDU\_j \]

\[
LDC\_S\_j = B\_LDS\_j \times [\sum_{l1} \beta\_LDS_{l1,j} \times LD_{l1,j}^{\rho\_LDS\_j}] - \rho\_LDS\_j \]

Where: 
- \(LDC\_U\_j\) composite unskilled labor force in activity \(j\)  
- \(LDC\_S\_j\) composite skilled labor force in activity \(j\)  
- \(\rho\_LDU\_j\) is a substitution parameter,  
- \(\rho\_LDS\_j\) is a substitution parameter,  
- \(LD_{l2,j}\) is unskilled male and unskilled female labor in activity \(j\),  
- \(LD_{l1,j}\) is skilled male and skilled female labor in activity \(j\),  
- \(\beta\_LDU_{l2,j}\) is CES activity function share parameter,  
- \(\beta\_LDS_{l1,j}\) is CES activity function share parameter,  
- \(B\_LDU\_j\) is efficiency parameter in the CES activity function, and  
- \(B\_LDS\_j\) is efficiency parameter in the CES activity function.

Equation 3 below shows the aggregation of skilled and unskilled labor into one composite labor force of different gender and skill level. Assuming significant skill level difference between skilled and unskilled workers, substitution between workers in the two skill levels is set to be low.

\[
LDC\_j = B\_LD\_j \times [\beta\_LD\_j \times LDC\_S\_j^{\rho\_LD\_j} + (1 - \beta\_LD\_j) \times LDC\_U\_j^{\rho\_LD\_j}] - \rho\_LD\_j \]

Where: 
- \(LDC\_j\) composite labor force in activity \(j\)  
- \(\rho\_LD\_j\) is a substitution parameter,  
- \(LDC\_U\_j\) composite unskilled labor force in activity \(j\)  
- \(LDC\_S\_j\) composite skilled labor force in activity \(j\)  
- \(\beta\_LD\_j\) is CES activity function share parameter, and  
- \(B\_LD\_j\) is efficiency parameter in the CES activity function.
Equation 4, 5 and 6 generates the relative demand functions for male and female labor in each skill level and between skilled and unskilled aggregated labor forces respectively. The equations show relative demand for each labor (in the composition) relies on a share parameter, the relative wage rate, and the sectoral elasticity of substitution. The optimal mix of the different labor forces is a function of the relative wage rates of each labor type.

\[
LD_{l_{2},j} = \left[ \beta_{LDU_{l_{2}},j} \right] \left( \frac{WC_{U_{j}}}{WTI_{l_{2}},j} \right) \sigma_{LDU_{j}} B_{LDU_{j}}^{\sigma_{LDU_{j}}-1} \cdot LDC_{U_{j}} \] ............................... (4)

Where: \( WTI_{l_{2},j} \) wage rate paid by industry \( j \) for unskilled labor including tax, 
\( WC_{U_{j}} \) wage rate of industry \( j \) composite unskilled labor 
\( \sigma_{LDU_{j}} \) CES composite elasticity

\[
LD_{l_{1},j} = \left[ \beta_{LDS_{l_{1}},j} \right] \left( \frac{WC_{S_{j}}}{WTI_{l_{1},j}} \right) \sigma_{LDS_{j}} B_{LDS_{j}}^{\sigma_{LDS_{j}}-1} \cdot LDC_{S_{j}} \] ............................... (5)

\[
LDC_{S_{j}} = \left[ \left( \frac{\beta_{LD_{j}}}{1 - \beta_{LD_{j}}} \right) \left( \frac{WC_{U_{j}}}{WC_{S_{j}}} \right) \right] \sigma_{LD_{j}} B_{LD_{j}}^{\sigma_{LD_{j}}-1} \cdot LDC_{U_{j}} \] ............................... (6)

Activity level wage rate for the composite labor is calculated as a weighted average of wage for skilled and unskilled labors in that activity. In detail, wage in the non-MSE sector is assumed to be fixed since wage rate in the public sector and big firms is not market driven and rather set and led by the government’s decision. However, wage rate in the MSE sector, the sector in which unemployment is assumed, is set to be efficiency wage rate calculated as shown in equation 7 below.

\[
W_{MSE} = ee_{i} + \left( ee_{i} / q_{q_{i}} \right) \left( b_{b_{i}} / u_{u_{i}} \right) + rr \] ............................... (7)

Where : \( W_{MSE} \) wage rate for labor in MSE sector 
\( ee_{i} \) effort desutility 
\( q_{q_{i}} \) probability of detection of shirking 
\( b_{b_{i}} \) exogenous probability to be fired 
\( u_{u_{i}} \) unemployment rate 
\( rr \) discount rate

In this model unemployment is considered. The labor market from the supply side is constructed as such the non-MSE sector satisfies its labor demand first (i.e every worker prefer to work in the non-MSE sector). If a worker couldn’t get job in the Non-MSE sector then she/he will search in the MSE sector. Some will be successful and some will remain idle. Thus unemployment is considered in this sector. As it is
shown in equations 8 and 9 full employment is settled in the non-MSE sector however the residual labor supply goes to the MSE sector. Thus whenever the MSE sector is expanded it can call up some labor from the unemployed pool.

\[ LS_{NMSE} = \sum_{j2} LD_{i,j2} \] ................................. (8)

\[ \frac{\sum_{j1} LD_{i,j1}}{(1 - u_{n_1})} = LS_i - LS_{NMSE} \] ................................. (9)

Where: \( LS_{NMSE} \) Labor supply in the Non-MSE sector,
\( LD_{i,j2} \) Labor demand of the Non-MSE sector,
\( LD_{i,j1} \) Labor demand of the MSE sector, and
\( LS_i \) Total labor supply in the economy

The substitution between capital and labor at the value added level of the production is treated differently for MSE and Non-MSE sectors. Since we assume technological change in the MSE sector is not that easy and needs some time, the substitution between labor and capital is set lower than in the non-MSE sector in which technological change is more likely.

In some industry and service sectors (which are classified into MSE and Non-MSE) a product is produced from two lines of production which uses two different technologies. In this study the disaggregation in the production part of the model goes down to scale of operation level especially in the manufacturing and construction activities from the industry sector and trade and hotel and restaurant activities from service sector. We select these sectors because most of the MSEs in Ethiopia are engaged in them². The two lines of production follow two different production technologies to produce the same output. As shown in table 1 below, the MSE sectors are using labor intensive technology than the Non-MSE.

CES functional structure is used to supply a single product of the two production lines. Thus a commodity is produced either from MSE or Non-MSE sector whichever is found cheaper in its production cost. Assuming difference in the product quality which is not visible for the consumer, substitutability between the two lines of

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²Operations at micro (classified under handicraft and cottage according to a classification by CSA) and small level are grouped under the MSEs while operations at medium and large level are grouped under non-MSEs.
production is set to be imperfect. As calculated in SAM the MSE sector is supplying 40.8% of the total production in those activities classified by scale of operation.

Table 4.1: Production technologies in the MSE and Non-MSE sectors

<table>
<thead>
<tr>
<th>Industrial classifications</th>
<th>MSE</th>
<th>Non_MSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Labor share</td>
<td>Capital share</td>
</tr>
<tr>
<td>Agriculture</td>
<td>75.4%</td>
<td>24.6%</td>
</tr>
<tr>
<td>Dairy</td>
<td>61.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Food</td>
<td>57.1%</td>
<td>43.0%</td>
</tr>
<tr>
<td>Beverage</td>
<td>61.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Textile and leather</td>
<td>61.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Wood</td>
<td>61.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Metal</td>
<td>61.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>50.5%</td>
<td>49.5%</td>
</tr>
<tr>
<td>Other industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>48.0%</td>
<td>52.0%</td>
</tr>
<tr>
<td>Hotel</td>
<td>62.9%</td>
<td>37.2%</td>
</tr>
<tr>
<td>Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other service</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Data from the SAM documentation 2005/06 and own computation

The output of every product of an industry is shared out among markets (domestic or export), again with the goal of maximizing the firm’s total revenue, given the demand in each market and the various taxes that apply. The model shows imperfect transformability between these two destinations, via the use of constant elasticity of transformation (CET) functions (Bernard, D. et al, 2002).

Domestic output net of exports from each production line is combined with a CES function and supplied domestically as shown in equation 10. The aggregation is made from the supply side not from the demand side. This technically means the distributor knows whether from MSE or Non-MSE a product is but the consumer doesn’t know. In turn this composite supply is combined with the imported products in an imperfect substitutability (i.e. Armington assumption) and creates total supply to satisfy domestic demand. This demand is the sum total of all demand by economic agents: it constitutes final consumption demands by households, and government and investment demand, intermediate consumption demands by activities and
transaction services’ demand.

\[ DD_i = B_{DS_i} \cdot \sum_j [\beta_{DS_{j,i}} \cdot DS_{j,i}^{-\rho_{DS_i}}]^{-1/\rho_{DS_i}} \]  \[ \text{\textit{(10)}} \]

Where: 
- \( DD_i \): domestic demand for commodity i produced locally
- \( DS_{j,i} \): supply of commodity i by sector j to the domestic market
- \( B_{DS_i} \): scale parameter
- \( \beta_{DS_{j,i}} \): share parameter
- \( \rho_{DS_i} \): elasticity parameter

Households have final consumption demands with the objective of utility maximization subject to budget constraints. The model has one representative consumer per household type, rendering identical preferences for all consumers in a given category. In our model there are two types of households, urban and rural. As shown in table 4.2 these households get their income from factor and non-factor sources. The non-factor sources we already have in our SAM are government transfer (social security for instance) and remittance. Representative household groups maximize their incomes by allocating factors of production across activities.

Table 4.2: Households’ source of income

<table>
<thead>
<tr>
<th>Source</th>
<th>Agricultural labor</th>
<th>Non-agricultural labor</th>
<th>Capital (capital + Land)</th>
<th>Government transfer</th>
<th>Remittance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural household</td>
<td>33.2%</td>
<td>1.2%</td>
<td>34.5%</td>
<td>0.5%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Urban household</td>
<td>10.9%</td>
<td>7.2%</td>
<td>0.7%</td>
<td>7.7%</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

Source: Data from the SAM documentation 2005/06
**Micro-simulation model**

Regarding poverty analysis, a separate consumption based micro-simulation module is prepared. This links each respondent in the 2009/10 HICE (Household Income Consumption and Expenditure) survey to their corresponding representative household group in the model. Thus we employ a top-down approach in which changes in commodity prices and households’ consumption spending are passed down from the CGE model to the micro-simulation module, where per capita consumption and standard poverty measures are recalculated. Poverty will be modeled using the Foster-Greer-Thorbecke (FGT) measures (Foster et al, 1984). This measure is noted as:

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

Where: 
- \( \alpha \) is the poverty aversion parameter,
- \( n \) is population size,
- \( q \) is the number of people below the poverty line,
- \( y_i \) is income,
- \( z \) is the poverty threshold.

The FGT \( P_{\alpha} \) class of additive decomposable poverty measures allows us to measure the proportion of poor in the population; poverty head count ratio if \( \alpha = 0 \), poverty depth if \( \alpha = 1 \), and severity of poverty if \( \alpha = 2 \).
5. Data

The CGE model used in this study is calibrated on a 2009/10 Social Accounting Matrix (SAM) of Ethiopia. This SAM was first developed by EDRI (Ethiopian Development Research Institute) for 2005/06 Ethiopian economy. It was later updated for 2009/10 for a research work on alternative financing of the GTP plan.

Further modification is made on the SAM in order to fit the objective of this study. The SAM in use in this study has 22 activities totally. 18 of them were 9 activities but split by scale of operation into MSE and Non-MSE. Disaggregation of these activities by scale of operation is made by using the composition of value added and intermediate inputs for each activity and at each level of operation that we calculated from CSA’s manufacturing sector surveys data. Table 3 below shows the share of MSE and Non-MSEs from the entire activity’s value addition and intermediate input consumption. Despite the difference at scale of operation, every activity produces a single output. Thus there are only 13 commodities in the SAM. As we got the information from the surveys, food, construction and textile activities in the MSE sector are the dominant in terms of value addition.

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3 For further clarification on the procedures taken to update the SAM, please refer Ermias et al, 2011
There are 5 types of factors in the SAM; four types of labor disaggregated by gender and skill level, and one type of capital. The real shares of labor and capital are guided by the data shown in the previous section in table 4.1. The disaggregation of labor by gender and skill level is governed by real shares based on data from MUDC survey of 2013 for MSE sector and CSA’s labor force survey data (CSA, 2006). Based on definition from SAM documentation 2005/06, unskilled labor is worker engaged in elementary occupation which requires only little skill or lowest level of education. Besides, in ILO website elementary occupation is defined as occupation which requires only the 1st ISCO skill levels. And skill level 1 requires only completion of primary level education or the 1st level of education (ILO, 2012). Thus based on these definitions we classified the labor force with primary level education and less as unskilled labor and higher than primary level as skilled labor. (See table 4 below).

Having a male-female segmented labor market in the SAM gives chance to see gender bias in terms of wages and employment opportunities in the Ethiopian labor market, and also occupational differences.
Table 5.2: Share of labor by gender and skill level for MSE and Non-MSE sectors

<table>
<thead>
<tr>
<th></th>
<th>MSE</th>
<th></th>
<th>Non-MSE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female unskilled</td>
<td>Male unskilled</td>
<td>Female skilled</td>
<td>Male skilled</td>
</tr>
<tr>
<td>Agriculture</td>
<td>48.5%</td>
<td>48.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Dairy</td>
<td>30.4%</td>
<td>30.1%</td>
<td>17.2%</td>
<td>22.3%</td>
</tr>
<tr>
<td>Food</td>
<td>29.0%</td>
<td>14.0%</td>
<td>24.3%</td>
<td>32.7%</td>
</tr>
<tr>
<td>Beverage</td>
<td>29.0%</td>
<td>14.0%</td>
<td>24.3%</td>
<td>32.7%</td>
</tr>
<tr>
<td>Textile and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leather</td>
<td>20.6%</td>
<td>34.4%</td>
<td>16.5%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Wood</td>
<td>4.4%</td>
<td>22.6%</td>
<td>13.1%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Metal</td>
<td>4.4%</td>
<td>22.6%</td>
<td>13.1%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Construction</td>
<td>4.3%</td>
<td>36.1%</td>
<td>8.6%</td>
<td>51.1%</td>
</tr>
<tr>
<td>Other industries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>25.9%</td>
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<tr>
<td>Other services</td>
<td></td>
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</tr>
</tbody>
</table>

Source: CSA 2006, MUDC 2012 and own computation

There are also 2 households that are disaggregated by location (urban/ rural). Government, ‘saving-investment’, ‘rest of the world’ and different tax types are also components of this SAM.

For the poverty analysis we employed the very recent, 2009/10 HICES data of CSA. The households from this data are disaggregated into urban and rural. Thus it enables us to look into urban poverty as a result of government’s effort to develop the MSE sector, which is also very important for policy recommendation.
6. Results and analysis

6.1 Simulations

The study tests three sets of simulations. All the simulations are based on the current MSEs’ development plan of the Ethiopian government but considering different implementation strategies. The first is exploring scenarios that consider government’s strategy towards implementation of the plan. However, the second and third simulations consider two different alternative strategies that the government can consider to implement the plan for better accomplishment of its goals. The major difference between the actual strategy and the suggested alternative strategies is the activities in the MSE sector that are targeted. The government so far is evenly distributing the interventions to the activities in the sector. However, the alternative strategies recommend that to be selective in a way to come up with better results in terms of employment creation and poverty reduction in particular and goals of the plan in general.

The interventions in all the simulations are the same and they are;

1. Raising MSEs’ TFP as a result of training given so far (i.e. training coverage in terms of number of MSE operators). Based on MUDC 2013 data, only 34% of the operators got training opportunity so far. Here we assume a trained labor can use all the other factors more efficiently. Thus, training can increase productivity of not only labor but also the other factors. A research paper by J. Konings and Stijn V. (2010) stated that training has a positive impact on productivity. The marginal product of a trained worker is on average 23% higher than that of an untrained worker. Thus we took this as a bench mark rate and calculated the actual productivity enhancement level that can be achieved as a result of the 34% training coverage already achieved. Table 6.1 below shows that the training delivered so far enables the MSE sector to achieve a 5.8% increase in productivity.

2. Training for MSE operators cannot be succeeded without cost. There is some
kind of effort needed, cost wise, from the government side which can directly be seen as increased government spending on education sector for its effort to build vocational training centers and to equip them and besides to cover the running costs. For the 34% coverage level achieved so far, the government had to spend additional money which is around 0.9% of the total government spending level at the base year.

3. Besides the training facility, the government also extends loan to the MSEs to start up with or expand their business. Capital grows in the MSE sector by the amount of loan which is given out to the MSEs so far which is part of the development plan. Assuming direct flow of the loan funds to be invested (spent for procurement of capital goods) in the MSE sector, it brings equal amount of new capital formation. We tried to model this through introducing public investment (in the SAM and also in the model) on other industry ('othind') commodities which can represent purchasing of some capital goods like machineries, hand tools and equipments. Public investment is introduced as an exogenous term assuming it is subjected to political decision rather than being endogenously set by demand and supply forces. The GTP progress report (MoFED, 2014) stated that 2 billion birr was given out as loan to MSE operators in the early two years of the GTP period. Thus, government spends this through public investment which is financed from the government budget which can be considered as dis-saving from the local saving pool. The public investment on this regard is taken directly to augment the capital stock in the MSE sector. (Table 6.1).
Table 6.1: Percentage changes in the experimental parameters and the target activities in each simulation

<table>
<thead>
<tr>
<th>Experimental parameters/Target activities</th>
<th>Sim1 (all MSE activities)</th>
<th>Sim2 (manufacturing MSEs)</th>
<th>Sim3 (Service sector MSEs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>Public spending</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Public investment</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Government income from foreign sources</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

For both the simulations we also used some means of financing the interventions. The changes in productivity and capital growth cannot be found for free. It is explicitly stated in the mid-term plan of the Ethiopian government that around 45% of the finance is expected from domestic sources and the remaining 55% from external sources (MoFED, 2010). Financing from external sources is simulated as increased transfer from the rest of the world to the government. In order to raise the fund needed to finance the already accomplished part of the MSE development plan, government should have secured a 3.8% increase in foreign transfer.

By construction of the model, government is made to save the residual of its revenue from the total expense. Thus, as government’s expenditure for training and public investment spending increases, the left over decreases which endogenously reduces government’s saving. With this mechanism, higher portion of the cost for the implementation of the plan is covered by the increased foreign transfer to the government and the remaining part of the cost is served through domestic dis-saving by the government.

Even though, these are the common points between all the simulations, they are different regarding the target sectors to focus on for implementation of the plan. In the first simulation (Sim1) all activities in the MSE sector are evenly treated towards
any development intervention. However, in the 2nd simulation (Sim2) the development intervention goes only to the major manufacturing activities in the MSE sector which are found highest in their value added share based on the data found from CSA. These target activities include textile, wood, and metal manufacturing activities and the construction sub-sector. In the 3rd simulation (Sim3) the target activities are proposed to be the MSE activities in the service sector. So essentially, the two alternative strategies suggest focusing either on manufacturing activities or on the service sector activities. Thus, based on the differences on the outcomes of these simulations, we recommend some alternative strategies for implementation of the MSEs’ development plan which can be quite useful.

In order to clearly show the distinct effect of every intervention, each intervention in Sim1 is run and analyzed one-by-one separately. First increase in public spending for training is shocked and its expected effect on the MSE sector through enhancing productivity follows. The third step becomes increasing capital stock in the MSE sector through increasing public investment on top of the first two. Finally, increasing government revenue through foreign transfer is shocked on top of the first three which formulates exactly the first simulation (Sim1) as it is seen in table 6.1.
6.2. Analysis of CGE results

6.2.1. Simulation 1 – current implementation of the plan

6.2.1.1. Effects on production and prices

Increasing government spending by itself come up with almost no effect on almost all variables of interest (i.e., production, unemployment and GDP) except for investment demand which decline slightly, by -0.4%. Production both in MSE and Non-MSE activities declined a bit, -0.1%, but increases slightly in the only two activities on which the government spends; public administration by 0.6% and other service sector by 0.1%. This intervention becomes more meaningful when the resulted productivity increase is applied on the MSE activities. Training to the MSE operators has some implications on the production side of the economy. The MSE sector expands by 4.5% and the non-MSE shrinks by 0.6% as a result of fierce competition from the MSE activities. Activities like textile, wood and metal works in the MSE sector has got the highest expansion. Other industries, administration and other service sectors also expand by 0.8%, 1.1% and 0.9% respectively which is a result of the spillover effect. These activities expand by at least double or more the magnitude of production increase in the first intervention. This shows that indirect effects of efficiency gain in the MSE sector is much meaningful to these activities than direct effects they receive from an increase in government spending. This might be because of the inflow of labor force from the labor reallocation effects of the efficiency shock. However, agriculture sector shrinks slightly by 0.3% as a result of its forward linkage with the Non-MSE sector which also shrinks.

Besides training the operators, government also gives loan to MSEs which is expressed through provision of capital goods (on which the government invests and public investment rises) which adds up to the capital stock in the MSE sector. Doubling of public investment (as seen in table 6.1) on top of the interventions discussed above appeared to have stronger positive effect on production in the MSE sector but stronger negative effect on the Non-MSE sector. Other industry,
administration and other service sectors also benefit from this intervention. Increasing public investment and the capital stock appears to be more powerful regarding the impact on production than training the operators. The former makes production in MSE sector rise by 10.4% and decline in the Non-MSE sector by 1.7% which is more than double the effect in the later. Textile, wood and metal work activities in the MSE sector are those that receive highest expansion as a result of the rise in capital stock. Additionally, trade and construction activities expand much more in this intervention than because of training due to the highly capital intensive nature of the two activities.

If we look at the results of the simulation scenarios all together (including increase in foreign transfer to the government), the expansion in the MSE and shrinking of the non-MSE sectors will not be that high as a result of the positive effect of the financing strategy to the non-MSE sector. MSEs expand by 9.0% and the Non-MSEs narrow-down by 0.5%. Since outputs from MSE and non-MSE in the same sector are made substitutable\(^4\), increased supply of the products from the MSE sub-sector as a result of the interventions which favor the sub-sector makes the product from MSE activities cheaper than those produced from the Non-MSEs. Following the reduction in demand, price in the non-MSE sub-sector also decreases afterwards. (See table 6.2)

It is worth mentioning that a sensitivity analysis is done on the substitutability of the products from MSE and non-MSE sub-sectors. As we assume the products from the two sources are more of substitutable (with a substitutability elasticity of 1.2), then a percent expansion in the MSE sector causes the non-MSE sector to shrink by 0.11%. However, if the two sources are assumed to be less substitutable (with a substitutability elasticity of 0.8) then Non-MSE sector shrinks by only 0.06% for the same magnitude of expansion in the MSE sector.

\(^4\) Substitutability between MSE and Non-MSE commodities is set to be 0.8 assuming them as substitutable but not perfectly.
Table 6.2: Changes in production and price

<table>
<thead>
<tr>
<th></th>
<th>Production</th>
<th></th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
<td>Sim1</td>
<td>%</td>
</tr>
<tr>
<td>MSE</td>
<td>74.1</td>
<td>80.7</td>
<td>9.0%</td>
</tr>
<tr>
<td>Non-MSE</td>
<td>181.6</td>
<td>180.6</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>189.8</td>
<td>189.4</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Other industry</td>
<td>33.5</td>
<td>34.2</td>
<td>2.1%</td>
</tr>
<tr>
<td>Administration</td>
<td>20.6</td>
<td>20.9</td>
<td>1.4%</td>
</tr>
<tr>
<td>Other service</td>
<td>98.7</td>
<td>100.5</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Source: Simulation results

### 6.2.1.2 Effects on investment and Gross Domestic Product

The plan to develop the MSE sub-sector in Ethiopia is planned to be financed from both domestic and external sources. By construction of the model the government is made to endogenously dis-save or borrow from domestic sources the amount of spending that cannot be covered by its revenue. Thus government borrows some portion of the spending to finance the plan from domestic banks which directly crowds out the private investors. This effect is clearly seen on the simulation results. Total investment expenditure drops slightly by about 0.2%. (See figure 6.1)

A shrinking investment has a negative impact on a country’s GDP. Even though investment declines in Sim1 in our case, the expansion in the MSE, other industry, administration and other service sub-sectors come up with a positive impact on the GDP. This positive effect is coupled with a significant drop in overall price. The consumers’ price index (CPI) falls by 1.4%. These give the country’s GDP grow in real terms by about 0.9% in Sim1. This is the other significant positive effect of government’s effort to develop the MSE sub-sector. (See figure 6.1)
Let us look at the effects of each intervention in Sim1 one-by-one. Increasing government spending (i.e. by 0.9%) to finance the cost of provision of training to the MSE sector brings almost zero effect on the country’s GDP and a slight reduction, a 0.4% in total investment expenditure. However, this intervention resulted in stronger effects on both GDP and investment expenditure when public spending is coupled with the expected efficiency gain in the MSE sector; investment drops by 1.5% and GDP rises by 0.3%. However, if we add public investment on top of these interventions with the aim of increasing capital stock in the MSE sector, as compared to the previous interventions, there happens no significant difference on GDP while investment expenditure declines double the magnitude. This shows that government’s saving is depleted as it is the only source of finance to all the interventions at this point. However, when we introduce an intervention with increased foreign transfer to the government (i.e. when the entire interventions in Sim1 are applied) this problem is almost wiped out and investment expenditure dropped slightly by 0.2% only.
6.2.1.3 Effects on factors of production and returns

As one of our major interventions in Sim1 is increasing efficiency of the factors in the MSE activities, less number of factors is needed to produce equal amount of the output from the sector. Thus, at this point what matters most is the demand for that product. If the economy creates higher demand for that product for some reason, then the negative impact of the efficiency shock on labor demand may be netted out by the positive effect on labor demand from increased demand for that particular output.

In our case, the positive effect couldn’t net out the negative effect. Thus the efficiency shock resulted in significant reduction in labor demand for all gender types and skill levels in the MSE sub-sector. Regarding gender difference, unskilled male and skilled female workers face lower lay off rate than their counter parts. Dairy, food, construction, trade and hotel MSE activities are the major activities in which unskilled female and skilled male laborers face highest lay off. Specially, in unskilled labor market demand for female workers from MSE sector fall significantly than the demand for the male. (See table 6.3).

On the contrary, rise in skilled labor demand is exhibited in the Non-MSE sector with demand for unskilled female workers decreasing slightly. Since the proportion of skilled workers is higher than the unskilled in the Non-MSE sub-sector, the positive effect is stronger on the demand for skilled workers. Labor demand in the Non-MSE sector is mostly because of wood works, other industries, administration and other service activities whose labor demand rises as a result of the efficiency and capital stock shocks on the MSE sector which causes factor reallocation. However, the increase in public spending unexpectedly comes up with lower impact on labor demand in the non-MSE sector because the shock is at a smaller magnitude.
In the specification of the model, as already discussed in the methodology section, any worker whether male or female and skilled or unskilled first goes to the non-MSE sub-sector searching for job. If he/she is not successful then he/she will go to the MSE sub-sector. If he/she is not still successful then he/she will be unemployed.

In the first simulation, implementation of the plan can be evaluated ineffective as we measure it from employment creation (or unemployment reduction) goal. In this simulation unemployment increases on average by 2.9 percentage points for every labor type. The unskilled labor force is the most affected than the skilled because it was mostly hired by MSEs which are now more efficient and don’t need that much unskilled labor anymore. Skilled laborers also face increased unemployment because of the reduced demand from the MSEs side but increases at a lower rate as it is mostly hired in the Non-MSE sector and enjoyed increased demand from this sector as discussed above. As seen in table 6.4 female unemployment increases the largest in both skill levels; unskilled and skilled female unemployment increases by 5.0 and 3.2 percentage points respectively whereas that of unskilled and skilled male labor forces rise 2.3 and 0.9 percentage points respectively. In general the increased labor unemployment is the result of the efficiency shock and the capital stock increase in the MSE sector. Considering only efficiency shock in the MSE sector brings about a 3.3 percentage points increase in unemployment on average on all the labor forces. When we consider increase in capital stock in the MSE sector on top of the efficiency shock, the result on labor unemployment is going to be more
than double.

Contrary to the very objective of the MSE development plan, unemployment is increasing for the vulnerable groups and also in general. Female unemployment is rising for both skill levels. In fact, unemployment in unskilled female increases higher than unemployment in skilled female. Thus, it is clearly seen that the MSE sector is not yet made ready to absorb the increasing unemployed youth and women in urban centers. This is because of the implementation strategy that the government follows so far. This can be clearly seen in the next alternative simulations discussed below.

Table 6.4: Simulation effects on unemployment (in percentage points) and wage rate

<table>
<thead>
<tr>
<th></th>
<th>Unemployment</th>
<th>MSE wage rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
<td>Sim1</td>
</tr>
<tr>
<td>Unskilled female</td>
<td>27.0%</td>
<td>32.0%</td>
</tr>
<tr>
<td>Unskilled male</td>
<td>13.7%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Skilled female</td>
<td>27.0%</td>
<td>30.2%</td>
</tr>
<tr>
<td>Skilled male</td>
<td>13.7%</td>
<td>14.6%</td>
</tr>
</tbody>
</table>

Source: Simulation results

As it is already explained in the methodology section, wage rate in the Non-MSE sub-sector is made exogenous which cannot be changed by market forces rather by policy decisions. Thus the only change we can discuss on is the MSE wage rate. As we can see from table 6.4 above, wage rate in the MSE sub-sector for all labor types decrease as a result of reduced demand for all labor types in the MSE sector following the efficiency and capital stock increase shocks. The magnitude of the change is a bit stronger for unskilled workers than skilled counterparts for both male and female showing the stronger effect from the MSEs’ side.

On the other hand, the economy wide return to capital also decreases on average by 11.9% in Sim1. The increased productivity which is coupled with growth in capital stock in the MSE sector resulted in biggest, 30.0% fall in capital return in MSE
sector. Following government’s dis-saving to finance some portion of the implementation cost, investment in the country shrinks as government’s borrowing from domestic banks crowd out the private sector. As a result, there is a negative effect on capital demand and returns to capital from those industries that supply their output for investment. On the other hand, larger share of the outputs from these industries is consumed by the other industries as intermediate inputs or consumed by households. Thus, the increased demand for their output from households and other activities increases their demand for capital and returns to capital. Since this positive effect is stronger, then it wiped out the negative effect. Therefore there is a slight, a 0.7%, increase in capital return from the Non-MSE sub-sector side.

### 6.2.1.4 Effects on household income, consumption and poverty

Household nominal income decreases for both household types although urban households enjoy raised income in real terms. As shown in figure 6.2 below, nominal income from almost all sources decreases in the 1st simulation. Both households exhibit similar fall in income from all the sources except income from labor. Urban households got a slightly higher drop in income from their labor force which is the highest contributor to their income.

Regarding consumption, rural households are forced to consume a bit lower as a result of the drop in real income following the interventions in the MSE sector whereas urban households enjoy rise in consumption. This is a clear replica of the change in their real income. Households’ better position in terms of consumption despite the decrease in nominal income is completely the effect of a bigger drop in price as compared to the decrease in income. This technically means that urban households are now richer in real terms, though their nominal income is falling whereas rural households are getting poorer. See table 6.5 below.
Table 6.5. Simulation effects on household income and household consumption

<table>
<thead>
<tr>
<th></th>
<th>Household income</th>
<th></th>
<th>Household consumption</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BASE</td>
<td>SIM1</td>
<td>%</td>
<td>SIM2</td>
</tr>
<tr>
<td>Rural households</td>
<td>243.3</td>
<td>239.1</td>
<td>-1.7%</td>
<td>242.5</td>
</tr>
<tr>
<td>Urban households</td>
<td>90.5</td>
<td>89.4</td>
<td>-1.3%</td>
<td>90.6</td>
</tr>
</tbody>
</table>

Source: Simulation results

As it can be clearly seen in figure 6.2, income from all sources declines for both household types in Sim1. Income from returns to capital dropped the highest as result of significant reduction in returns to capital which was discussed well in the previous section.

Figure 6.2: Sources of household income

Implications of the interventions on households’ real income make urban households consume more whereas rural households consume less as discussed above. This in turn has its own implication on households’ poverty level. As shown in figure 6.3 below, the current implementation of the plan and the strategy the government followed (i.e Sim1) has a little bit worsened the poverty problem nationwide. However, there is a very slight, 0.1 percentage points reduction in urban
poverty head count ratio while it increases by 0.4 percentage points for the rural households. The only success registered in terms of poverty reduction is that of the urban households which even is very minimal in magnitude.

Again contrary to the major objectives of the development plan, implementation of the plan so far ends up on further increment in the number of poor nationwide. This shows us that the plan with its current implementation strategy is ineffective from poverty reduction angle too. Thus, we have tried two different alternative strategies to implement the plan which have better implication on poverty level both in urban and rural centers.

Figure 6.3. Implications of the simulations on poverty incidence

![Bar chart showing poverty head count ratio for national, rural, and urban areas with different strategies.](source: Simulation results)
6.2.2. Alternative simulations: Sim2 and Sim3

Simulation 2 and 3 are the alternative scenarios that we propose for better implementation of the MSE development plan. As described in the simulation part already, these alternative simulations are exactly the same with the first simulation in terms of magnitude and direction of interventions. But these alternative scenarios follow different strategies to select target MSE activities for implementation of the development plan. The first simulation (Sim1), the implementation so far, follows a strategy of equal treatment towards all the MSE activities which means that the MSE development interventions are evenly applied on all MSE activities. However, Sim2 focuses only on few manufacturing sector activities which are proved to be of high value addition. These are textile, wood, and metal manufacturing activities and the construction sub-sector. In this simulation these are the only activities that receive the interventions, all the rest remain intact. Moreover, Sim3 gives another alternative strategy which concentrates only on MSEs in the service sector. Thus, service sector MSEs are the only entitled to receive development interventions.

6.2.2.1. Effects on production and prices

As seen in table 6.2 above, production efficiency in the MSE sector increases by 5.8% and capital stock is made to rise by the amount of public investment which is doubled. Besides, government spending on public sectors like education increases by 0.9%. These interventions all together bring about positive impact on all sectors’ production in Sim2 except for the agriculture sector which faces a slight, 0.1% loss. Contrary to the reduction in production it faces in Sim1, the Non-MSE sector is now expanding a bit, by about 0.2%. However, the MSE sector and other sectors like other industry, administration and other service sectors expand at 5.8, 1.0, 0.8 and 0.9 percent respectively at slower pace than in Sim1. Except agriculture and the Non-MSE sector, this shows that focusing on the manufacturing sector only has lower impact than evenly distributing the intervention regarding production expansion. Thus the country’s overall production increases lower in this simulation.
The same is true for Sim3, the other alternative strategy also. In this simulation all the sectors are expanding except the Non-MSE and agriculture sectors. In terms of magnitude, as compared to the first simulation the MSE, and the other service sectors increase at a slower pace whereas the Non-MSE and agriculture sectors expand either at the same or faster rate. See table 6.2 above.

In terms of price, interventions’ negative effect on producers’ price is almost similar in magnitude between Sim1 and Sim3 except for MSEs’ price which declines in Sim3 by a rate less than half the rate in Sim1 as a result of the relatively slower expansion in the MSE sector. However, Sim2 has more of a positive effect on producers’ price than both simulations. Prices of Non-MSE and other industry outputs increase slightly whereas that of MSE and other service activities reduce but at a slower pace than in Sim1. The relative increase in price in the Non-MSE sector is a result of increased demand for the Non-MSE commodities substituting MSE commodities following a relatively slower pace in MSE production rise. Besides, production side relative changes are the reasons for the relative changes in price for other industry, MSE and other service activities.

6.2.2.2 Effects on investment and Gross Domestic Product

In order to finance the costs of the implementation of the development plan, the government needs some money additional to the amount it got from foreign transfer. That gap is going to be filled through domestic borrowing which can possibly bring crowd out effect on private investment. In both Sim1 and Sim3 there is slight reduction in total private investment expenditure, by 0.2% and 0.01% respectively showing the crowding out effect. However, investment expenditure in Sim2 increases by 1.4% telling us that there is increased investment demand which surpasses the negative effect from government’s dissaving. Thus the two alternative strategies towards how to implement the plan, come up with either absolute or relative positive solution to the reduction in private investment in Sim1. Sim2 is found to be the best
solution to increase investment in the country along with implementing the MSEs’ development plan.

On the other hand the country’s total value addition increases in all simulations but the increase in Sim1 is bigger in magnitude than the alternative scenarios which increase almost equally by 0.64%. See figure 6.1 above. Considering only production effects, both the alternative strategies are found to bring a bit weaker effect than Sim1. Thus the country’s GDP increases by about 0.2 percentage points less in both the alternative strategies.

6.2.2.3 Effects on factors of production and returns

Since the major interventions in all the simulations are efficiency shock and increase in capital stock in the MSE sector, then the effects are over all negative for the factors of production in the MSE sector in all the simulations. Moreover, the effects are stronger in Sim1 and Sim3. Sim2 brings about the lowest rate of reduction for factor demand in the MSE sector. Thus this can be considered as a suitable strategy for the unemployment reduction goal of the government.

On the contrary, factor demand increases in the Non-MSE sector for all the simulations because of those non-MSE activities that expand as a result of the simulations. Skilled laborers of both genders are the most benefited in the Non-MSE sector since they have the dominance in labor demand in this sector.

Following stronger drop in labor demand in the MSE sector which couldn’t be compensated by the increase in demand from the Non-MSE sector, Sim1 couldn’t come out with reliable solution for the employment creation (or unemployment reduction) question of the country which is the major goal of the MSE development plan. As the major objective of this research work lies on this, then we tried alternative strategies or simulation scenarios that can answer this serious question in a better way. Both our alternative simulations come up with better results in this
regard. Sim3 (i.e concentrating only on service sector MSEs while implementing the plan) also affects unemployment negatively but at a lower rate than the current implementation strategy (Sim1). This can be used as a means at least to ease the problem. However, the absolute solution can be found if the government concentrates only on the manufacturing MSEs to apply the plan on (Sim2). Unemployment reduces by about 0.3, 0.7 and 0.4 percentage points from its level at the base for both unskilled and skilled female and skilled male respectively. Unemployment rate for unskilled male labor exceptionally increases by 0.4 percentage points but still way lower than what happens with the current strategy. As compared to Sim1, Sim2 is stronger enough to reduce the overall unemployment level by 3.1 percentage points on average. In the current strategy, female workers at any skill level were the most affected by the increase in unemployment but Sim2 reveals that if it is applied female workers will be the least affected at any skill level. Thus, concentrating on the manufacturing sector reduces unemployment in general and female unemployment in particular.

6.2.2.4 Effects on household income, consumption and poverty

Household nominal income decreases for both household types in all the simulations except urban households enjoy raised income in Sim2. However if we consider real income only, then Sim1 and Sim2 come up with similar effects on income levels of both households. Sim3 outdo both simulations by making rural and urban households earn 0.1 and 0.6% higher income in real terms. Thus, in this simulation both households become richer than before.

As shown in figure 6.2 above, nominal income from almost all sources decreases in Sim1 and Sim3. Similarly income from capital, income from government’s transfer and income from returns to labor decline in rank for both simulations. However, urban and rural households experience the least drop in income from all sources in Sim2. Even income from returns to labor increases for urban households while income from government’s transfer increases for both households.
Households’ saving also increases in Sim2 either relatively or absolutely to that of the other simulations. This can be one reason why investment demand increase in Sim2 while it decreases in other two. Thus Sim2 can be considered as a best strategy to increase investment in the country along with implementation of the MSE development plan.

Regarding consumption, it is found to be the exact replica of real income. Rural households are consuming a bit lower by 0.3% and 0.4% in Sim1 and Sim2 respectively as a result of the drop in real income. Whereas, urban households enjoy rise in consumption in these simulations. However, Sim3 has got the best solution for both households. If the government concentrates only on service sector MSEs, then rural and urban households would enjoy higher consumption which increases by 0.1% and 0.6% respectively.

Implications of Sim3 on households’ real income make both households consume more. This in turn has its own implication on households’ poverty level. As seen in figure 6.3 above, poverty level in urban centers reduces by 0.4 percentage points which in turn reduces the national poverty head count ratio a bit by 0.03 percentage points with rural poverty level increasing a bit. The other two simulations have also succeeded to reduce urban poverty a bit but it is not that much as it reduces in Sim3 and they haven’t succeeded to reduce national poverty. Thus, if the government focuses on the service sector MSEs to apply the development plan on, then it can get a better solution towards poverty reduction goal of the country.
7. Conclusion and Recommendation

The major objective of this study is to assess the role of MSEs to reduce unemployment and poverty. This study is very timely as it raises this objective, because the government of Ethiopia is expecting a lot from the MSE sector which is not yet developed. CGE modeling approach is used to address the research objective.

The study tests three sets of simulations. All the simulations are based on the current MSEs’ development plan of the Ethiopian government but through different implementation strategies. The first simulation (Sim1), the way used so far, follows a strategy that evenly applies the MSE development interventions to all MSE activities. However, Sim2 focuses only on few manufacturing sector activities which are proved to be of high value addition. Moreover, Sim3 gives another alternative strategy which concentrates only on MSEs in the service sector.

In the first simulation, results show that MSEs expand and the Non-MSEs narrow-down as a result of competition between the two sub-sectors. Even though the Non-MSE sector shrinks, the expansion in the MSE sector and some other activities like the public sector brings positive impact on the overall value addition in the economy. Real GDP increases by 0.9% but total investment drops. Besides, in Sim1 the efficiency shock resulted in significant reduction in labor demand for all gender types and skill levels in the MSE sub-sector but especially for unskilled female workers. On the contrary, rise in skilled labor demand is exhibited in the Non-MSE sector. However, the negative effect surpasses the positive and labor demand in total decline which resulted in worsening the unemployment problem on average by 2.9 percentage points for every labor type. The unskilled labor force is the most affected than the skilled. Besides, female unemployment increases the largest in both skill levels. Thus we can conclude the current strategy is ineffective towards the unemployment reduction goal.
In the current implementation of the plan, urban households enjoy raised income in real terms whereas that of rural households decline. Regarding consumption, rural households are forced to consume a bit lower whereas urban households enjoy consumption slightly increased and poverty reduced.

Since the current government strategy of implementation is not addressing the major development concerns of the government in the best way, then alternative strategies are explored. Focusing only on manufacturing MSE activities is a strategy that the government can alternatively follow to reduce unemployment. Unemployment reduces by about 0.3, 0.7 and 0.4 percentage points from its level at the base for both unskilled and skilled female and skilled male respectively. As compared to Sim1, Sim2 is stronger enough to reduce the overall unemployment level by 3.1 percentage points on average. Moreover, Sim2 reveals that if it is applied female workers will be the least affected at any skill level contrary to Sim1. Besides, total investment increases only in this strategy.

On the other hand, concentrating only on the service sector MSEs (Sim3) is another strategy to get the best solution in poverty reduction. Unlike the other two, Sim3 makes both households earn better income in real terms than before which makes them richer. This strategy makes poverty reduce both in urban centers and nationally on average. Poverty level in urban centers reduces stronger than in Sim1. In fact, Sim3 also has a better solution regarding unemployment reduction and increase investment than the first simulation. However, the alternative simulations are not the best solutions regarding overall production but they have positive impact.

Based on these results, it is learnt that the MSE sector has potential for change in unemployment and poverty reduction. The policy recommendations of this study are;

First, the government has to rethink about the best strategies for implementation of
the MSEs’ development plan. It is recommended that implementation strategies should be first investigated for the possible results before being applied.

Second, there are different alternative strategies which have different merits and demerits. So the best way forward to the government is to select the best one for each burning issue or top developmental concern.
8. Policy influence (or research communication strategy)

The following table constitutes a list of institutes that we targeted for effective implementation of the policy prescriptions. We are approaching each of the following institutions to gather information about the actual operation of the sector. We also have continuous consultation with each of them about the challenges and constrains of the sector.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Contact</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro and Small Enterprises Development Agency</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>MSE Development Offices</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ministry of Urban Development and Construction</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Addis Ababa City Administration MSE section</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ministry of Women's, and Children Affairs</td>
<td>Yes</td>
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</tr>
</tbody>
</table>

We have already done discussion with few government officials at these institutions and with some researchers who have been engaged in MSE and microfinance related studies currently or in the past.

During these sessions the team introduced this research work and undertook discussions on simulation areas and variables, structures and design of the models (i.e both the econometrics and the CGE) and possible implications of the output. Besides, we closely follow government policies and strategies to adjust our models and simulations. We strongly believe that this allows policy makers and other concerned bodies to follow the progress of the study.

As part of our dissemination strategy, we will have meetings with experts from MSEs Development Agency, and experts on MSE related works from Ministry of Urban Development and Construction, Addis Ababa City Administration MSE section, and
Ministry of Women's and Children Affairs. During these meetings, the team will be presenting the findings of the research work and the policy recommendations of the study. We expect insights from these experts how to use the results of the study as an input to develop strategies and policy formulations even in future.

During our discussion with few of government officials, we learnt that they are keen to review this kind of studies and use it as input in developing alternative strategy and even to supplement their strategies for the sector’s development. We strongly believe that the findings of this study will be asset for policy makers in allocation of resources for development of MSEs and to have clear understanding of the bottlenecks of the sector, design to solve factors that hinder MSEs’ growth; and maximize the contribution of the sector to reduce unemployment and poverty.

The team has also plan to organize a workshop to present these findings to policy makers and academicians, to get their feedback and comments which we believe is invaluable to improve the quality and relevance of the work. We have also plan to present the paper during the coming EEA (Ethiopian Economics Association) annual international conference. From past experiences, this conference is well known for creating a platform where policy makers, academicians and practitioners are all gathering. As a result of this conference, we anticipate that our findings can be more widely disseminated and we will benefit from constructive comments and feedbacks from participants with different insights which will strengthen the paper. Besides as a strategy to reach the wider audience, we plan to publish the final paper on one of peer reviewed local or international journals.
## 9. List of team members

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex(M,F)</th>
<th>Training and experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ermias Engida</td>
<td>31</td>
<td>M</td>
<td>Holds M.A. in economics (Applied Trade Policy Analysis). He took his B.A in economics. He has taken several professional trainings on CGE modeling, GAMS software, and applied Micro econometrics by renowned professors with several years’ experience in teaching and research. He has extensive experience in macro-economic modeling. He has played vital role in the design of Ethiopia’s Growth and transformation plan employing CGE modeling and examined different aspects of the plan over time including alternative financing options. He has also applied CGE modeling to examine agricultural productivity, public investment, role of livestock, and public services. He also applied CGE to examine alternative policy schemes and their implication to welfare. His areas of research are multi-sectoral and goes beyond national boundaries as could...</td>
</tr>
</tbody>
</table>
Easily be seen from attached CV indetail. He is working as a research officer at International Food Policy Research Institute (Ethiopian Strategic Support Program) where he has produced several policy relevant papers independently and jointly with varied international researchers. As part of Ethiopia strategic Support program’s capacity building project he is advising several graduate and postgraduate students with their thesis on CGE modeling. Before he joined IFPRI he used to teach at Arba Minch University where he lectured core departmental courses. He is fluent in English and Amharic languages.

| **Ibrahim Worku** | 33 | M | Holds M.Sc. (Economic Policy Analysis) and B.Sc. in economics. He has also successfully completed training by the World Bank on “Impact Evaluation in Agriculture and Community Driven Development Program”. Economic policy analysis using GAMS and CGE Software. He works for International Food Policy Research Institute (Ethiopian Strategic Support Program and Ethiopian Development Research Institute) as research officer. In this capacity he has written and published several papers relevant for both the academia and to |
Inform policy. He has expert level skills in several statistical and econometric softwares including STATA, SPSS, and GAMS. He has extensive experience in coordinating large surveys. He also has proven experience in cleaning, analyzing, and publishing papers based on these massive datasets. Before he joined IFPRI, he was teaching as a lecturer and working on different projects as a researcher at Addis Ababa University, department of Economics. He also briefly took a research position at Ethiopian Development Research Institute (EDRI) where he collaborated with experienced researchers in several studies. He is fluent in English and Amharic.

<table>
<thead>
<tr>
<th>Mekdim Dereje</th>
<th>33</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holds M.Sc. (Finance and economic development) and B.Sc. in economics. He has successfully completed training in survey management and CSpro Data entry and processing application. He works for International Food Policy Research Institute (IFPRI). At IFPRI, he has, independently and jointly with colleagues, published in working papers and peer reviewed journals. He has also taken part in report writing, survey coordination, data management, analysis and presentation at conferences and</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Institutes and the academia. He has expert level skill in several statistical and econometric softwares including STATA, SPSS, and GAMS. He has extensive experience in coordinating large surveys. He also has proven experience in cleaning, analysing, and publishing papers based on these massive datasets. Before he joined IFPRI he used to be a lecturer at Haramaya University, department of Economics where he participated both in research and teaching. He also worked as a research assistant in Copenhagen University, Denmark and chief economist in Wabekon Consult. He is fluent in English, Afan Oromo and Amharic languages.

**Feiruz Yimer**

31 F

Holds M.Sc. (Economic Policy Analysis) and B. Sc. in Economics. She has also successfully completed training in Economic policy analysis using CGE and GAMS software. She has also taken training on “Impact evaluation on agricultural and community driven development programs”; Training on leadership skills and training on GAMS/CGE–dynamic version. She works for International Food Policy Research Institute (Ethiopian Strategic Support Program and Ethiopian Development Research Institute) as research officer. In
In this capacity she has written and published several papers relevant for both the academia and to inform policy. She has expert level skills in several statistical and econometric software including STATA, SPSS, and GAMS. She also has proven experience in cleaning, analyzing, and publishing papers based on massive datasets. Before she joined IFPRI, she was achieving as a lecturer and working on different projects as a researcher at Addis Ababa University, Department of Economics. She served as a coordinator of Gender Office of Faculty of Business and Economics at Addis Ababa University, Addis Ababa, Ethiopia. She has also participated in several community development programs such as creating awareness about HIV-AIDS and the importance of women empowerment. She is fluent in English and Amharic languages.

| Saba Yifredew | 31  | F   | Holds M.A. (Economics of International Trade), M.A. (Economics) and B.Sc. in economics. She has also successfully completed training on Economics Policy analysis using CGE and GAMS software; Training on leadership skills and training on GAMS/CGE - dynamic version. She is currently the head of the Department of Economics at Addis Ababa University. She |
is also Academic Programs Unit Head of Addis Ababa University. She has independently and jointly with colleagues at Addis Ababa University and elsewhere written several research papers. She has extensive experience in report writing and communication with affiliate organizations.
10. Capacity building

The research team is composed of individuals with different specializations. For some of the team members this is the first CGE type research (Mekdim and Ibrahim) while the experiences of the three remaining researchers ranges from more than 6 years (Ermias) to roughly 2 years (Saba and Feiruz). This, therefore, creates an excellent platform, particularly, for two new members to grasp the basics of CGE modeling. The team leader devotes some time introducing the different steps of CGE modeling including data compilation, model implementation, simulation and debugging to Mekdim and Ibrahim. On the other hand, Ibrahim and Mekdim are well acquainted with econometric techniques pertinent to establish the type of relationship we seek in this study including dichotomous data model estimation and instrumental methods (IV method). This gives opportunity for Ermias and possibly Saba and Feiruz to learn rigorous econometric techniques. The team members also hugely benefit from proved report writing experiences of Saba and data management skills of Feiruz. This varied, yet vital, skills help the team to produce quality research while simultaneously equip members in their future research endeavor.

Below we present specific tasks each team member would carry out in executing the project:

<table>
<thead>
<tr>
<th>Name</th>
<th>Task/contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ErmiasEngida</td>
<td>He is the team leader. Overall responsible incoordination of activities. He serves as a focal person for meetings with government officials and MSEs leaders, and communicating proposal and research outputs of the team to all stakeholders. He also takes active part in CGE modeling and mentoring of team members to develop capacity for future research.</td>
</tr>
<tr>
<td>IbrahimWorku</td>
<td>Responsible to coordinate the sub-team that does econometric modeling. He focuses on running and testing the binary and IV regressions and establishes whether the results withstand different sensitivity tests.</td>
</tr>
<tr>
<td><strong>Feiruz Yimer</strong></td>
<td>Coordinates the econometric work to estimate elasticity for the CGE part. She was also responsible to clean and make ready the data that is used in this estimation. She also helps in organizing and synthesizing pertinent literatures and to cross check the consistency of the result with other studies. She was also responsible for writing the section on conceptual framework of the basic models.</td>
</tr>
<tr>
<td><strong>Mekdim Dereje</strong></td>
<td>Mainly worked on the descriptive analysis of the study. He produced tables and graphs on key variables to complement the econometric modeling. Together with Feiruz, he also took active part in literature review.</td>
</tr>
<tr>
<td><strong>Saba Yifredew</strong></td>
<td>While taking active part both in CGE and econometric modeling, she also coordinates the report writing. She takes care of the coherence between the different sections of the report. His extensive experience in this regard was essential for other team members to share her experience.</td>
</tr>
</tbody>
</table>
## 11. List of past, current or pending projects in related areas involving team members

<table>
<thead>
<tr>
<th>Name of funding institution</th>
<th>Title of project</th>
<th>Team members involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReSAKSS-ECA</td>
<td>Role of livestock in the Kenyan Economy: Policy Analysis using Dynamic CGE model for Kenya</td>
<td>Ermias Engida</td>
</tr>
<tr>
<td>PEP</td>
<td>Alternative Policy Strategy to ADLI for Ethiopia: A Dynamic CGE Framework Analysis</td>
<td>Ermias Engida</td>
</tr>
<tr>
<td>IFPRI</td>
<td>Ethiopia’s Growth and Transformation Plan: A CGE Analysis of Alternative Financing Options</td>
<td>Ermias Engida</td>
</tr>
<tr>
<td>Ethio-Telecom</td>
<td>Three rounds of Customer satisfaction survey</td>
<td>Saba Yifredew</td>
</tr>
<tr>
<td>World Bank</td>
<td>Responsiveness of Rural Households to cereal Price Changes</td>
<td>Saba Yifredew</td>
</tr>
<tr>
<td>DFID</td>
<td>Exploring Demand and supply factors behind recent cereal prices</td>
<td>Saba Yifredew</td>
</tr>
<tr>
<td>Ethiopian Development Research Institute</td>
<td>Inflation-Growth nexus-Estimation of Inflation threshold for Ethiopia</td>
<td>Saba Yifredew</td>
</tr>
<tr>
<td>Ethiopian Development Research Institute</td>
<td>Cereal Consumption and Demand Patterns in Urban Ethiopia</td>
<td>Saba Yifredew</td>
</tr>
<tr>
<td>Ethiopian Development Research Institute</td>
<td>Road Sector Development and Economic Growth in Ethiopia</td>
<td>Ibrahim Worku</td>
</tr>
</tbody>
</table>
12. References


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