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The role of micro and small scale enterprises in the Ethiopian economy, government intervention and alternative strategies: A CGE analysis

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Abstract

Given the fact that Micro and Small scale enterprises (MSEs) are high on the Ethiopian government's agenda for mid-term growth and transformation plan (GTP), this study aims to investigate the major contributions and the potential of this sector to the Ethiopian economy. Using a CGE modeling approach, we assess the role of MSEs towards the major development goals of the government: unemployment and poverty reduction. Three simulation scenarios were designed based on the current MSE development plan but with different implementation strategies. The strategy that the government is currently following to implement the MSE development plan was found to be performing the best on expanding overall production, but failed to tackle the critical issues of poverty and unemployment reduction. However, other alternative strategies were found to give the country the best solutions to these development concerns as well as investment. Female unemployment also reduced the most in these alternative scenarios. This shows that the MSE sector has the potential to meet the envisaged developmental goals in Ethiopia, but strategy adjustment is needed.

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Table of contents

Tables and figures

I. Introduction

Micro and Small scale Enterprises (MSEs) are defined differently by different researchers and organizations. Though their definition is context specific, and thus varies by country, the definitions are typically based on the number of employees, the value of sales, and/or the value of assets (OECD 2004b). According to the World Bank, micro and small enterprises are those which employ no more than 50 people, and have total assets and an annual turnover of less than 3 million USD. However, Meghana, Beck, and Demirgüç-Kunt (2003) discuss that definitions based on employment are the most common, even though there is variation on the upper and lower limits. In the Ethiopian context, the Ministry of Urban Development and Construction (MUDC) (2013) defines MSEs based upon the number of employees and the assets owned by the enterprises. An enterprise can be defined as micro and small when the number of employees (including the owner or family) is not greater than 30, and total assets do not exceed 1,500,000 ETB. This is the definition we followed in this paper. Since micro enterprises are typically informal (Malhotra, 2007), this study also covers the informal activities as a significant part of the MSE sector. Using the criteria of undertaking business registration and acquiring a license as a formality to distinguish formal and informal enterprises (Bigsten, Kimuyu, and Lundvall, 2000; CSA, 2003, Hussmanns, 2001), 31% of MSEs in Ethiopia were found to be operating informally (MUDC, 2013).

No matter how diverse the definition is, the development of MSEs is taken as a key strategy for job creation, poverty alleviation and more generally, economic development in developing countries. According to a study by Beck and Demirguc-kunt (2005), the contribution of MSEs along with medium enterprises accounted for about 30% of employment and 17% of GDP in developing countries. The Association of Southeast Asian Nations (ASEAN) estimates that in its member countries, small and medium-sized enterprises (SMEs) account for more than 96% of all enterprises, and 50% to 85% of domestic employment. The contribution of SMEs to ASEAN members' gross domestic product (GDP) is between 30% and 53%, and the contribution of SMEs to exports is between 19% and 31% (ADB, 2014). In developed countries, the share of the enterprises is also large, and accounts for, on average, about 50% of GDP and 60% of employment. 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 would be highly important as they are closely associated to the relatively poor, and especially to disadvantaged groups of women and youth (Robu, 2013).

The role of MSEs in employment creation and overall economic growth is strongly emphasized in the literature. Daniels (1999) and Beck and Demirguc-kunt (2005) discuss that 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 appeal more to the poor and the vulnerable in particular. Hence the expansion of these enterprises could serve as a powerful tool for reducing poverty, and spur economic growth without worsening income inequality. As discussed in MUDC (2013), tackling issues of unemployment through the support and promotion of large scale manufacturing industries has repeatedly failed in countries like Ethiopia. Large scale enterprises are characterized by larger demand for heavy machineries with relatively advanced technologies, high investment and working capital, and more skilled manpower, which are all in limited supply in developing countries.

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 and standard of living of the citizens of these countries, and the degree of vibrancy of the respective country's MSEs.

MSEs play a significant role in the Ethiopian economy too. According to the 2002 nationwide survey of the Central Statistics Authority (CSA), in Ethiopia there were 974, 676 cottage/handicraft[1] manufacturing establishments employing 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% were in urban areas) employing 97, 782 people.

[1] Which are classified as micro enterprises according to CSA classification.

According to Aregash (2005), 98% of business firms in Ethiopia are micro and small enterprises, out of which small enterprises represent 65% of all businesses. The service sector represents the majority (46.4%) of these enterprises, followed by the trading sector (40.0%), the manufacturing sector (9.2%) and the construction sector (4.4 %) (Bekele and Muchie, 2009). Even though a small portion of these enterprises are engaged in the industry sector, they contribute the biggest number of enterprises in the industry sector. Like many other African countries, the industrial sector in Ethiopia is characterized by a large number of very small enterprises, and a small number of large firms (Page and Söderbom, 2012).

Value added share and labor-capital composition of the MSE sector is scarce in the literature. Thus, we managed source this important information using the three manufacturing sector surveys of the CSA[2] and the SAM documentation of EDRI (2009). We found that MSEs contribute 31.8% of the total non-agricultural value addition in Ethiopia. Besides, they contribute 18.5% of the labor, and 13.3% of the total capital in the country excluding the agriculture sector. This clearly shows that the MSEs in Ethiopia are more labor intensive.

These enterprises have significant economic meaning to the majority of women living in poverty. According to Rahmato (2004), small business enterprises constitute the only livelihood available to the majority of impoverished women in Ethiopia. According to CSA (2004), roughly 49% of new businesses that were operational between 1991 and 2003 were owned by women. Based on the MUDC (2013) report, Ethiopian women take a significant part of their employment in the MSE sector nationwide. Of the jobs created by MSEs, 44% of them are filled by women, and 40% of the owners and/or managers of these enterprises are women. The enterprise survey of the International Finance Corporation (IFC) estimates that the proportion of formal micro, small and medium enterprises (MSMEs) with one or more women owners is 38% to 47% in central Asia and 38% to 46% in Eastern Europe. Women-owned MSMEs are therefore making significant contributions to these economies. Besides, women are more likely than men to work in agriculture and services, while the opposite is true for manufacturing (ADB, 2014). According to

[2] 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.

ILO (2002), in sub-Saharan Africa 84% of female non-agricultural workers are informally employed compared to 63% of male non-agricultural workers. Females are relatively highly employed in service sector activities in Ethiopia too. As Gebreyesus (2007) stated, even though the vast number of businesses in Ethiopia are led by men, service sector activities like retail trading, beauty salons, bars and restaurants, and local brewing businesses are mainly led by women.

Even though Ethiopian women are significantly employed in the MSE sector and creating job opportunities, there is still a gender bias in the major cities of the country. The strategic support women enterprises receive from the national government has been minimal. This is one reason for the lack of growth in these enterprises (Abegaz, 2004). CSA (2015) indicates that the female urban unemployment rate is 23.8% while the male urban unemployment rate is significantly lower at 10.4% (less than half that of women), which indicates that female unemployment is a big problem. Thus, the MSE sector has a significant gap to fill since it is still the biggest absorber of the female labor force which must be considered in addressing the question of how to reduce female unemployment.

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

II. Significance and objectives

This research is significant due both to its relevance and the novelty of the technique applied. This study is very timely because the government of Ethiopia is currently placing a lot of emphasis on and is expecting a lot from the MSE sector, which has not yet been developed. This study also recommends policy options which could help to improve growth and efficiency of the sector so that it can meet the envisioned goals.

The technical contribution comes from special features of and modifications in the SAM and the CGE model. This gives us the luxury of being able to generate robust results which, in turn, allow for an original and unique analysis that meets the intended objectives of this research.

In Ethiopia, there are few studies that have rigorously examined the role of MSEs on employment, economic growth and poverty. Moreover, we were not able to find any economy wide assessment of the role of MSEs in Ethiopia; it may be that this has not yet been done. Therefore, we attempt to critically examine the role of MSEs in the Ethiopian economy by employing appropriate data and techniques.

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

Specifically, this study addresses the following research questions:

A. What is the role of MSEs on reducing unemployment and poverty in Ethiopia? In particular, do they have the potential to address these development concerns of women?

We try to assess the potential of MSEs to answer the development questions through public investments in line with the MSE development plan. This development plan is being implemented through giving training and better access to working capital that can improve the productivity and competitiveness of MSEs.

B. Is there any alternative strategy to implement the MSE development plan which could have a better effect on poverty and unemployment reduction goals in general, and that of women in particular? Based on this objective, this paper will assess the effectiveness of government's actual strategy in comparison with alternative strategies.

III. Methodology

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

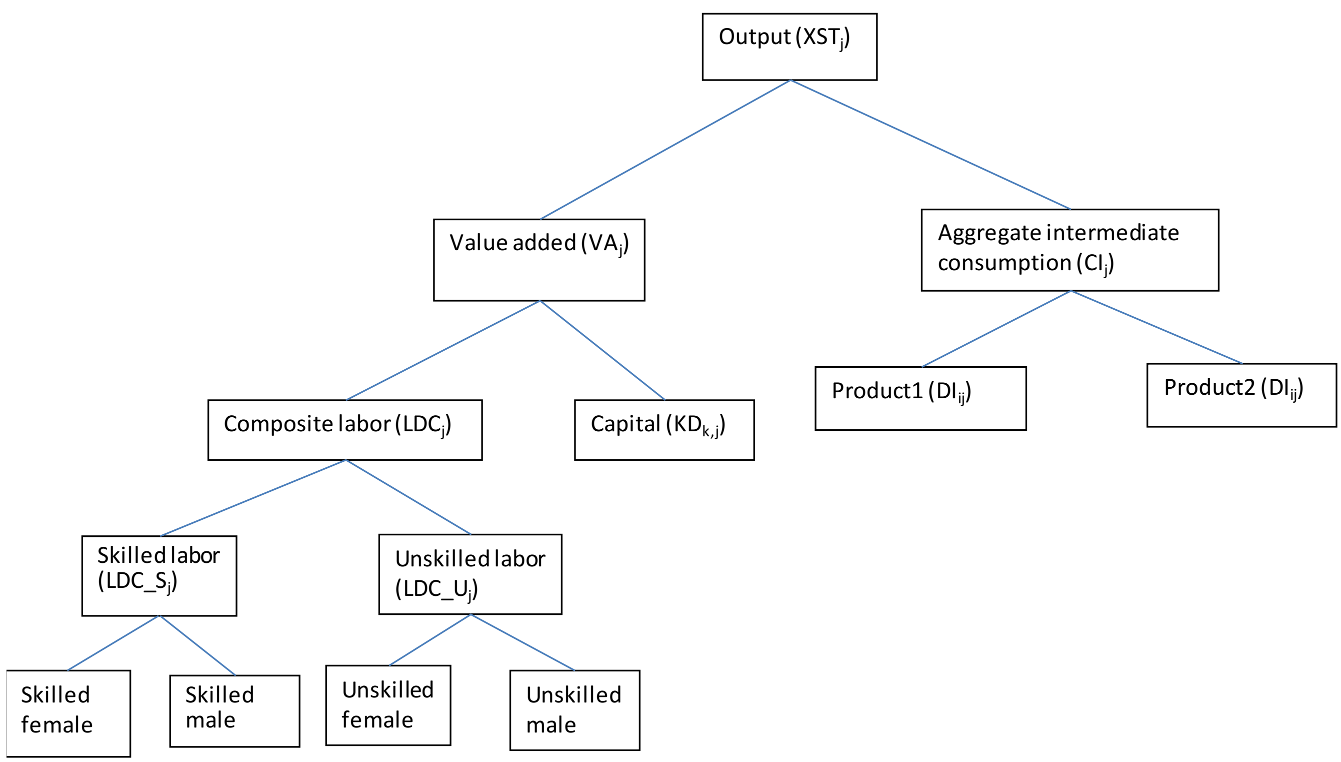
3.1. CGE model

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, 2008).

Our model uses labor and capital as factors of production. For the purpose of our study, 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 in a less substitutable manner. Technically, this means that the manager first decides what skill level of labor to hire, and then, whether the labor should be male or female in that particular skill level (but not vice 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, 2008).

As it is can be seen in Figure 4.1, 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.

Figure 4.1: Nested structure of production



Equations 1 and 2 illustrate 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 the unskilled labor market, assuming the work is more physical rather than technical, male and female workers are made to be less substitutable. However, since the skilled labor market involves more technical and intellectual work, we assume that female workers have better chances of getting a job in the skilled rather than in the unskilled labor market. Thus male – female substitutability is greater in the skilled labor market than the unskilled.

$$\boldsymbol{LDC\_U_j = B\_LDU_j * [\textstyle\sum_{l2} \beta\_LDU_{l2,j} * LD_{l2,j}^{-\rho\_LDU_j}]^{\frac{-1}{\rho\_LDU_j}}} \text{ .... } \mathbf{(1)}$$

$$\boldsymbol{LDC\_S_j = B\_LDS_j * [\textstyle\sum_{l1} \beta\_LDS_{l1,j} * LD_{l1,j}^{-\rho\_LDS_j}]^{\frac{-1}{\rho\_LDS_j}}} \text{ .... } \mathbf{(2)}$$

Where: LDC_U_j *composite unskilled labor force in activity j*

LDC_S_j *composite skilled labor force in activity j*

ρ_LDU_j *is a substitution parameter,*

ρ_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.

$$\boldsymbol{LDC_j = B\_LD_j * [\beta\_LD_j * LDC\_S_j^{-\rho\_LD_j} + (1 - \beta\_LD_j) * LDC\_U_j^{-\rho\_LD_j}]^{\frac{-1}{-\rho\_LD_j}}} \text{ .... } \mathbf{(3)}$$

Where: LDC_j *composite labor force in activity j*

ρ_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*

β_LD_j *is CES activity function share parameter, and*

B_LD_j *is efficiency parameter in the CES activity function,* Equations 4, 5 and 6 generate 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.

$$\boldsymbol{LD_{l2,j}} = [\boldsymbol{\beta\_LDU_{l2,j}} * \left(\boldsymbol{WC\_U_j}/\boldsymbol{WTI_{l2,j}}\right)]^{\sigma\_LDU_j} * \boldsymbol{B\_LDU_j^{\sigma\_LDU_j - 1}} * \boldsymbol{LDC\_U_j} \ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(4)}$$

Where: $WTI_{l2,j}$ *wage rate paid by industry j for unskilled labor including tax,*

WC_U_j *wage rate of industry j composite unskilled labor*

σ_LDU_j *CES composite elasticity*

$$\boldsymbol{LD_{l1,j}} = [\boldsymbol{\beta\_LDS_{l1,j}} * \left(\boldsymbol{WC\_S_j}/\boldsymbol{WTI_{l1,j}}\right)]^{\sigma\_LDS_j} * \boldsymbol{B\_LDS_j^{(\sigma\_LDS_j - 1)}} * \boldsymbol{LDC\_S_j} \ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(5)}$$

$$\boldsymbol{LDC\_S_j} = [\left(\boldsymbol{\beta\_LD_j}/(\boldsymbol{1 - \beta\_LD_j})\right) * \left(\boldsymbol{WC\_U_j}/\boldsymbol{WC\_S_j}\right)]^{\sigma\_LD_j} * \boldsymbol{LDC\_U_j} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(6)}$$

The activity level wage rate for composite labor is calculated as a weighted average of wage for skilled and unskilled labor in that activity. To be more precise, the wage rate in the non- MSE sector is assumed to be fixed since the wage rate in the public sector and big firms is not market driven and is rather set and led by the government. However, the wage rate in the MSE sector, the sector in which unemployment is assumed, is set to be at the efficiency wage rate calculated as shown in equation 7.

$$\boldsymbol{W\_MSE_l = ee_l + \left(ee_l/qq_l\right) * \left(bb_l/un_l + rr\right)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(7)}$$

Where : W_MSE_l wage rate for labor in MSE sector

ee_l effort desutility

qq_l probability of detection of shirking

bb_l exogenous probability to be fired

un_l unemployment rate

rr discount rate

In this model unemployment is considered. The labor market from the supply side is constructed so that the non-MSE sector satisfies its labor demand first (i.e. every worker prefers to work in the non-MSE sector). If a worker cannot get a job in the non-MSE sector then she/he will search in the MSE sector. Some will be successful and some will remain without work. 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 pool of the unemployed.

$$\boldsymbol{LS\_NMSE_l = \sum_{j2} LD_{l,j2}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad \textbf{(8)}$$

$$\boldsymbol{\sum_{j1} LD_{l,j1} \Big/ (1 - un_l) = LS_l - LS\_NMSE_l} \ldots\ldots\ldots\ldots\ldots\ldots \quad \textbf{(9)}$$

Where: LS_NMSE_l *Labor supply in the Non-MSE sector,*
$LD_{l,j2}$ Labor demand of the *Non-MSE sector,*
$LD_{l,j1}$ Labor demand of the M*SE sector, and*
LS_l 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 industries 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 the scale of operation level, especially in the manufacturing and construction activities from the industry sector and trade, and hotel and restaurant activities from the service sector. We select these sectors because most of the MSEs in Ethiopia are engaged in them[3]. The two lines of production follow two different production technologies to produce the same output. As shown in Table 1, the MSE sectors use more labor intensive technology than the non-MSE sectors.

CES functional structure is used to supply a single product of the two production lines. Thus, a commodity is produced in either the 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 production is set to be imperfect. As

[3]Operations at micro (classified under handicraft and cottage according to CSA's classification) and small level are grouped under the MSEs while operations at medium and large level are grouped under non-MSEs.

calculated in SAM, the MSE sector supplies 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

Industrial clasifications	MSE		Non_MSE	
	Labor share	Capital share	Labor share	Capital share
Agriculture			75.4%	24.6%
Dairy	61.0%	39.1%	46.5%	53.5%
Food	57.1%	43.0%	38.7%	61.3%
Beverage	61.0%	39.1%	46.5%	53.5%
Textiule and leather	61.0%	39.1%	46.5%	53.5%
Wood	61.0%	39.1%	46.5%	53.5%
Metal	61.0%	39.1%	46.5%	53.5%
Construction	50.5%	49.5%	25.6%	74.4%
Other industries			41.4%	58.6%
Trade	48.0%	52.0%	20.6%	79.4%
Hotel	62.9%	37.2%	50.3%	49.7%
Administration			31.1%	68.9%
Other service			54.1%	45.9%

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 (Decaluwe, Lemelin, Robichaud and Maisonnave, 2013).

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 a product is from MSE or Non-MSE, but the consumer does not. 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.

$$\boldsymbol{DD_i} = \boldsymbol{B\_DS_i} * \sum_j [\boldsymbol{\beta\_DS_{j,i}} * \boldsymbol{DS_{j,i}^{-\rho\_DS_i}}]^{-1/\rho\_DS_i} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad \textbf{(10)}$$

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

ρ_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

	Agricultural labor	Non-agricultural labor	Capital (capital + Land)	Government transfer	Remittance
Rural household	33.2%	1.2%	34.5%	0.5%	4.2%
Urban household		10.9%	7.2%	0.7%	7.7%

Source: Data from the SAM documentation 2005/06

3.2. 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, Greer and Thorbecke, 1984). This measure is noted as:

$$\boldsymbol{P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^\alpha} \quad \text{...} \quad \textbf{(11)}$$

Where: α *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_α 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 α=2.

IV. 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 the 2005/06 Ethiopian economy. It was later updated for 2009/10 for a research project on alternative financing of the GTP plan[4].

Further modification is made on the SAM in order to meet the objective of this study. The SAM in use in this study has a total of 22 activities. 18 of them were 9 activities but were split by scale of operation into MSE and non-MSE. These activities are dairy, food, beverage, textile and leather, wood, metal and construction from the industry sector, and hotel and trade from the service sector. However, all of the other activities; agriculture, other industry ('othind'),

[4] For further clarification on the procedures taken to update the SAM, please refer Ermias et al, 2011

administration and other service ('othser') remain aggregated. The disaggregation 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 the CSA manufacturing sector survey data. Table 5.1 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. To avoid confusion in the coming parts of the paper, when we use "MSE sector", it means MSEs in the 9 activities listed above, and whenever "Non-MSE sector" is used, it means the non-MSE counterparts of these activities. Apart from these, we also have the following activities in the SAM; agriculture, other industry ('othind'), administration, and other service ('othser'). These are not included in MSE, or in non-MSE sectors. Based on the CSA manufacturing sector survey data, metal, wood work, construction and textile activities in the MSE sector are the dominant ones in terms of value addition.

Table 5.1: Intermediate input and value added shares from an activity by scale of operation

	MSE		Non-MSE		Total
	Intermediate input	Value addition	Intermediate input	Value addition	
Agriculture			9.5%	90.5%	100.0%
Dairy	23.2%	8.8%	39.9%	28.1%	100.0%
Food	23.2%	8.8%	39.9%	28.1%	100.0%
Beverage	23.2%	8.8%	39.9%	28.1%	100.0%
Textile and leather	15.3%	11.2%	61.4%	12.1%	100.0%
Wood	22.8%	24.0%	34.1%	19.2%	100.0%
Metal	8.2%	9.1%	65.6%	17.1%	100.0%
Construction	16.8%	11.1%	48.4%	23.7%	100.0%
Other industry			60.7%	39.3%	100.0%
Trade	16.1%	12.8%	49.9%	21.2%	100.0%
Hotel	23.2%	8.8%	39.9%	28.1%	100.0%
Administration			65.2%	34.8%	100.0%
Other services			65.2%	34.8%	100.0%

Source: Data from CSA 2003 and 2004, and own computation

There are 5 types of factors in the SAM; four types of labor disaggregated by gender and skill level, and one type of capital. In each activity, we first disaggregate the total value added into labor and capital, based on the share shown in Table 4.1 in the previous section. Then we disaggregate labor by gender and skill level governed by real shares based on data from the MUDC survey of 2013 for the MSE sector, and the CSA labor force survey data (CSA, 2006). Based on the definition from SAM documentation 2005/06, unskilled labor is a worker engaged in an elementary occupation which requires only little skill, or the lowest level of education. Besides, on the ILO website, an elementary occupation is defined as an occupation which requires only the 1st ISCO skill levels. Furthermore, skill level 1 only requires the 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 5.2). Having a male-female segmented labor market in the SAM provides the opportunity to observe 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

	MSE				Non-MSE			
	Female unskilled	Male unskilled	Female skilled	Male skilled	Female unskilled	Male unskilled	Female skilled	Male skilled
Agriculture					48.5%	48.5%	1.5%	1.5%
Dairy	30.4%	30.1%	17.2%	22.3%	10.9%	26.1%	9.0%	54.1%
Food	29.0%	14.0%	24.3%	32.7%	10.9%	26.1%	9.0%	54.1%
Beverage	29.0%	14.0%	24.3%	32.7%	10.9%	26.1%	9.0%	54.1%
Textile and Leather	20.6%	34.4%	16.5%	28.6%	20.3%	20.4%	16.8%	42.4%
Wood	4.4%	22.6%	13.1%	60.0%	7.4%	28.1%	6.1%	58.4%
Metal	4.4%	22.6%	13.1%	60.0%	8.0%	27.8%	6.6%	57.7%
Construction	4.3%	36.1%	8.6%	51.1%	14.4%	24.0%	11.8%	49.8%
Other industries					15.5%	23.3%	12.8%	48.4%
Trade	25.9%	25.4%	23.7%	24.9%	12.4%	25.1%	10.2%	52.2%
Hotel	29.0%	14.0%	24.3%	32.7%	10.9%	26.1%	9.0%	54.1%
Administration					12.4%	25.1%	10.2%	52.2%
Other services					12.4%	25.1%	10.2%	52.2%

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 from the CSA. The households from this data are disaggregated into urban and rural. Thus, it enables us to examine the effect of the government's effort to develop the MSE sector on urban and rural poverty separately, which is the major focus of the paper, and also very important for policy recommendation.

V. Results and analysis

5.1. Simulations

The study tests three sets of simulations. All the simulations are based on the Ethiopian government's MSE development plan in the GTP but considering different implementation strategies. The first explores scenarios that consider the government's actual strategy towards the implementation of the plan. However, the second and third simulations attempt to examine two different alternative strategies that the government could have considered when implementing the plan for better accomplishment of its goals. The major difference between the actual strategy and the suggested alternative strategies is the target MSE activities. The government, so far, evenly distributes the interventions to the activities in the sector. However, the alternative strategies recommend that being selective is important for generating better results in terms of employment creation and poverty reduction, in particular, and goals of the plan in general.

The following interventions are applied in all the simulations;

1. Raising MSEs' TFP (Total Factor Productivity) as a result of training given so far (i.e. training coverage in terms of the number of MSE operators who received it). Based on MUDC (2013) data, only 34% of the operators had a training opportunity so far. Here, we assume trained labor can use all the other factors more efficiently. Thus, training could increase productivity of not only labor, but also the other factors. A research paper by Konings and Stijn (2010) stated that training has a positive impact on productivity. The marginal product of a trained worker is, on

average, 17% 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 throughout the MSE sector as a result of the 34% training coverage already achieved. Table 6.1 shows that the training delivered so far enables the MSE sector to achieve a 5.8% increase in productivity.

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

3. Besides the training opportunity, the government also offers loans to MSEs to start up or expand their businesses. Capital grows in the MSE sector by the amount of loan which is given out so far to the MSEs as part of the development plan. Assuming 100% of the loan funds invested on procurement of capital goods to the MSE sector, the loan brings new capital formation of the same magnitude to that sector. We tried to model this through introducing public investment (in the SAM and also in the model) on other industry ('othind') commodities which represent the purchasing of some capital goods like machinery, hand tools and equipments by the government. Then this investment is distributed among the MSE activities based on their original share of capital stock. Thus, finally, MSE activities' capital stock would be the previous stock plus the new capital formation. Public investment is introduced as an exogenous term assuming it is subject to political decision rather than being endogenously set by demand and supply forces. The GTP progress report (MoFED, 2014) stated that 2 billion ETB was given out in loans to MSE operators in the first two years of the GTP period. Thus, the government covers this spending through public investment which is financed from the government budget, through dis-saving from the local saving pool. The public investment in this regard is taken directly to augment the capital stock in the MSE sector (see Table 6.1).

Table 6.1: Percentage changes in the experimental parameters and the target activities in each simulation

Experimental parameters/Target activities	Sim1 (all MSE activities)	Sim2 (High value-added manufacturing MSEs)	Sim3 (Women oriented MSEs)
Productivity	5.8	5.8	5.8
Public spending	0.9	0.9	0.9
Public investment	100	100	100
Government income from foreign sources	3.8	3.8	3.8

For all the simulations, we used both internal and external sources as a means of financing. For modeling convenience we first made the entire cost of the interventions to be covered by government. This is well explained in the above paragraphs. In the second stage, the government is made to receive money from foreign sources in terms of transfer in order to cover its portion of the entire cost from foreign sources. This is based on the information we got from the mid-term plan of the Ethiopian government which states 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 modeled as increased transfer from the rest of the world to the government. In order to raise the funds needed to finance the already accomplished part of the MSE development plan, the government should secure a 3.8% increase in foreign transfer according to our calculations (see Table 6.1)

By construction of the model, the government is made to save the residual of its revenue from the total expense. Thus, as the government's expenditure for training and public investment spending increases, the leftover decreases which endogenously reduces the government's saving. With this mechanism, a 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, the actual and alternative simulations are different regarding the target activities to focus on for implementation of the plan. In the first simulation (Sim1), all activities in the MSE sector are evenly treated with any development intervention. However, the second and third simulations try different alternative strategies to compare the effectiveness of the policy with the same budgetary cost. In the second simulation (Sim2), the development intervention goes only to the major industrial activities in the MSE sector which are found highest in their value added and employment share based on the data from CSA. Construction, metal and wood work sub-sectors have a propensity to employ more labor than the other MSEs (MUDC, 2013). These target activities include textile, wood, and metal manufacturing activities and the construction sub-sector. Ethiopia has a tiny manufacturing sector which the government is working to improve. The current growth plan of the country (GTPII) also envisaged the country's take off towards transformation of the agrarian economy into an industrial one. Here, industries among the MSEs would play a significant role. Thus, focusing on the industrial sector in our simulation has the objective of examining the potential of the sector, whether it can fulfill the government's expectations and better answer the employment creation question. In the third simulation (Sim3), the target activities are proposed to be the MSE activities in the service sector; hotel and trade MSEs. The justification for this simulation is to see potential effects of a female oriented development strategy. As Mulu (2007) stated, females are relatively highly engaged in service sector activities. As discussed in the introduction, female owned enterprises have been discriminated against and lack attention, which has resulted in bad performance of the MSE sector despite its huge potential. This simulation attempts to discover the effects of favoring female oriented sectors. Based on the differences on the outcomes of these simulations, we recommend some alternative strategies for implementation of the MSEs' development plan, which is highly relevant to government policy.

In order to clearly show the distinct effect of every intervention, in Sim1 each of them are ran and analyzed step-by-step in a cumulative manner. First, an increase in public spending for training is shocked and its expected productivity effect on the MSE sector follows. The third step is increasing capital stock in the MSE sector through increasing public investment, in addition to the first and second increase. Finally, increasing government revenue through foreign transfer is shocked in addition to the first three which formulates the first simulation (Sim1) exactly as it is seen in Table 6.1.

5.2. Analysis of the results

5.2.1. Simulation 1 – current implementation of the plan

5.2.1.1. Effects on production and prices

Increasing government spending by itself results in almost no effect on almost all variables of interest (i.e, production, unemployment and GDP) except for investment demand which declines slightly, by 0.4%. Production in both MSE and non-MSE activities declines a bit by 0.1%, but increases slightly in the only two activities which the increased government spending goes to; public administration by 0.6% and other service sector ('othser') by 0.1%. This intervention becomes more meaningful when the expected productivity increase is applied to the MSE activities. Training the MSE operators has significant 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. MSEs in activities like textile, wood and metal works has the highest expansion. Other industries ('othind'), administration and other service sectors ('othser') also expand by 0.8%, 1.1% and 0.9% respectively, which is a result of government spending and spillover effects. These activities expand by at least double or more the magnitude of production increase gained in the first intervention (i.e increasing government spending alone). This shows that the indirect effects of efficiency gain in the MSE sector is much more 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 labor reallocation effects of the efficiency shock. However, the agriculture sector shrinks slightly by 0.3% as a result of its forward and backward linkage with the non-MSE sector, which also shrinks.

Besides training the operators, the government also gives loans 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 public investment (see Table 6.1), in addition to the interventions discussed previously, appear to have stronger positive effects on production in the MSE sector, but stronger negative effects on the Non-MSE sector. Other industry ('othind'), administration and other service sectors ('othser') also benefit from this intervention. Increasing public investment and the capital stock appears to be more powerful than training the operators regarding the impact on production. The former makes production in the 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 latter. Textile, wood and metal work activities in the MSE sector are those that receive the highest expansion as a result of the rise in capital stock. Additionally, trade and construction activities expand much more in this intervention than training the operators due to their highly capital intensive nature.

If we examine the results of the simulation interventions 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 on the non-MSE sector. MSEs expand by 9.0% and non-MSEs shrink by 0.5%. Since outputs from MSEs and non-MSEs in the same sector are made to be substitutable[5], increased supply of the products from the MSE sector as a result of the interventions which favor this sector makes the product from MSE activities cheaper than those produced by non-MSEs. Following the reduction on demand, the price in the non-MSE sector also decreases afterwards (see Table 6.2)

Combined, these interventions bring about a positive impact on all sectors' production in Sim2 except for the agriculture sector which faces a slight (0.1%) loss, which is a little better than

[5] Substitutability between MSE and Non-MSE commodities is set to be 0.8 assuming they are substitutable but not perfectly.
It is worth mentioning that a sensitivity analysis was carried out on the substitutability of the products from MSE and non-MSE sub-sectors. As we assume the products from the two sources are more substitutable (with a substitutability elasticity of 1.2), 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 the non-MSE sector shrinks by only 0.06% for the same magnitude of expansion in the MSE sector.

it does in Sim1. Contrary to the production failure it faces in Sim1, the Non-MSE sector expands slightly by about 0.2% when the implementation strategy targets high value added industry activities only (i.e. Sim2). However, the MSE sector and other sectors like other industry ('othind'), administration and other service sectors ('othser') expand at 5.8%, 1.0%, 0.8% and 0.9% respectively, and at a slower pace than in Sim1. Except agriculture and the non-MSE sector, this shows that focusing on the high value added industrial activities only has a 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 which targets women oriented activities. In this simulation, all the sectors expand except the non-MSE and agriculture. In terms of magnitude, as compared to the first simulation, the MSE and the other service sectors ('othser') increase at a slower pace, whereas the non-MSE and agriculture sectors expand either at the same, or a faster rate (see Table 6.2).

In terms of effects on price, the interventions' negative effects on producers' prices are almost similar in magnitude between Sim1 and Sim3 except for MSE prices, which declines in Sim3 by a rate less than half the rate in Sim1. This is a result of the relatively slower MSE expansion in Sim3. However, Sim2 has more of a positive effect on producers' prices than both simulations. Prices of non-MSE and other industry ('othind') outputs increase slightly, whereas that of MSE and other service activities ('othser') 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 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 'othind', MSE and 'othser'.

Table 6.2: Changes in production and price

	Production							Price						
	Base	Sim1	%	Sim2	%	Sim3	%	Base	Sim1	%	Sim2	%	Sim3	%
MSE	74.06	80.71	9.0%	78.33	5.8%	78.28	5.7%	1.000	0.913	-8.7%	0.954	-4.6%	0.964	-3.6%
Non-MSE	181.58	180.61	-0.5%	182.00	0.2%	180.67	-0.5%	1.000	0.990	-1.0%	1.001	0.1%	0.991	-0.9%
Agriculture	189.83	189.43	-0.2%	189.65	-0.1%	189.79	0.0%	1.000	0.998	-0.2%	1.000	0.0%	0.999	-0.1%
Other industry	33.52	34.24	2.1%	33.86	1.0%	34.23	2.1%	1.000	0.998	-0.2%	1.004	0.4%	0.996	-0.4%
Administration	20.64	20.93	1.4%	20.81	0.8%	20.90	1.3%	1.000	0.994	-0.6%	1.001	0.0%	0.996	-0.4%
Other service	98.72	100.51	1.8%	99.62	0.9%	100.24	1.5%	1.000	0.990	-1.0%	0.998	-0.2%	0.992	-0.8%

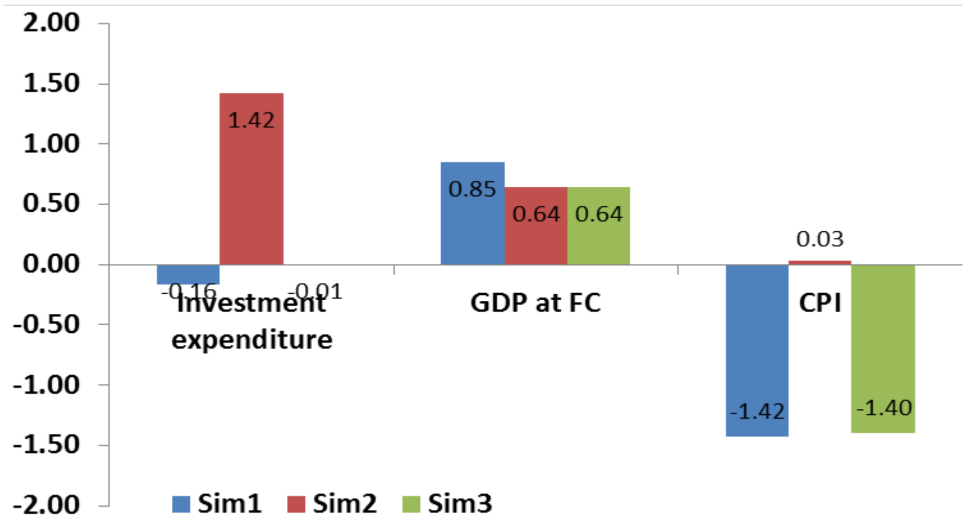
Source: Simulation results

5.2.1.2. 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 the amount of spending that surpasses its revenue from domestic sources. This could have a crowd out effect on private investors. This effect is clearly seen in Sim1 and Sim3 (see Figure 6.1). In both simulations, there is slight reduction in total private investment expenditure, 0.2% and 0.01% respectively. However, investment expenditure in Sim2 increases by 1.4% indicating that there is increased investment demand which surpasses the negative effect from the government's dissaving. Thus the two alternative strategies either generate absolute or relative positive solutions to the reduction in private investment in Sim1. Focusing on high value industrial activities, Sim2 is found to be the best solution to increase investment in the country along with implementing the MSEs' development plan.

Even though investment declines in Sim1 and Sim3, the expansion in the MSE, 'othind', administration and 'other' sub-sectors have a positive impact on GDP. This positive effect is coupled with a significant drop in overall price. The consumers' price index (CPI) falls by 1.4% for both Sim1 and Sim3. This helps the country's GDP grow by about 0.9% in real terms in Sim1. 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 %. Considering only production effects, both the alternative strategies are found to have a slightly weaker effect than Sim1. Thus the country's GDP increases by about 0.2 percentage points less in both the alternative strategies. This is the significant positive effect of the government's actual strategy over the alternative ones (see Figure 6.1).

Figure 6.1: Simulation effects on macro variables



Source: Simulation results

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 in total investment expenditure (0.4%). 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 is no significant difference on GDP, while investment expenditure declines two-fold. This shows that the government's savings are depleted as they are the only source of finance for 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 completely eliminated and investment expenditure drops only by 0.2%.

5.2.1.3. Effects on factors of production and returns

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

In our simulations the positive effect could not even 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 sector, with the exception of unskilled females in Sim2. The effects are found to be stronger in Sim1 and Sim3. However, Sim2 brings about the lowest rate of reduction for factor demand in the MSE sector. Regarding gender difference, unskilled male and skilled female workers face lower lay-off rates than their counter parts in Sim1. Dairy, food, construction, trade and hotel MSEs are the major activities in which unskilled female and skilled male laborers face the highest lay-off rate. Especially in the unskilled labor market, demand for female workers from the MSE sector falls significantly than the demand male workers (see Table 6.3).

On the contrary, factor demand increases in the economy excluding the MSE sector for all the simulations because of the activities like 'othind', administration and 'othser' that expand as a result of the simulations. The efficiency and capital stock shocks on the MSE sector created factor reallocation from the MSE sector to the rest of the economy. Skilled laborers of both genders benefit the most since they have the dominance in labor demand in these activities. The only exceptional cases here are the slight decrease in demand for unskilled female workers in Sim1, and the zero change obtained for unskilled males and females in Sim1 and Sim2 respectively.

Table 6.3: Simulation results on labor demand in MSE and all the other sectors in the economy excluding MSE

	MSE							All other sectors						
	Base	Sim1	%	Sim2	%	Sim3	%	Base	Sim1	%	Sim2	%	Sim3	%
Unskilled female	2.80	2.67	-4.9%	2.81	0.2%	2.64	-5.9%	68.57	68.49	-0.1%	68.57	0.0%	68.63	0.1%
Unskilled male	4.01	3.91	-2.5%	3.93	-2.1%	3.87	-3.6%	74.08	74.08	0.0%	74.16	0.1%	74.21	0.2%
Skilled female	2.68	2.51	-6.3%	2.65	-1.0%	2.54	-5.2%	6.680	6.754	1.1%	6.749	1.0%	6.751	1.1%
Skilled male	5.32	4.97	-6.6%	5.06	-5.0%	5.04	-5.2%	25.33	25.67	1.4%	25.66	1.3%	25.64	1.2%

Source: Simulation results

In the specification of the model, as already discussed in the methodology section, any worker whether male or female, skilled or unskilled, first goes to the non-MSE sector to search for job. If he/she is not successful then he/she will go to the MSE sector. If he/she is not still successful, then he/she will be unemployed.

In Sim1, unemployment increases on average by 2.9 percentage points for every labor type. The unskilled labor force is more affected than the skilled labor force because it is mostly hired by MSEs which are now more efficient and do not need that much unskilled labor anymore. Skilled laborers also face increased unemployment because of the reduced demand from MSEs, but this increases at a lower rate as they are mostly hired in the non-MSE sector and enjoy increased demand from this sector, as discussed above. As can be seen in Table 6.4, in Sim1 female unemployment increases the most 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 males rises 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 the efficiency shock in the MSE sector, there is a 3.3 percentage points increase in unemployment on average on all the labor forces. If we consider an increase in capital stock in the MSE sector on top of the efficiency shock, the result on labor unemployment could be more than double.

The stronger drop in labor demand in the MSE sector, which cannot be compensated by the increase in demand from the non-MSE sector, indicates that the government's actual strategy (i.e Sim1) couldn't result in a reliable solution for employment creation (or unemployment reduction) in Ethiopia, which is the major goal of the MSE development plan. Contrary to this plan, unemployment of vulnerable groups (i.e. women), in particular, is increasing. Female unemployment is on the rise for both skill levels. In fact, the unemployment of unskilled females increases more than for skilled females. Thus, it clearly shows that the MSE sector is not yet ready to absorb the increasing unemployed youth and women in urban centers. This is because of the implementation strategy that the government has followed so far. This can be clearly seen from the results of our alternative simulation scenarios that we propose to answer this serious question in a more effective manner.

Both our alternative simulations come up with better results in this regard either absolutely or relatively. Focusing on women-oriented MSEs (i.e Sim3) has no negative effect on unemployment, but it increases at a lower rate than the current implementation strategy (i.e Sim1). This can be used as a means, at least, to ease the problem. However, the absolute solution could be found if the government focuses on high value added and employment industrial MSEs (i.e 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 females and skilled males, respectively. Exceptionally, the unemployment rate for unskilled male labor increases by 0.4 percentage points, but still it is a lot lower than what is happening with the current strategy. As compared to Sim1, Sim2 is strong 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 would be the least affected at any skill level, especially the unskilled. Thus, concentrating on those industrial MSEs reduces unemployment in general and female unemployment in particular.

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

	Unemployment							MSE wage rate						
	Base	Sim1	% point	Sim2	% point	Sim3	% point	Base	Sim1	%	Sim2	%	Sim3	%
Unskilled female	27.0%	32.0%	5.0	26.7%	-0.3	30.1%	3.1	1	0.919	-8.1%	1.01	0.5%	0.95	-5.3%
Unskilled male	13.7%	16.0%	2.3	14.1%	0.4	14.4%	0.7	1	0.902	-9.8%	0.98	-1.7%	0.97	-3.2%
Skilled female	27.0%	30.2%	3.2	26.3%	-0.7	29.5%	2.5	1	0.945	-5.5%	1.01	1.3%	0.96	-4.3%
Skilled male	13.7%	14.6%	0.9	13.3%	-0.4	13.9%	0.2	1	0.957	-4.3%	1.02	1.8%	0.99	-0.7%

Source: Simulation results

As it is already explained in the methodology section, the wage rate in the economy, excluding the MSE sector, is made to be exogenous which can only be changed by policy decisions rather than market forces. Thus, the only change we can discuss is the MSE wage rate. As we can see from Table 6.4, the wage rate in the MSE sector for all labor types decreases in SIM1 and Sim3 as a result of reduced demand for all labor types in the MSE sector following the efficiency and capital stock increase shocks. In Sim1, the magnitude of the change is a bit stronger for unskilled workers than their skilled counterparts for both males and females, showing the stronger effect from MSEs. In Sim3, it is the female workers in both skill levels who face a stronger drop in their wage rate. On the contrary, all labor types employed in the MSE sector, except unskilled males, enjoy a significant increase in wage in Sim2.

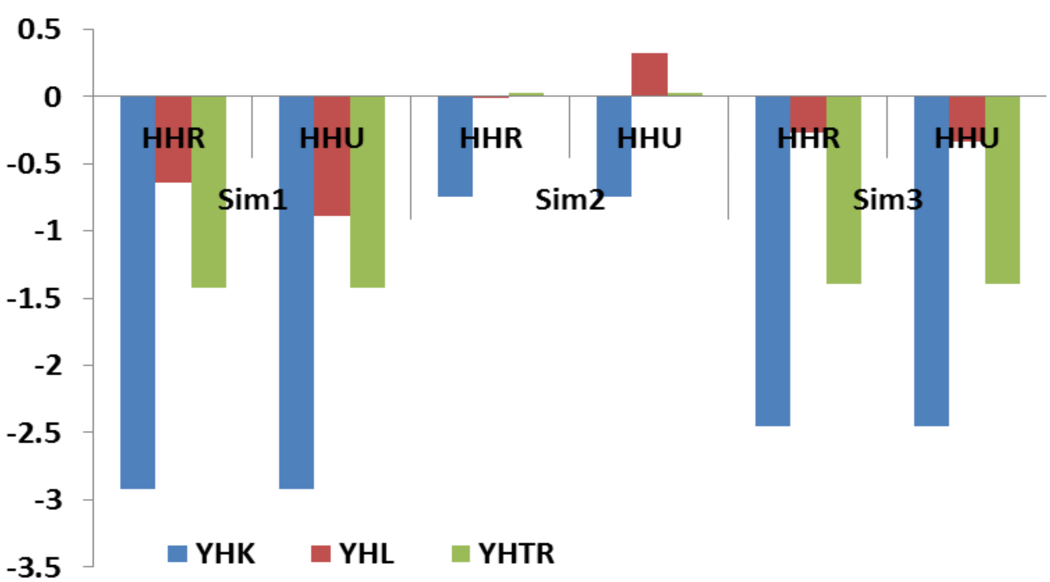
On the other hand, the economy wide return to capital also decreases on average by 11.9% in Sim1. In the MSE sector, this figure can be as much as 30% as a result of increased productivity which is coupled by growth in capital stock. However, capital returns increase in the rest of the economy. Even though the government's dis-saving to finance some portion of the implementation cost shrinks private investment in the country, public investment in 'othind' increases. Besides, there is increased intermediate input and household consumption which increases demand for capital and returns to capital from non-MSEs. Since this positive effect is stronger, it eliminates the negative effect. Therefore, there is a slight increase (0.7%) in capital return from the rest of the economy excluding MSEs.

5.2.1.4. Effects on household income, consumption and poverty

Household nominal income decreases for both household types in all the simulations except urban households who enjoy a raised income in Sim2. As shown in Figure 6.2, nominal income from almost all sources decreases in Sim1 and Sim3. Income from capital (YHK), income from government transfers (YHTR) and income from returns to labor (YHL) decline in rank for both simulations. Urban households experience a slightly higher drop in income from their labor force, which is the highest contributor to their income. However, urban and rural households experience the least drop in income from all sources in Sim2. Income from returns to labor even increases for urban households while income from government transfers increases for both households. Moreover, income from returns to capital drops significantly in Sim1 and Sim3, whereas it increases very slightly in Sim2.

If we consider real income however, Sim1 and Sim2 result in similar effects on income levels of both households. Sim3 outperforms both simulations by making rural and urban households earn 0.1% and 0.6% higher income in real terms. Thus, focusing on women-oriented MSEs could make both households richer than before.

Figure 6.2: Sources of household income



Source: Simulation results

Regarding consumption, it is found to be the exact replica of real income. Rural households consume a little lower by 0.3% and 0.4% in Sim1 and Sim2 respectively, as a result of the drop in real income following interventions in the MSE sector, whereas urban households enjoy a rise in consumption in these simulations. The improved position of households in terms of consumption, despite the decrease in nominal income, is due to the effect of a larger 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 become poorer. However, Sim3 has the best solution for both households. If the government focuses on women-oriented MSEs (i.e Sim3), both rural and urban households will enjoy higher consumption, which increases by 0.1% and 0.6% respectively (see Table 6.5).

Table 6.5: Simulation effects on household income and household consumption

Nominal	Household income							Household consumption						
	BASE	SIM1	%	SIM2	%	SIM3	%	BASE	SIM1	%	SIM2	%	SIM3	%
Rural households	243.29	239.15	-1.7%	242.45	-0.3%	240.13	-1.3%	193.88	193.27	-0.3%	193.18	-0.4%	194.00	0.1%
Urban households	90.52	89.35	-1.3%	90.62	0.1%	89.78	-0.8%	60.45	60.56	0.2%	60.50	0.1%	60.82	0.6%

Source: Simulation results

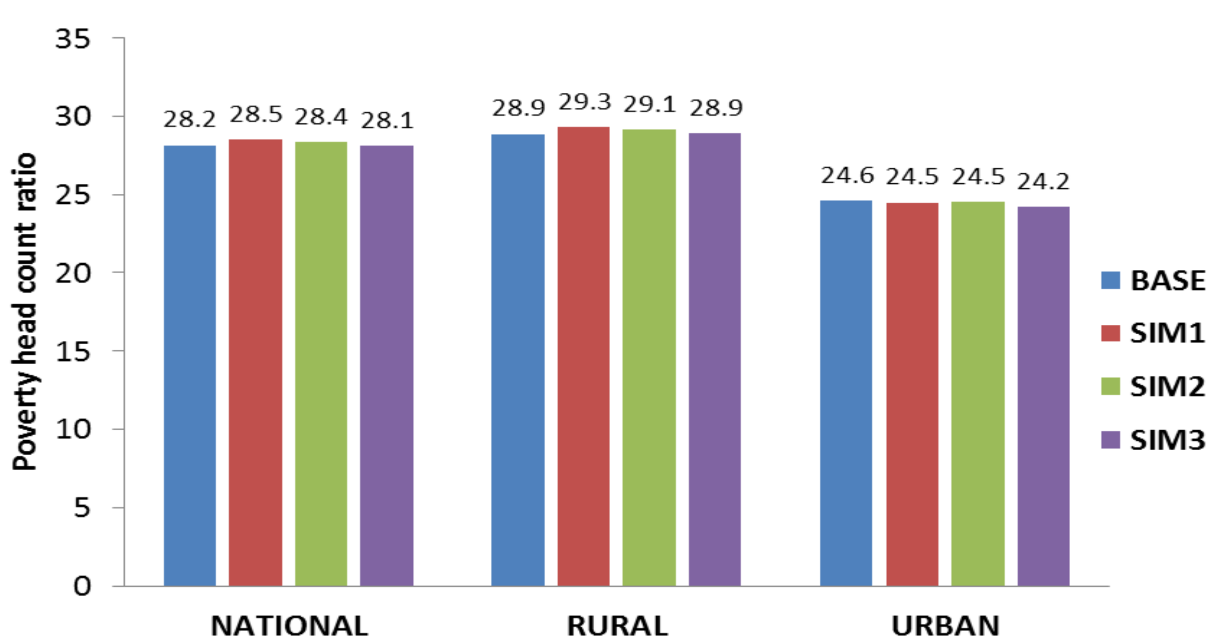
If we examine household saving, it increases in Sim2 either relatively or absolutely to that of the other simulations. This could be one reason why investment demand increases in Sim2 while it decreases in the other two simulations. Thus, Sim2 can be considered the best strategy to increase investment and also employment in the country along with implementation of the MSE development plan.

The effect of the simulations on household income and consumption has its own implication on household poverty level. As shown in Figure 6.3, the current implementation of the plan and the strategy the government follows (i.e Sim1) has a slightly worsened the poverty problem nationwide. The rural poverty head count ratio increases 0.4 percentage points, though that of urban households declines very slightly by 0.1 percentage points. The only success registered in terms of poverty reduction is that of urban households, which is very minimal in magnitude and later on overshadowed by the bigger failure in rural poverty.

Again contrary to the major objectives of the development plan, the government's current strategy ends up further increasing the number of poor nationwide. This shows us that from a poverty reduction angle, the plan with its current implementation strategy is ineffective. Thus, we tried out our alternative strategies.

Sim3 successfully reduces the urban poverty level by 0.4 percentage points which in turn reduces the national poverty head count ratio a little by 0.03 percentage points, with the rural poverty level increasing slightly. Sim2 also succeeds in reducing urban poverty slightly, but not as much as it is reduced in Sim3, and it does not succeed in reducing national poverty, which is also observed in Sim1 as discussed above. Thus, if the government focuses on women-oriented MSEs for applying its development plan, it could provide a better solution towards the poverty reduction goals of the country.

Figure 6.3: Implications of the simulations on poverty incidence



Source: Simulation results

VI. Conclusion and recommendations

The major objective of this study is to assess the role of MSEs in reducing unemployment and poverty. This study is very timely because the government of Ethiopia expects a lot from the MSE sector which is not yet developed. A CGE modeling approach was used to address the research questions.

The study tested three sets of simulations. All the simulations were based on the current MSE 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 showed to be of high value addition and employment. Moreover, Sim3 gives another alternative strategy which concentrates only on women oriented MSEs.

In the first simulation, results show that MSEs expanded and 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, "other industry" and "other service" brought a positive impact on the overall value addition in the economy. The real GDP increased by 0.9%, but total investment dropped. 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, the rise in skilled labor demand was shown in non-MSE activities. However, the negative effect surpasses the positive and labor demand in total declined which resulted in the worsening the unemployment problem on average by 2.9 percentage points for every labor type. The unskilled labor force was more affected than the skilled labor force. Besides, female unemployment increased the largest in both skill levels. Thus, we can conclude that the current strategy is ineffective towards the unemployment reduction goal of the MSE development plan.

In the current implementation strategy of the plan, urban households enjoy raised income in real terms, whereas that of rural households declines. Regarding consumption, rural households are forced to consume a little less, whereas urban households enjoy slightly increased consumption and poverty reduction.

Since the current government strategy does not address the major development concerns of the plan in the best way, alternative strategies were explored. Focusing on high value added industrial MSEs (i.e Sim2) was found to be a strategy that the government could exercise 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 females and skilled males respectively. As compared to Sim1, Sim2 was strong 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 only increased in this strategy.

On the other hand, focusing on women-oriented MSEs (i.e Sim3) is another strategy for finding the best solution in poverty reduction. Unlike the other two, Sim3 helps 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. The poverty level in urban centers reduces more than in Sim1. In fact, Sim3 also has a better solution regarding unemployment reduction and investment increases than the first simulation. However, the alternative simulations are not the best solutions regarding overall production, although they do have a positive impact.

Based on these results, the MSE sector has potential to change unemployment and poverty reduction. The policy recommendations of this study are:

First, the government has to rethink the best strategies for implementing the MSE 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 for the government is to select the best one for each important issue or top developmental concern. For instance, in our case the government is highly concerned about poverty and unemployment reduction. Thus, focusing on high value added industrial and women-oriented MSEs, which include activities like wood and metal work, textile, construction, trade and hotel, could be the best solution.

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