PUBLIC SPENDING COMPOSITION AND EFFICIENCY: IT'S IMPLICATIONS FOR GROWTH, STRUCTURAL CHANGE AND HOUSEHOLD WELFARE IN ETHIOPIA (USING RECURSIVE DYNAMIC CGE MODEL)

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ABSTRACT

This study examines the impacts of change in spending composition and efficiency on economic growth, structural change process and household welfare using a recursive dynamic computable general equilibrium model. The specification of this model incorporates spending composition into account and calibrates elasticity coefficients derived from the relationship between spending composition and sectoral total factor productivity. This is important to capture the effects of shifting public resources from unproductive administration sector to productive and efficient sectors of agriculture, manufacturing and infrastructure. The reduction in public expenditure on administration would have negative spillover and externality effects that could in turn reduce the productivity of expenditure on productive sectors. Therefore, the study considers monetary cost or opportunity costs of such reallocation of public resources. The study finds that the net effects of such changes in spending composition positively influence the economy wide growth rate and household welfare, but have different implications for structural change process. It is only the spending option of shifting public resources from administration to manufacturing industry that generates a positive impact on structural change process in Ethiopia. The study also finds that spending on infrastructure and agriculture is better in fostering economic growth rate and improving household welfare respectively. All simulations also show that service sector dominates GDP composition and possibly leads to a structural change burden. The study therefore recommends that the government undertakes a series economic policy revision in spending composition and favors spending on manufacturing in order to achieve both sustained economic growth and rapid economic transformation.

Key words: *structural change process, sectoral Growth Options, composition of public spending, recursive dynamic CGE model, middle-income country status*

INTRODUCTION

Ethiopia has experienced three main political regime changes with five economic policy shifts in the last five decades along with an unremitting political instability and war. The imperial government (1940-1974) mainly attempted to introduce series economic policy revisions targeting consumer goods industrialization and infrastructural development in the first five year plan over the period 1957-1962, durable goods industrialization in the second five year plan, and both commercial agriculture and industries in the third year plan (Chole, 1992 and Rahmato, 2004). However, the structure of economy was stagnant as the share of manufacturing in GDP and accounted for only 4.4 percent in 1974 (CSA, 1974). There was not significant structural change even if the socialist government (1974-1991) seized power and nationalized all the emerging private industries. The real per capita GDP rather declined to 1.4 percent on annually

and the foreign currency reserve also dwindled to 10 days of import coverage at the end of the reign (MEDaC, 1999; NBE, 1992).

In May 1991, the current reformist government toppled the socialist regime after a long period of internal conflict and War. The government has subsequently undertaken a series economic reform program of WB and IMF. In the reform, the government sets poverty reduction as the core objective for which growth is considered as the means (MOFED, 2005). Since 2005, the government pronouncedly redirected the basic framework of the economy towards a state-led development program and achieved a successive high economic growth rate above 7 percent on average. In order to keeping up this economic growth, the government also drew the Growth and Transformation Plan (GTP) in 2010 as a stepping stone to reach the middle-income status by 2025 and also intended to complement the current remarkable growth rates (MOFED, 2010).

Learning from the performance of Ethiopian economy, there are mainly two basic and persistent problems over the last decades. Firstly, economic growth and the associated per capita income characterized by mixed, volatile, erratic and poor performance. It shows negative growth rate performances seven times over the period 1981-2010. Secondly, the structural change is slow in pace and marginal in magnitude as evidenced by the manufacturing sector which has a negligible share in GDP (4.8 percent on average) and an insignificant contribution to GDP growth rate over the period 1981-2010 (WB, 2011).

The study, therefore, raises some research questions such as to what extent change in spending composition affects sectoral TFP and thereby growth, which economic sector should receive a prior attention in government budget allocation, and which sector is more productive and efficient in the face of growth and structural change. The main objective of the study is to examine the impact of change in spending composition on economic growth, structural change process, and household welfare. The specific objectives are as follows: examining the net effect of shifting public resource from administration to other productive sectors (agriculture, industry and service), and investigating the impact of change in spending composition on efficiency (total factor productivity) and then economic growth.

The main justification of the study is attributed to the severity and the extent of the problem associated with the role of government in line with solving erratic growth and stagnant structural change process that harm the lives of millions. There is an intensive and hot political debt regarding alternative government roles for securing sustainable growth options. However, the debate is not derived based on a rigorous analysis and holistic economy-wide approach. It is rather affiliated with politics. In addition to this, the government has faced public expenditure portfolio management. Expenditure on service sector accounts for the largest share (75 percent in 2010) in public capital expenditure while manufacturing industry is neglected and has a negligible share. A considerable share of public investment has been directed towards service

sector without identifying and analyzing the economic sector that generate more productivity and efficiency in the context of long run growth. This indicates that the government is poor in budget priority, public resource allocation and portfolio management by sector in order to secure sustainable growth and rapid transformation. Most studies also do not take into account the effect of prioritization and dynamic efficiency of change in spending composition. Therefore, the paper seeks to investigate these issues meticulously using dynamic CGE model.

Size and Composition of Government Expenditure

The Ethiopian economy has been growing with different fashions depending on the economic policies undertaken by the ruling governments at their times. During the 1980s socialist regime, the economy grew by 2.3 percent while the population grew by 3.2 percent on average. In effect, the per capita real GDP deteriorated overtime, accompanied with a negative 0.8 percent growth rate on average. This growth rate increased to 3 percent in the 1990s following the onset of more of liberalization policy. Unprecedentedly, it became around 7 percent over the period 2001-2010 in response to pro-poor economic growth policy and state-led development program (WB, 2011). The role of government in sustaining growth and economic transformation varies from regime to regime (Table 1).

Table 1: Summary of Government Finance in 1981 -2010

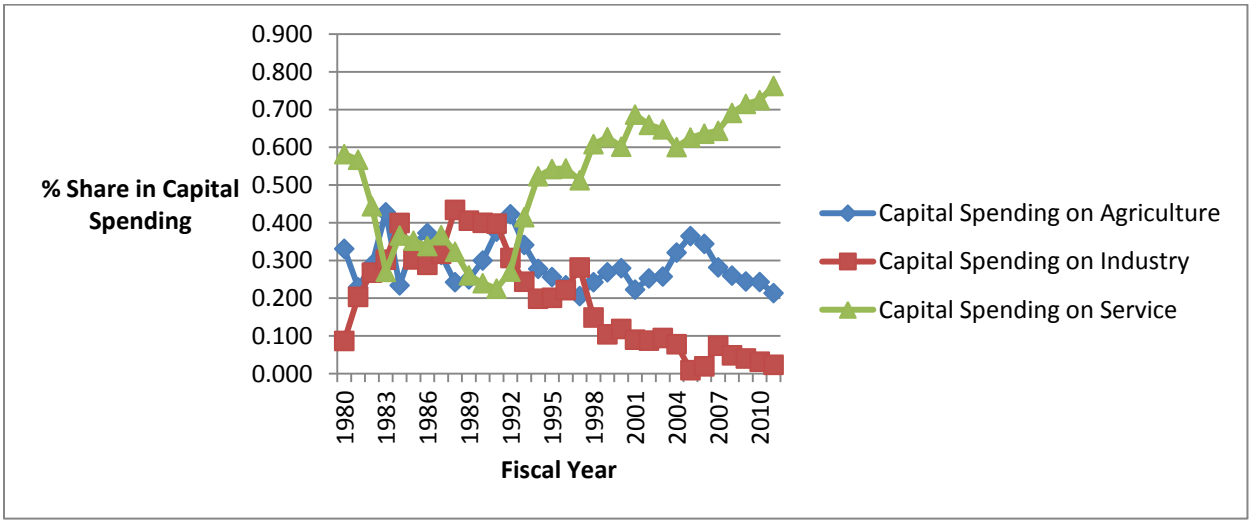
Particulars	Summary of Government Finance as percentage of GDP (%)		
	Part of Socialist Regime (1980-1991)	Neo-Liberalization Regime (1991-2001)	Pro-poor growth Regime (2001-2010)
Total Revenue and Grants	23	17	18
Revenue	20	15	14
Grants	3	3	4
Expenditure	29	23	23
Current expenditure	20	15	13
Defence	8	4	3
Capital expenditure	9	7	10
Overall balance including grant	-6	-6	-5
Overall balance excluding grant	-9	-8	-8
Financing	6	6	5
External (net)	3	3	3
Domestic	3	3	2

Source: MOFED, Ethiopia

The imperial regime attempted to establish the foundation for private sector industrialization. However, the socialist government after taking over political power in 1974 nationalized industries and subsequently reorganized them into state-owned corporations. The socialist government also participated in producing and distributing basic goods along with providing basic infrastructure and social services. The government parastatal, institutions and public enterprises drove the entire economy by neglecting the private investors' role in economic transformation. The government favored the socialized sectors with the preferential right to access bank credit at lower interest rate against the private sector. The socialized sector, however, was not efficient and productive to meet the demand of the economy and export market, failed to repay loans back. As a result, the persistent and widening fiscal deficit, along with the macroeconomic imbalance, challenged the performance of the economy. The industrial sector in this regard experienced structural, policy and technical constraints. The current expenditure accounted for 70 percent of total expenditure. Around 40 percent of recurrent outlay was allocated for defense, which in turn adversely affected the industrial development in the country in the socialist regime (MEDaC, 1999).

The incumbent government after toppling out the socialist regime launched a fiscal federalism system which provides substantial authority to regional states. The total expenditure as a share of GDP that was 29 percent in 1980s reduced to 23 percent in the subsequent reformation period. Government spending on capital formation shows a mixed performance in terms of the structure. Regarding the structure of capital expenditure by sector, government expenditure on services accounts for the lion's share in the pro-poor growth regime, followed by agriculture, and industry. This indicates that the would-be source of structural change is narrow as the share of industry in capital expenditure is negligible overtime in the same reference period (Figure 1).

Figure 1: Sectoral Government Capital Expenditure by Sector in 1980-2010



Source: MOFED, Ethiopia

The spending composition by activities also reflects how expenditure on administration accounts for significant share. Based on the data over the period 2006-2011, expenditure on administration accounts for 18 percent and expenditure on agriculture takes a share of 16 percent of total government expenditure. Expenditure on infrastructural development and human capital (education and health) also accounts for 13 percent and 19 percent in the same reference period. However, the industry sector receive little attention and accounts for 2.5 percent of total expenditure. Other socioeconomic service receives the lion's share (32 percent).

LITERATURE REVIEW

Theories and empirics regarding the role of government for achieving sustainable growth have a long history of contentions, mainly grounded between exogenous and endogenous growth models. The exogenous growth model advocates that economic growth is determined by population growth and technological change in which government expenditure has no role (Solow, 1956). However, the endogenous growth models and some empirical literature reject the prediction of exogenous growth model and identify that knowledge stock with its spillover and externality effect as a perpetual source of growth. Fiscal policy in this regard is acknowledged as one of the factors responsible for economic growth through taxes and expenditures (Barro, 1990 and Romer, 1990). Several researches find inconclusive results about the impact of expenditure on growth (Agell, Lindh and Ohisson, 1997).

Recently, the line of argument has been shifted towards examining the impact of spending composition instead of analyzing the effect of aggregate size of public expenditure (Devarajan et al., 1996 and Barro, 1990). Such shift with fixed aggregate expenditure enables researchers to investigate the efficiency of spending, reallocation of scares public resources, prioritization of budget, spending portfolio management and productivity of spending. This entails a transmission mechanism total factor productivity growth channel in order to assess the impact of change in spending composition on economic growth.

A number of studies that examined the impacts of changes in spending composition on economic growth have left inconclusive results. The primary reason is attributed to the lack of operational rules that translate theories into public expenditure portfolio (Devarajan, et. al. 1996). Moreover, the level of development, institutional capacity and social structural of economy contribute and determine the relationship between spending composition and growth, causing a wide range of growth effects. Therefore, each component of spending has different impacts on economic growth through TFP, which helps to understand the dynamics of the impact of change in spending composition (Ashni, 2008).

According to Landau (1986), government spending on education and capital formation has a positive impact on growth. On the contrary, Devarajan et al. (1996) finds that expenditure on defense, education and capital accumulation negatively affect growth. They also indicate that the

current expenditure and health expenditure positively influence per capita income, but the share of capital expenditure negatively influences per capita income. Wyatt (2005) also finds defense, health, economic and administration expenditures positively affect growth while spending on education negatively affects it. However, Castles and Dowrick (1990) discovers expenditure on education positively influence economic growth.

Shifting a public resource from one component to another is directly and indirectly connected with the economies of productivity. For instance, Fan et al (2000) find that spending on road infrastructure and agricultural technology is more productive and enhances TFP. Ashni (2008) also finds that spending on infrastructure and education positively influences economy but spending on agriculture and health negatively affects the TFP. Such experiences indicate that change in spending composition causes the TFP to increase or decline depending on the nature and magnitude of the expenditure as well as the structure of the economy in general. One of the arguments regarding infrastructural expenditure involves the creation of fertile ground and complements private sector development by reducing cost of transactions and increasing factor productivity, allowing private sector to be an engine of growth. Moreover, infrastructural development also put on a positive influence on facilitating education and health services (Agenor and Blanca, 2006).

Some of the endogenous growth models treats spending on government consumption as non-productive in that does not promote productivity while other activities other than administration are considered as productive and increases efficiency of private sector (Barro, 1990). This is in the sense that government consumption has no crowding-in effects on private investment and productivity so that it negatively affects economic growth (Grier and Tullock, 1987). No matter how the debate is so intensive and unsolved, neither empirics nor theories provide conclusive results how spending composition influence economic growth.

RESEARCH METHODOLOGY

This study uses the recursive dynamic CGE model based on the 2006 SAM in order to examine the impact of alternative change in spending composition on economic growth, structural change and household welfare. We can also draw the main justifications of using dynamic CGE model. Firstly, the model enables us to run various experiments of change in spending composition at the same time and simultaneously compare their effects at benchmark and counterfactual policy scenarios. Secondly, it considers entire economy in the sense of general equilibrium and discerns the macro and micro effect of change in spending composition. Thirdly, it incorporates the dynamic nature of structural change and market interactions and feedbacks. Finally, it incorporates adaptive expectation behavior of economic agents instead of forward looking expectations, helps to reflect the economic nature of developing countries. The specification of CGE model in the study follows the manual developed by Sherman Robinson and his colleagues in 2002 in the context of neoclassical-structuralist tradition and enabled to address the structural

features of Ethiopian economy: home-consumed commodities (non-marketed commodities) and transaction costs of import, export and domestic trade.

The dynamic CGE model is calibrated to 2006 SAM prepared by Ethiopian Development Research Institute. It comprises database that shows the flow of economic resources and transactions among economic agents. The Ethiopian SAM 2006 consists of 47 activities disaggregated to 14 agricultural, 19 industrial, 1mining and 13 service sub-activities. It has also 93 commodities disaggregated to 25 agricultural, 27 industrial, 3 mining and 38 service sub-commodities. To account for the variations in factors of productions, labor disaggregated into agricultural labor, administrative workers, professional workers, non-agricultural unskilled workers, and non-agricultural skilled workers. Capital is also disaggregated into the land for rural poor, land for rural non-poor, livestock for rural poor, and livestock to rural non-poor and non-agricultural capital. There is one marketing margin account which records the sum of trade and transport margins and five factor accounts. Both capital and labor are mobile across the three sectors. The SAM also consists of institutions of households, private enterprises, the government, and the rest of the world. Households are disaggregated into rural poor, rural non-poor, urban poor, and urban non-poor. The SAM also presents a detailed tax system: nine types of direct taxes and eight indirect commodity taxes (EDRI, 2009).

Having CGE model specification and SAM 2006, the study calibrates dynamic variables based on the actual performance and forecast of Ethiopian economy. Following dynamic natural growth of the population overtime, labour as the factor of production grows accordingly or probably with different rates. The CGE model assumes that such labour growth pushes up the other factors of production-cultivated land and capital- to grow in order to enhance output growth. The changes in factors in one year have effects on the next year's performance. In effect, investment (capital formation) dynamically soars up in order to accompany the growth of factors of production. The dynamic CGE model, therefore, considers these factor adjustments overtime which enables the model to reflect the dynamic feedbacks via change in factors of production. It also accounts for the cost of adjustment and the time taken to full adjustment process. Linking one period to the next period, the dynamic part of the model is captured by updating variables that grow at a constant rate per period and by controlling the accumulation of capital. The study, therefore, takes the dynamic CGE model that considers the following assumptions: The growth in total labor supply is consistent with the projected annual population growth of 2.4 percent. The average annual growth rate of cultivated land across the modeled period is 3.1 percent. Capital accumulation is an endogenous outcome of savings and investments and assumed to increase by 11.5 percent with 5 percent depreciation rate (NBE, 2010 and WB, 2011).

Finally, the study prefers to analyze the impact change in public spending composition through total factor productivity, claiming building the relationship between spending composition and total factor productivity (TFP) in the CGE model. To this end, the study considers a specification

of Cobb Douglas production function, augmented with public expenditure (Fan and Rao, 2003; Davoodi and Zou, 1998). Equation 1 shows the augmented Cobb Douglas production function.

$$y = f(L, K, G) \quad \text{..... (1)}$$

Whereas Y denotes output; L stands for labour; K stands for capital; G stands for government expenditure. The government expenditure in this case consists of public expenditure on human capital (GH), expenditure on agriculture (GA), expenditure on industry (GI) and expenditure on administration (GD), expenditure on infrastructural development(GF) and other expenditure (GO). Hence, equation 1 can be rewritten as follow.

$$y = f(L, K, GA, GH, GI, GD, GF, GO) \quad \text{..... (2)}$$

Taking total differential form of equation 2, we obtain the following

$$dy = \frac{\partial y}{\partial L}dL + \frac{\partial y}{\partial K}dK + \frac{\partial y}{\partial GA}dGA + \frac{\partial y}{\partial GH}dGH + \frac{\partial y}{\partial GI}dGI + \frac{\partial y}{\partial GD}dGD + \frac{\partial y}{\partial GF}dGF + \frac{\partial y}{\partial GO}dGO \quad \text{..... (30)}$$

Expressing the dependent variable in terms of growth rate by dividing by 'y' and using some mathematical manipulation in labour and capital part, we obtain

$$\frac{dy}{y} = \frac{\partial y}{\partial L}\frac{L}{Y}\frac{dL}{L} + \frac{\partial y}{\partial K}\frac{K}{Y}\frac{dK}{K} + \frac{\partial y}{\partial GA}\frac{GA}{Y}\frac{dGA}{GA} + \frac{\partial y}{\partial GH}\frac{GH}{Y}\frac{dGH}{GH} + \frac{\partial y}{\partial GI}\frac{GI}{Y}\frac{dGI}{GI} + \frac{\partial y}{\partial GD}\frac{GD}{Y}\frac{dGD}{GD} + \frac{\partial y}{\partial GF}\frac{GF}{Y}\frac{dGF}{GF} + \frac{\partial y}{\partial GO}\frac{GO}{Y}\frac{dGO}{GO} \quad \text{..... (3)}$$

Presenting in growth notation gives

$$g_y = \beta_1 . g_L + \beta_2 . g_K + \beta_3 . g_{GA} + \beta_4 . g_{GH} + \beta_5 . g_{GI} + \beta_6 . g_{GD} + \beta_7 . g_{GF} + \beta_8 . g_{GO} \quad \text{..... (4)}$$

Whereas $\frac{\partial y}{\partial L}\frac{L}{Y} = \beta_1, \frac{\partial y}{\partial K}\frac{K}{Y} = \beta_2 \frac{\partial y}{\partial GA}\frac{GA}{Y} = \beta_3, \frac{\partial y}{\partial GH}\frac{GH}{Y} = \beta_4, \frac{\partial y}{\partial GI}\frac{GI}{Y} = \beta_5, \frac{\partial y}{\partial GD}\frac{GD}{Y} = \beta_6, \frac{\partial y}{\partial GF}\frac{GF}{Y} = \beta_7, and \frac{\partial y}{\partial GO}\frac{GO}{Y} = \beta_8$ are the respective elasticities. The growth rates for factors of production and spending compositions are presented by $\frac{dy}{y} = g_y, \frac{dL}{L} = g_L, \frac{dK}{K} = g_K, \frac{dGA}{GA} = g_{GA}, \frac{dGH}{GH} g_{GH}, \frac{dGI}{GI} = g_{GI}, \frac{dGD}{GD} = g_{GD}, \frac{dGF}{GF} = g_{GF}, \frac{dGO}{GO} = g_{GO}$.

Introducing the Solow residual concept, the study calculates the TFP growth rate by $g_{TFP} = g_y - (\beta_1 g_L + \beta_2 g_K)$ on the basis of growth accounting approach. Therefore, equation 4 can be rewritten as follows:

$$g_y - (\beta_1.g_L + \beta_2.g_K) = \beta_3.g_{GA} + \beta_4.g_{GH} + \beta_5.g_{GI} + \beta_6.g_{GD} + \beta_7.g_{GF} + \beta_8.g_{GO} \quad \text{..... (5)}$$

Explaining the TFP growth rate in terms of other variables gives equation 34 as follows:

$$g_{TFP} = \beta_3.g_{GA} + \beta_4.g_{GH} + \beta_5.g_{GI} + \beta_6.g_{GD} + \beta_7.g_{GF} + \beta_8.g_{GO} \quad \text{.....(6)}$$

The dynamic CGE model assumes that aggregate government expenditure is exogenous and fixed. This allows that the positive growth rate in one of the components occurred at the cost of the growth of the other component, allows a change the composition of expenditure. Therefore, it is possible to substitute the growth rate of spending components by the corresponding shares in the total expenditure (Fan and Rao, 2003).

$$g_{TFP} = \beta_3.S_{GA} + \beta_4.S_{GH} + \beta_5.S_{GI} + \beta_6.S_{GD} + \beta_7.S_{GF} + \beta_8.S_{GO} \quad \text{..... (7)}$$

This specification permits to calibrate the elasticity coefficients on which the study examines the impacts of shifting public resource towards productive activities through public expenditure induced TFP. The coefficients in equation 7 are estimated and incorporated in the dynamic CGE model based on the base-run technique that assumes TFP growth calibrated and equal to one at benchmark equilibrium (Matovu and Sennoga, 2010). The study, therefore, uses the average spending composition over the period 2006-2011 in order to set the base-run scenario spending share. Accordingly, Table 2 gives the details of percentage shares as follow.

Table 2: Average Government Spending Compositions in 2006-2011

Spending Composition	Government expenditure (Millions in Ethiopian currency)	percentage share	Elasticity of sectoral TFP
Administration	62,426.34	17.74	2.66
Agriculture	57,333.33	16.29	2.54
Industry	8,555.06	2.43	1.24
Human capital	67,060.14	19.06	2.25
Infrastructure	45,368.12	12.89	2.78
Others socioeconomic service	111,145.84	31.59	4.00
Total	351,888.84	100	-

Source: MOFED, Ethiopia

The study is interested to examine increasing spending share of agriculture, manufacturing industry and infrastructure at the cost of reducing spending on administration. However, such shifting spending towards the productive sectors has an opportunity monetary cost associated with reducing the share of spending on administration which generates a wide range of benefits

like social security, peace building, and externality and spillover effects. Therefore, the study considers a reduction in TFP due to a decrease in spending on administration as an opportunity cost. This leads to examine the net effect of change in spending compositions (both increasing spending on productive sectors and decreasing spending on administration). In other words, the study examines the combined effect of reducing spending on administration and increasing spending on productive activity by the same percent. This allows capturing the monetary cost of shifting public resources towards productive sector from administration. The reduction in TFP due to a reduction in spending on administration is treated as a monetary cost of change in spending composition favoring the productive sectors.

SIMULATIONS AND FINDINGS

Public resources are part of development resources mobilized from the general public through taxation and then administered by the government. The composition of public spending has its own implication for achieving perpetual growth and rapid pace of economic transformation. In this study, the simulation analysis considers the net effect of increasing public spending on productive activities by reducing non-productive public spending. Such change in composition of spending and allocation of public resources also takes into account the link between the composition of government spending and TFP via elasticity of spending. The recursive dynamic CGE model in this regard assumes that the government reduces the share of unproductive spending (on administration, justice, defense, public order and security and general services) by 5percent and invests this share into the productive activities of agriculture, infrastructure and manufacturing industry. The impact of spending induced TFP and efficiency of spending on the overall economy and structural change process is as follows.

Impacts on Macroeconomic Performance:

The effect of change in spending composition on macro economy is intensively and extensively examined, but there are inconclusive results in literature. The dynamic CGE model in this regard contributes some facts to the literature of developing countries. Table 3 presents the macroeconomic effect of change in spending composition. The net effect of change in spending composition on productive activities by the same share yields a positive impact on the macroeconomic indicators. In the initial year, the amount of goods and services demanded by the entire economy exceeds the goods and services produced by the economy. However, such relationship reversed in the destination year (2025) across all the simulation scenarios. In particular, shifting public resources towards productive activities makes the economy to produce more and create an opportunity of expanding the foreign trade, as well.

Table 3: Impacts of Change in Spending Composition on Macroeconomic Variables

Demand Composition	Initial Value	Base-Run Scenario	Net effect of shifting public spending towards productive Sectors (in Billion)		
			Agriculture	Infrastructure	Manufacturing
GDP at factor cost	122.2	480.47	510.36	518.76	512.96
Domestic Absorption	162.56	402.92	435.40	418.42	424.51
Total Private Consumption Demand	114.75	355.03	387.50	370.52	376.60
Government Consumption Demand	15.91	15.91	15.91	15.91	15.91
Gross Capital Formation	31.89	31.98	31.99	31.99	32.00
Export Demand	16.77	160.28	162.08	186.35	186.93
Total Demand for domestically produced	179.32	563.20	597.48	604.77	611.44
Import Demand	-47.00	-190.52	-192.31	-216.59	-217.17
Total Final Demand	132.32	372.68	405.17	388.18	394.27

Source: Authors Simulation based on dynamic CGE model

N.B: - The initial value represents values in the SAM 2006. However, the base-run scenario presents the would-be economic performance in the simulation year of 2025 if the economy keeps growth with the current path. The simulation scenarios on the other hand explain the would-be economic performance when we shock the system by increasing the sectoral TFP growth in different forms. Moreover, the CGE model the study use assumes government consumption demand is fixed.

The main driving force that makes supply outweigh demand is attributed to sectoral TFP growth induced by change in spending composition favouring productive sectors. It is noted that the Ethiopian economy has faced acute shortage of food /supply as compared to total demand as can been seen in SAM 2006. However, shifting resource towards productive sector via increasing induced TFP improves and capable of reducing shortage of supply. This also possibly improves the macroeconomic performance of the Ethiopian economy. Especially, infrastructural development generates the highest GDP at factor cost due to the fact that it creates a fertile ground for private sector, reduces transaction cost and improves TFP. This also encourages producers to actively participate in the production of goods and service.

Impacts on Growth and Per Capita Income:

The base-run scenario shows that if the economy keeps going on the path of SAM 2006, the GDP at factor cost grows by 7 percent with which the service sector records the highest growth rate, among the major sectors. Besides, the service sector accounts for the highest share of 4.9 percent growth rate in contributing to the 7 percent growth rate of GDP. In other words, the

service sector contributes 70 percent of GDP growth rate. Both agriculture and manufacturing account for 16 percent and 3.5 percent of the GDP growth rate, respectively. This indicates that the nature of the entire economy is dominated by services which are relatively less productive and innovative. Such service-oriented current economic path ends up with the per capita income of USD 687 in 2025, forcing the country to stay in the low-income country status (Table 4).

Table 4: Impacts of Change in Spending Composition on GDP and Per Capita Income

Indicators	Initial Values	Base-Run Scenario	Net effect of shifting public spending towards productive Sectors (in Billion)		
			Agriculture	Infrastructure	Manufacturing
Annual Growth Rate					
GDP	7.00	7.09	7.36	7.99	7.63
Agriculture	6.41	4.09	5.14	4.01	4.15
Industry	6.00	6.44	6.71	6.98	8.65
Manufacturing	5.40	4.83	5.24	4.52	8.91
Service	7.82	8.78	8.88	9.97	9.00
Sectoral Contribution to GDP growth rate					
Agriculture	3.00	1.17	1.66	1.06	1.15
Industry	0.82	0.94	0.95	0.94	1.61
Manufacturing	0.26	0.25	0.26	0.19	0.75
Service	3.17	4.94	4.74	5.98	4.89
Per Capita Income, in 2006 USD	294.51	687.87	752.70	718.80	730.96

Source: Author's Estimation using dynamic CGE model

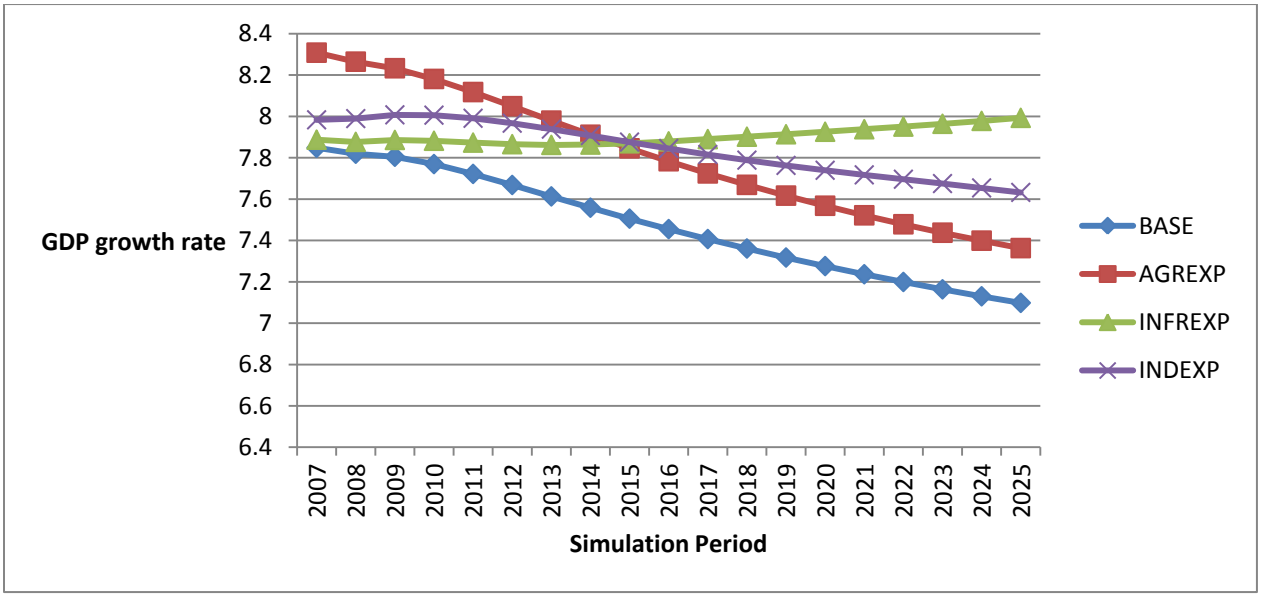
Shifting government spending towards productive activities of agricultural, infrastructural and industrial development positively influences the GDP growth rate and the move towards the middle-income country status. The increase in the agricultural spending significantly stimulates the entire economy through agriculture. It also heavily favors the sector itself in comparison to the growth rates in other sectors and negatively influences the contribution of service to GDP growth rates. This is essential in order to reduce the debacles of structural change burden emanating from the service and spread to the entire economy. However, there is almost no change in the contribution of industry to GDP growth rate. Regarding the increasing spending on infrastructural development, it greatly benefits the service sector in terms of sectoral growth rate and contribution the GDP growth rate. It also negatively affects the contribution of agriculture and manufacturing to the economy-wide growth rate as compared to the base-run scenario.

On the same fashion, increasing spending on manufacturing industrial development also generates higher GDP growth rate as compared to the base-run scenario. It also enables the manufacturing sector to contribute significantly to the economy-wide growth rate compared with the contribution generated by all other alternative scenarios, triggering the economy to have a

structural change and then sustainable economy-wide growth. All scenarios of change in spending composition positively influence per capita income, but failed to make the country to reach the middle-income country status by 2025. However, they all have positive impacts on economy-wide growth rate and economic transformation process via enhancing the sectoral TFP. Looking at Table 4, reallocating public resource to agriculture and manufacturing positively affect all major economic sectors. Nonetheless, agriculture and manufacturing sectors responds negatively to a spending shift of infrastructural development.

Figure 2 shows that the evolution of economy-wide growth rate in response to change in the spending composition. The change in spending composition that favors the productive activities illustrates different types of growth path across the alternative scenarios. Following the base-run growth of the economy, both spending options towards agriculture and industry show a declining trend in growth rate. However, it is only infrastructural spending that causes the economy to grow with the increasing trend in the simulation period, stimulating the economy and laying a fertile ground for private sector development in long run.

Figure 2: Evolution of GDP growth rate in response to the Change in Spending Composition



Source: Author's simulation based on dynamic CGE model

Analyzing the impact of change in spending composition, what is the reason why increasing TFP induced by infrastructural development improves and restores growth performance towards increasing trend? In the first place, infrastructure in Ethiopia has been neglected for decades so that it slows down economic performance, contributed only 0.6 percent to annual growth rate over the last decades while it was around 3 percent in middle income country group (Vivien and

Elvira, 2011). Therefore, giving more attentions and reallocating public investment to infrastructural development definitely benefit the entire economy through sectoral TFP. In particular, it highly improves the service sector performance in Ethiopia which heavily dominates the structural of economy, GDP growth rate, and government investment. However, other spending options do not have such kind of impact on service sector so that they failed to bring an increasing trend of GDP growth rate in the simulation period.

Impacts on the structure of the economy

Broadly, the structure of the economy can be manifested by the structure of GDP and the structure of final demand. Looking at the structure of GDP in table 5, the service sector dominates the structure of the economy, which accounts for 57 percent. This is followed by the agriculture and then the industry. However, manufacturing takes only 5 percent of the GDP in base-run scenario.

Table 5: The Impacts Change in Spending Composition on Structure of GDP

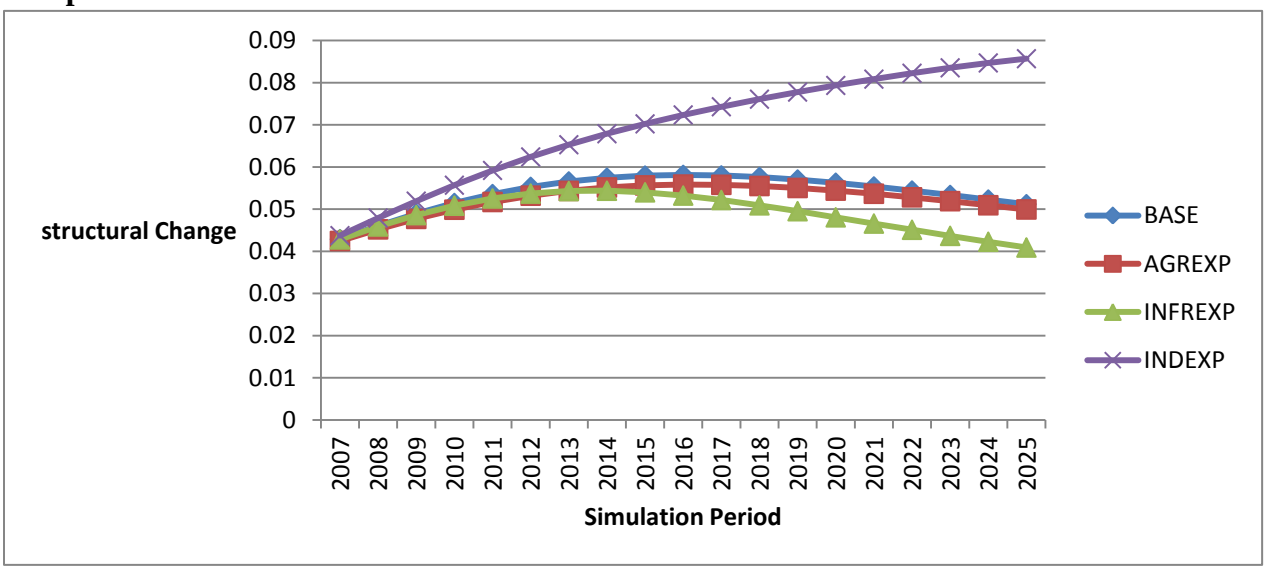
Indicators	Initial Value	Base-Run Scenario	Net effect of shifting public spending towards productive Sectors		
			Agriculture	Infrastructure	Manufacturing
Agriculture	48.12	27.89	31.72	25.53	26.09
Cereal Crops	33.7	18.16	20.19	16.78	17.18
O/W- Non-Exportable	13.7	9.00	9.83	8.47	8.52
O/W- Exportable agriculture	6.20	4.00	4.49	3.59	3.96
Industry	11.48	14.61	14.11	13.33	18.85
Manufacturing	4.70	5.11	4.99	4.09	8.56
Other Industry	6.78	9.49	9.12	9.24	10.28
Service	40.40	57.48	54.16	61.13	55.05
Private Service	31.17	54.75	51.57	58.59	52.47
Public Service	9.23	2.73	2.58	2.53	2.58

Source: Authors estimation based dynamic CGE model Simulation

The impacts of increasing spending on agriculture, by reducing the spending on administration, positively influences the share of agriculture in GDP, but negatively affects the GDP share of the industry and service. However, the decreasing share of manufacturing in GDP harms the structural change process and the long-run economy wide growth of the country. Furthermore, the scenario of increasing spending on infrastructure negatively affects the share of agriculture and industry in GDP while it positively influences the GDP share of the service sector. Such infrastructural spending aggravates the structural change burden in the simulation period, has mixed effect in the face of economy wide growth and structural change.

The resultant effects of spending on industry generate negative impacts in the face of the share of agriculture and service in GDP. However, spending shifts towards industry generate a positive impact on the structural change process as is measured by the share of manufacturing in GDP. This helps the economy to cure the structural problem emanated from low productive sectors. The graphical presentation of the evolution of structural change is below in figure 3.

Figure 3: Evolution of the structural change in a response to change in Spending Composition



Source: Author's simulation based on dynamic CGE model

The paradoxical effects of spending on infrastructure ignite some insight looking in order to investigate the intuition behind its mixed performance of growth and structural change. It generates highest GDP growth and rescue the declining trend of growth in the simulation period in one hand. However, it failed to bring a positive impact on structural change process of the Ethiopian Economy. This is because of the existence of weak sectoral linkage between service and industry. Thus, the growth effect of service sector does not have strong enough impact on the share of manufacturing in GDP, leading to negatively affect the structural change process. Moreover, infrastructural development should be accompanied with the growth of agriculture and industry. Otherwise, it is hard to realize economic growth with structural change.

Pertaining to the structure of final demand; the share of private consumption demand accounts for above 95 percent of the total final demand. Shifting spending share towards agriculture increases the share of demand for private consumption and negatively influences the share of all other components comparing with the base-run scenario. The infrastructural spending positively affects the share of export and import demand. The infrastructural development creates an enabling environment for the export market, and consumption of more imports.

Table 6: Impacts of Change in Spending Composition on Structure Final Demand

Structure of Total Final Demand (%)	Initial Value	Base-Run Scenario	Net effect of shifting public spending towards productive Sectors		
			Agriculture	Infrastructure	Manufacturing
Total Private Consumption Demand	86.72	95.26	95.64	95.45	95.52
Government Consumption Demand	12.02	4.27	3.93	4.10	4.04
Gross Capital Formation	24.10	8.58	7.90	8.24	8.12
Export Demand	12.67	43.01	40.00	48.01	47.41
Import Demand	-35.52	-51.12	-47.46	-55.80	-55.08

Source: Author's estimation based on dynamic CGE model simulation

Increasing spending towards industrialization also has a positive effect on the demand for foreign trade as it requires and provides advanced industrial products from and to the international market. In a nutshell, changing the composition of spending in favor of the manufacturing industry assists the economy to achieve an encouraging structural change process compared to other scenarios. As the economy becomes structurally transformed, there exists a change in demand, tests and preference towards highly upgraded goods and service. Such relationship between change in demand and structural change process exhibits the bilateral relationship and reinforce each other.

Impacts on Factor and Institutional Income

In the case of factor income, all spending scenarios show mixed effects on factor income. It is only the spending on agriculture and industry that produces positive effects to all factors of production. In particular, increasing spending on infrastructural development has a negative repercussion on income generated from land and livestock, but enables laborers and capital owners to have a positive income growth as compared to the base-run scenario (Table 7).

The labour income is sill dominant across all the alternative scenarios, followed by capital income. Experience from other countries indicates that the share of labour income tends to decrease overtime during rapid economic transformation. However, this is not the case for Ethiopian economy, showing stagnant structural change process as it depends on labour. This is attributed to the scarcity of capital goods in the domestic market as constrained by the acute shortage of foreign reserve, among other factors.

All scenarios of change in spending exert a positive influence on institutional income growth rate per annum (Table 8). Spending in agriculture generates the highest institutional income growth for all components of institutions as compared to other spending scenarios. On the same note, the public enterprise receives the highest growth rate of income in all scenarios, following by the rural non-poor household, rural poor household, and urban non-poor household.

Table 7: Impacts of Change in Spending Composition on Factor Income

Factors	Initial (in billions)	Base Scenario (in billions)	The net effects of Shifting public spending towards productive Sectors against the Base-Run Scenario (%)		
			Agriculture	Infrastructure	Industry
Factor Income and its percentage change					
Labour	60.29	265.99	7.18	0.59	8.45
Land	8.46	36.99	4.89	-1.14	12.22
Livestock	5.47	16.33	11.04	-1.65	2.68
Capital	47.99	206.79	4.32	7.13	4.05
Share of Factor Income in GDP (%) in all columns below					
Labour	49.3	50.6	51.1	49.4	51.3
Land	6.9	7.0	7.0	6.7	7.4
Livestock	4.5	3.1	3.3	3.0	3.0
Capital	39.3	39.3	38.7	40.9	38.3

Source: Author's estimation based on dynamic CGE model simulation

The rural non-poor households that account for 42 percent of the total population take the largest share of institutional income, followed by urban non-poor (12 percent of the population) and rural poor (35 percent of the population). This means that there is not substantial structural change in institutional income across the alternative scenarios of spending shifts from unproductive to productive activities.

Table 8: Impacts of Change in Spending Composition on Institutional Income

Institutions	Initial Value (in billions)	Base Scenario (in billions)	Growth rate of institutional income under Alternative induced TFP growth Options (%)		
			Agriculture	Infrastructure	Industry
Institutional Income, and its growth rate simulation scenario					
ENT	1.32	22.75	5.70	9.80	5.70
HHD	133.02	519.40	5.94	2.23	6.49
HHD-RURP	24.84	100.56	6.72	1.23	7.29
HHD-RURN	73.14	300.16	5.82	2.77	6.65
HHD-URBP	5.00	17.39	6.35	0.24	6.68
HHD-URBN	30.04	101.28	5.46	1.96	5.21
Structure of Institutional Income (% in all columns below)					
ENT	0.49	2.14	2.14	2.30	2.13
HHD	49.75	48.93	48.93	48.85	48.94

HHD-RURP	9.29	9.47	9.54	9.37	9.55
HHD-RURN	27.36	28.28	28.24	28.38	28.32
HHD-URBP	1.87	1.64	1.64	1.60	1.64
HHD-URBN	11.23	9.54	9.50	9.50	9.43

Source: Author's simulation based on Dynamic CGE model

N.B: HHD stands for households, ENT denotes enterprises, HHD-RURP refers to rural poor households, HHD-RURN refers to rural non-poor households, HHD-URBP denotes urban poor households, and HHD-URBN stands for urban non- poor households.

Impacts on Household Welfare

As measured by the Equivalent Variation (EV), the net effects of changing spending composition favoring the productive sectors improve the welfare of each segment of households. As can be seen the Table 9, the rural non-poor that accounts for 42 percent of the population obtain the better welfare improvement as compared to the other segments of the households. In general, this indicates that shifting public resources towards productive activities and enhancing the efficiency of spending improve the welfare of households.

Table 9: Welfare status in response Change in Spending Composition

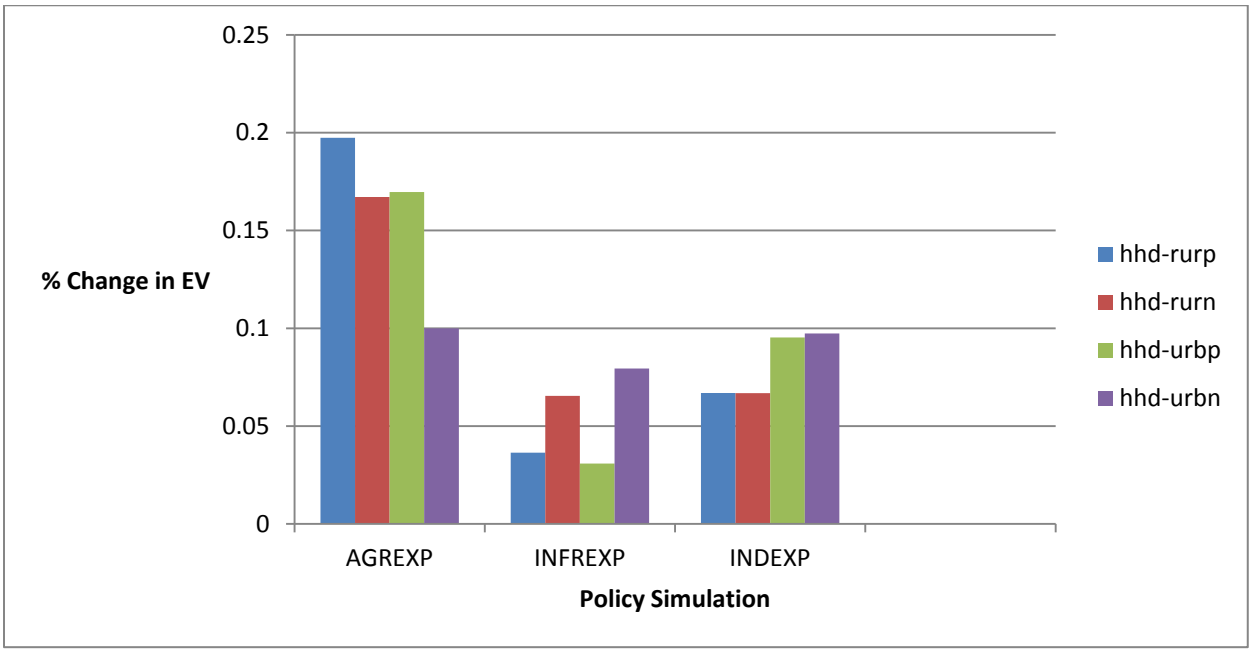
Institutions	EV value in Base Scenario	EV value in alternative scenarios of change in sectoral TFP growths		
		Agriculture	Infrastructure	Industry
HHD-RURP	0.039702	0.047539959	0.041149	0.04236
HHD-RURN	0.133041	0.155271869	0.141746	0.141933
HHD-URBP	0.007222	0.008447054	0.007444	0.00791
HHD-URBN	0.045848	0.050431994	0.04949	0.050311

Source: Author's estimation based on dynamic CGE model

In terms of EV value, both urban and rural non-poor households that account 52 percent of the population receive the highest value comparing to the poor households. However, in terms of percentage change in EV, both urban and rural poor household that account 48 percent of the population receives the highest percentage rate of EV in case of spending shift towards agriculture as compared to the welfare gain the non-poor household obtain. This has its own reflections on the effort of reducing poverty by the Ethiopian government. Looking at the percentage change in EV in the figure 4, spending on agriculture highly improves the welfare of

all segments of households as compared to other spending. This attributed to the fact that the majority of the population sustains their lives on agriculture.

Figure 4: Percentage of EV in response to the change in Spending Composition



Source: Author's simulation results based on Dynamic CGE model

CONCLUSIONS AND POLICY IMPLICATIONS

The Ethiopian economy in the last decades has been growing in different fashions depending on the economic policies undertaken by the ruling governments at their times. The economic performance is characterized by positive and negative growth rates, ranging from 13 percent and negative 11 percent in 1981-2010. There were negative real GDP rates seven times in 1981-2010 (WB, 2011). This was mainly aggravated by the vagaries of the nature, drought, internal conflict, political instability and war. The existence of such an erratic economic growth rate that coexisted with a constant population growth rate causes the per capita income to oscillate up and down in the reference period. With such erratic growth performance, the structure of the economy is largely dominated by the service and then agriculture sectors. There is no structural change as evidenced by the manufacturing sector that accounts for a negligible share in GDP (4.8 percent) and an insignificant contribution to GDP growth rate. Though the economy has successively been growing at above 7 percent, on average, since 2005, the share of manufacturing in GDP still remains the same and low. The existence of dominant service sector leads to a structural change burden that persistently slows down the country's pace towards reaching the middle-income country status by 2025.

This indicates that sustainable economic growth and structural change confront Ethiopia with a daunting challenge for reaching the middle income country status by 2025. In order to minimize these problems, increasing the growth rate of sectoral TFP, which is induced by change in spending composition, is one of the principal sources of perpetual growth as it has a nature of an increasing return to scale. The study, therefore, examine the impacts of change in spending composition using recursive dynamic CGE model.

According to the base-run scenario simulation results, if the economy continues to grow with the current path, it is expected to grow by 6.2 percent in 2025, showing a declining trend as compared to the initial value in 2006. Such declining projection is almost similar to the projection undertaken by the IMF in the medium term. This is attributed to the dominance of service over the structural of the economy while it is poor in productivity and weak in sectoral linkage. Evidently, the contribution of service to the GDP growth rate of 6.2 percent is large and accounts for about 57 percent of GDP growth rate in 2025. It negatively influences the structural change process. This leads to problems of structural change burden- of which declining growth trend and poor productivity is a manifestation. Besides, the marginal contribution of sectors to the economy wide growth rate shows that the economy constantly shifts to the service sector. As a result, the country will not join the middle-income country status by 2025.

The alternative scenario, on the other hand, reveals that the role of government in terms of increasing public investment in productive activities as well as enhancing its efficiency yields an encouraging result. The net effects of decreasing the share of spending on administration and increasing spending on the agriculture, industry and infrastructure positively influence the GDP growth rate and the per capita incomes. However, it is only the change in spending composition towards industry positively influences the structural change process while spending on agriculture and infrastructure has a negative impact on economic transformation process. Spending on infrastructural development also matters in the structural change process in the long run when the production sectors (agriculture and industry) are able to produce massive quantities and upgraded industrial products. Otherwise, increasing spending on infrastructure with poor performance of agriculture and industry would result in a negative repercussion on structural change process in Ethiopian economy.

The study, therefore, recommends that the government and the concerned development partners could undertake the following policy actions for securing both sustaining growth and rapid structural change. There must be a series economic policy revision focusing on enhancing sectoral TFP induced by change in spending composition with the knowledge of different impacts of each component of spending composition. This is confirmed by the alternative simulation scenarios of increasing sectoral TFP against the base-run scenario of increasing factor accumulation. Taking change in spending composition into account, the role of government in terms of public resource allocation depends on the target it sets. When the government is

interested in economy wide growth, reallocation towards infrastructural development is primarily recommended. However, enhancing agriculture investment and its efficiency is preferable economy policy when the government sets household welfare as an objective. In case of targeting growth, structural change and welfare at the same time, it is only the spending option towards manufacturing is preferable as it positively influences economy wide growth, structural change and household welfare in the simulation period.

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