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Economic Impact of Public Expenditure in The Gambia

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Thomas Roberts [α], François J. Cabral [σ] & Samuel Maxime Coly [ρ]

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I. Introduction

Due to the poverty and inequality-related challenges in The Gambia and many African countries, the Gambian Government and the international community have intensified their efforts to increase and redirect public resources to ensure that countries benefit from an economic development that is socially inclusive and environmentally sustainable. For instance, in Maputo, Mozambique, in 2003, the Gambian Head of State and other African Heads of State approved the establishment of CAADP. In 2014, at Malabo, Equatorial Guinea, African Heads of State reaffirmed their commitments to end hunger and halve poverty by 2025, through inclusive agricultural growth and productivity. They also reiterated their commitment to enhancing resilience in livelihoods and production systems to climate change-related shocks; a commitment to 10% of public investment to agriculture; among others (AUC, 2014).

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Moreover, it is worthy to note that Governments in developing countries struggle to fund productive sectors like agriculture. For instance, most developing countries have a large informal sector and inefficiencies in tax administration, which implies lower than average tax-to-GDP rations. Also, increasing Government tax revenues may significantly undermine private sector savings and investments in the economy (Sennoga and Matovu, 2010).

African leaders have signed and committed to various other Charters that demand public funds of considerable size. For instance, the 2001 Abuja Declaration called for Governments to spend 15% of their national budget in the health sector. Also the '2007 Year of Science and Technology' demanded that Governments spend 1% of GDP on science and technology. These commitments (among others) may, therefore, stretch the capacity of African Governments to consistently dedicate at least 10% of their expenditure to agriculture (Benin, 2015). Brüntrup (2011) and Mahalambe (2009) have, therefore, vigorously asserted that the 10% public agriculture expenditure commitment is highly arbitrary and indifferent to country-specific contexts.

Notwithstanding, one cannot neglect the fact that agriculture has a crucial role in contributing to Africa's inclusive and sustainable growth, given that almost two-thirds of the continent's population rely on agricultural income for a living—and the consumption expenditure of approximately three-quarters of the poorest African households is spent on food (Goyal and Nash, 2017). Moreover, targeting Government expenditure to reduce poverty is not enough. Public expenditure should equally stimulate economic growth.

Studies have shown that Government spending on agricultural R&D, irrigation and infrastructure (including roads and electricity) targeted to the rural poor have contributed to a reduction of rural poverty and growth in agricultural productivity (but in different variations) (Fan et al., 2000). Benin and Yu (2013) also emphasized that Government spending on growth-inducing agricultural R&D takes time to show results.

The financing of public capital spending through external or internal indebtedness, among others, would significantly discourage (or crowd-out) private investment from profitable sectors. This ineffective financing method is mostly the case in many developing countries where there is a weak structural

private financial system (Niels and Censink, 2001 and Ramirez, 1996). The concept of crowding-out the private sector has a long history of debate in macroeconomic theory. For instance, it was known to Keynes as 'diversion' (Buiter, 1977). Barro (1989) later asserted that public investment tends to be positively correlated to private investment. The relationship between public investment and private expenditure is either one of 'crowding-in' or 'crowding-out'. In order words, when public expenditure crowds-in (or attracts private investment), it is seen as productive—and when the latter occurs, it undermines growth. Generally, private capital, when stimulated by public capital can have the required economic growth and poverty reduction impacts through these pathways: technology advancing, human capital enhancing, transaction cost-reducing and crowding-in private capital (Benin, 2015).

Public expenditure also has an impact on Total Factor Productivity (TFP). The literature on the effect of public expenditure on TFP vary. For instance, the heterogeneity of TFP between regions was discussed in Destefanis and Sena (2005), as well as Ascariand Di Cosmo (2005). In these studies, public capital had a positive impact on TFP. On the other hand, Hansson and Henrekson (1994) did not notice a positive impact of general public spending on TFP in selected Organization for Economic Co-operation and Development (OECD) countries. However, the evidence from Bronzini and Piselli (2009) illustrates that public spending on infrastructure in one country can have a spillover effect on the TFP of a neighboring country.

Although the intended outcomes of public expenditure is not always realized, the rationale for public expenditure should not be ignored. The justification for public expenditure (underpinned by neoclassical economic theory) is categorized into twofold. Firstly, market failures and economic inefficiencies in an economy can be corrected through public sector involvement, especially via public investment in agricultural R&D, subsidization, or regulations. Secondly, there is a view that the challenge of inequality and the undesirably low material welfare among the poorest in society, can be addressed through public policy or public investment. This supposition is based on the fact that social inequalities are promoted because of the biased distribution of goods and services against the majority of people that reside in rural areas (Mogues et al., 2012 and Benin, 2015).

Moreover, studies on economic growth and income inequality started several decades ago, to address the issues of market inefficiencies, income inequality, poverty, among others. For instance, the Kuznets' hypothesis (Kuznets, 1955 and Kuznets, 1963) was one of the first studies to dominate the discussions on economic growth and income inequality. Kuznets founded an inverted U-shaped relation between income inequality and Gross National Product (GNP) per capita, using a time series and cross-country data. This simply implied that in the process of industrialization, there would be an initial increase in income inequality due to rural-urban migration. However, inequality will subsequently decrease after industries would have attracted a huge fraction of the rural labour force. Adelman and Morris (1973)[1] refuted Kuznets' hypothesis of a trickling down of benefits of economic growth to the poorest segment of people in low-income countries. In contrary, their study supported the Marxian view that economic structure (not income levels or economic growth) determined the patterns of income distribution.

Kuznets' hypothesis relatively explained the dynamics of growth in the USA and other developed countries, up to the 1970s, where inequality facilitated growth, and growth in-turn reduced inequality. However, this was not the case in the 20th Century. For instance, in the 1980s, the ratio of the 90th to the 10th percentile of the male wage distribution increased by 27% in the UK and 18% in the USA. (Aghion, 1999; Bourguignon and Morisson, 1992 and OECD, 1993). The evidence in this inequality in wages was, therefore, completely different from Kuznets' assertion.

Given that the Kuznets' theory may not be fully applicable in developing countries in the 21st Century, there is, therefore, the need to explore new economic theories that explain core factors that may affect income inequality and income redistribution in the developing world. In recent years, some significant findings supported by various authors suggest that economic growth in rural areas has a substantial effect on reducing poverty, than economic growth in urban areas. Also, it is indicated that the poverty-reducing impact of economic growth is more impactful if initial inequality is lower, and if the status of rural development and human resource development is more favorable (Ravallion and Datt, 1996; Ravallion, 1997; Lofgren and Robinson, 2008; and Timmer, 1997).

In the same way, Dollar and Kraay (2000) also explained the relationship between economic growth and poverty. In their study where they analyzed cross-country data set of 80 countries (over forty years) using regression, they discovered that on average, the income of poor people rises one-to-one with overall economic growth. Given that there is a one-to-one relationship between economic growth and the income of the poor, it is therefore crucial to understand the impact of certain public expenditure policies on the rural poor and economic growth in The Gambia—also considering that Krugman (1994) argued that economic growth ought to be driven by the gains in productivity (rather than capital accumulation and the quality of labour), as seen in the East Asian miracle.

[1] The book review of this study was conducted by Due (1975).

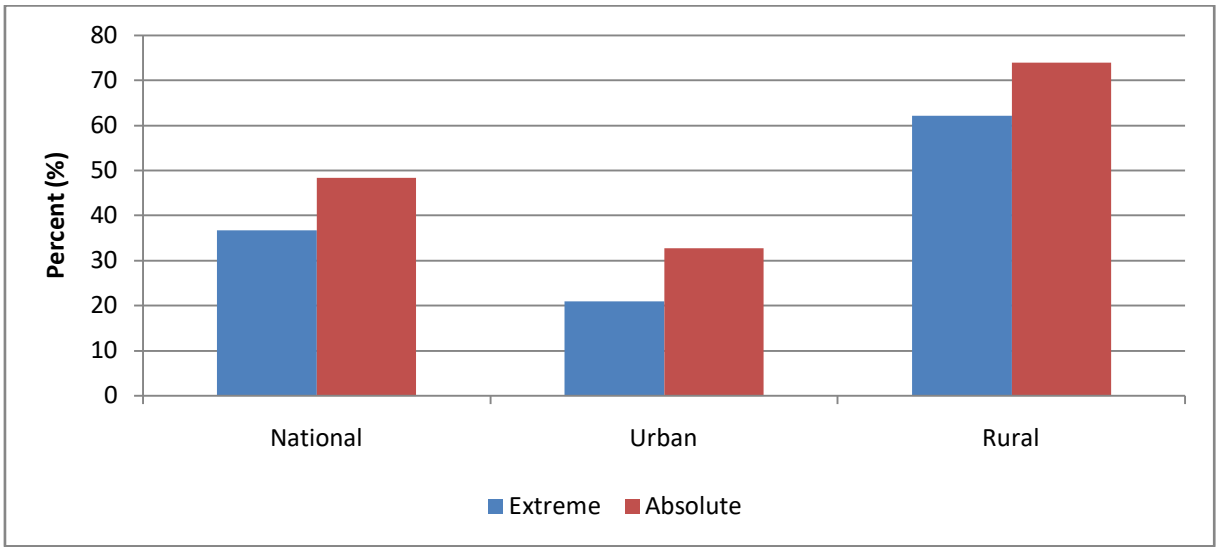
According to Cabral (2017), when inducing policy shocks for economy-wide impacts, Dynamic Computable General Equilibrium (DCGE) models[2] are the best models to be utilized. These models take into account the effect of shocks on sectoral supply and demand; factor returns and income; household consumption; among others. It is also temporal in scope, and it takes into account the heterogeneity of households.

In light of the significance of public expenditure in economic development (even though a consistent 10% commitment by African Governments may be challenging), it will be essential to assess the economic and welfare impact of a 10% budget allocation in the three major sectors of the Gambian economy over a medium-term period. This type of study has not been conducted in The Gambia—and as a result, the question regarding which economic sector has the utmost possibility of enhancing economic growth and welfare (with a 10% public expenditure commitment) still lingers. The CAADP agenda is focused on agriculture, and it has not explored other sectors that could equally have a positive impact on the Gambian population. Therefore, this study will contribute to the literature by particularly assessing the impact of a 10% commitment (over five years in agriculture, service and industry sectors) on GDP growth; value-added growth; rural and urban labour demand; rural and urban income; rural and urban consumer prices; and rural and urban welfare. The study will serve as a pointer for Gambian policy makers to consider the sector that most effectively maximizes the gains of public expenditure, in order to attain an equitable growth and ensure the country graduates into a middle-income country.

The first section of the paper will serve as an introduction. The second section will provide a brief overview of The Gambia's poverty profile. The third section will discuss the methodology. Finally, the fourth and fifth sections will discuss the results and conclusion, respectively.

II. Brief Overview of the Gambia's Poverty Profile

According to the 2010 Integrated Household Survey, using the upper national poverty line, the total headcount 'absolute' poverty rate was at 48.4% (see Figure 1). This meant that about 795,885 people in The Gambia were considered poor and unable to meet their basic food and non-food needs. The extreme poverty rate, which is measured using the lower national poverty line, meant that 36.7% of Gambians (that is, about 603,492 people) were not able to meet their basic food supply.

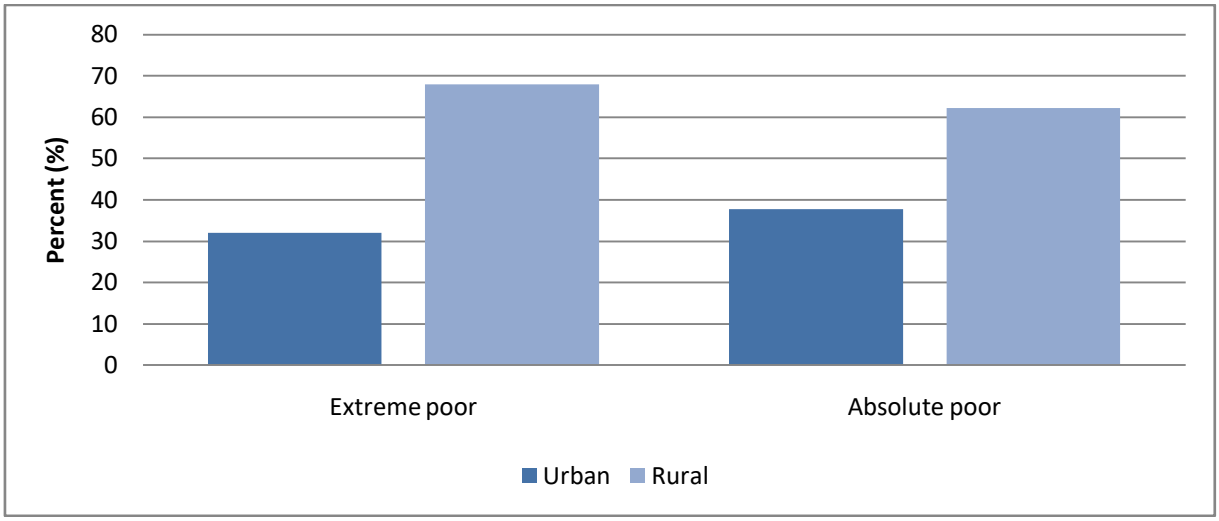


Source: Integrated Household Survey, 2010

Figure 1: Poverty Headcount of the population in The Gambia, 2010

It is also worthy to note that the incidence of rural poverty more than doubled urban poverty, for both absolute and food poverty. Approximately 1,215,205 people in rural areas are suffering from absolute poverty, in comparison to 537,716 people in the urban areas. Likewise, 1,021,126 people in rural areas are food poor, while 345,322 people in urban areas are food poor. The distribution of the poor in The Gambia (as seen in Figure 2) indicates that 68% of the food poor reside in rural areas, and 62.2% of the absolute poor reside in urban areas.

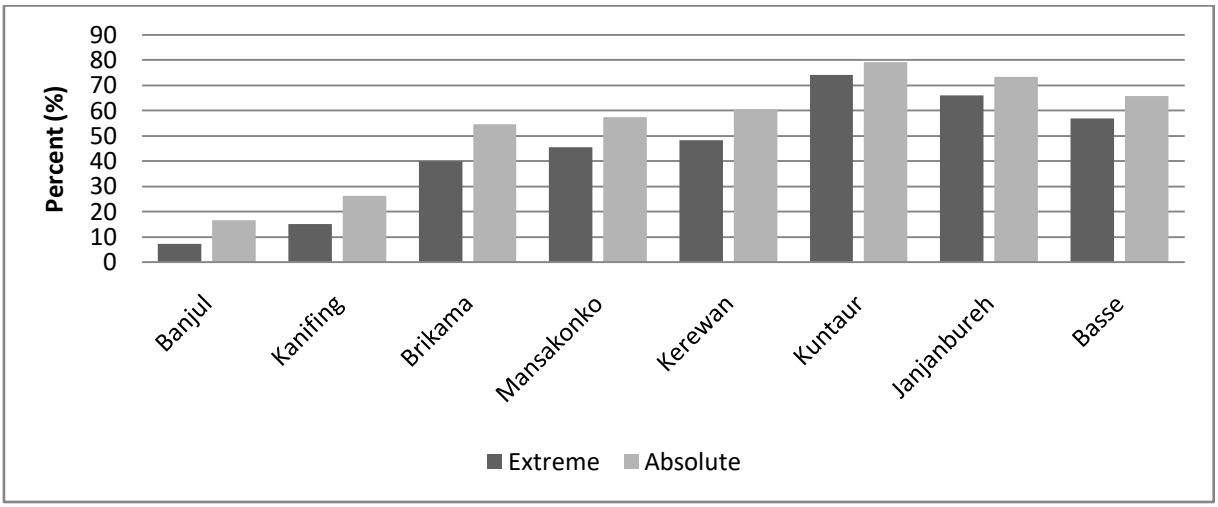
[2] The models are generally designed to capture the linkages between sectoral and national economic growth. Production-side linkages are influenced by sectors' technologies, and backward production linkages arise when producers demand intermediate inputs. The models can also be used to assess household incomes and poverty (Lofgren et al., 2003 and Diao and Thurlow, 2012).



Source: Integrated Household Survey, 2010

Figure 2: Distribution of the urban and rural poor in The Gambia, 2010

This LGA characterization of poverty will also assist in explaining the regional incidence of the poor. The Gambia has 8 LGAs, of which Banjul and Kanifing are considered the urban LGAs. Figure 3 shows that Kuntaur, Janjanbury, Basse and Kerewan have the highest poverty headcount for both absolute and food poverty. Due to the high amount of food insecurity in these four areas, UN-OCHA (2014) indicated that they have the highest prevalence of malnutrition in the country. Kuntaur, Janjanbureh and Basse specifically have the higher global acute malnutrition rates above the 10% WHO 'serious' threshold—and Kuntaur has the highest proportion of severely stunted children, at 8.2%. Also, the highest number of underweight women are found in Janjanbureh (at 20.9%) and Kuntaur (at 20.3%), while Banjul is the least affected area, at 11.5%.

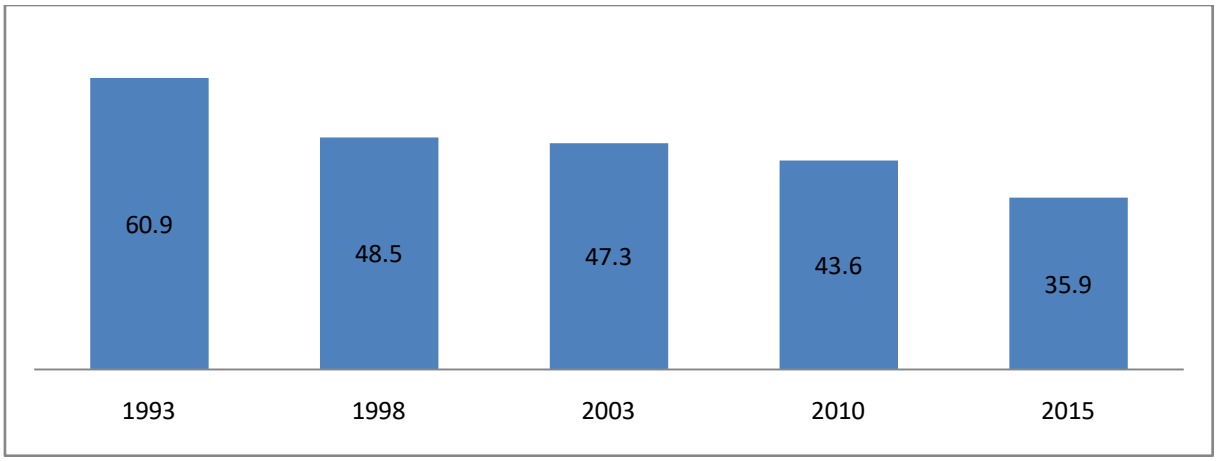


Source: Integrated Household Survey, 2010

Figure 3: Incidence of poverty according to LGAs in The Gambia, 2010

This large disparity between poverty in urban and rural areas is mainly as a result of the sub-standard agricultural systems in The Gambia. As previously noted by Goyal and Nash (2017), most of the consumption expenditure of the poorest household in Africa is utilized for food. As a result, developing the agricultural system in rural areas may have a positive impact on the income of poor rural households, which will enable them to meet their basic food and non-food needs.

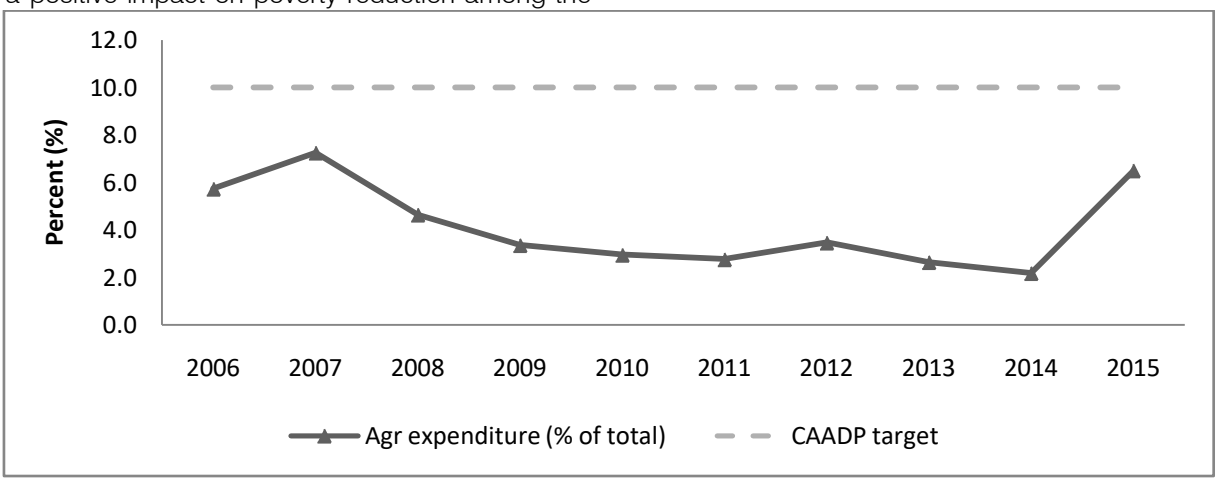
Historically, in The Gambia, the highest level of decrease in income inequality was between 1993 and 1998 (see Figure 4). In those five years, the Gini coefficient decreased by about 20%, from 60.9 in 1993 to 48.5 in 1998. From 1998 to 2015, income inequality has generally reduced in the country, but at a slower rate.



Source: WDI (World Bank) and the World Income Inequality Database

Figure 4: Income inequality (Gini coefficient), The Gambia

As previously alluded to by various post-Kuznets scholars, rural economic growth has a greater effect on reducing rural poverty. In order words, one can assume that development of the rural economy in The Gambia (which is mainly driven by agriculture) could have a positive impact on poverty reduction among the poorest people. The formation of the CAADP is equally grounded on this premise. However, Figure 5 shows that the Gambian Government's disbursement of agriculture expenditure between 2006 and 2015 was below the CAADP target of 10%.



Source: Re SAKSS and WDI (World Bank)

Figure 5: CAADP target and Government agriculture expenditure in The Gambia, 2006 - 2015

III. Methodology

The model used in this study is a DCGE model, and the data is an updated version of the 2009 SAM of The Gambia developed by IFPRI. The underlying principle of a SAM is the concept of circular flow of the economy (Mainar-Causapé et al., 2018), and CGE model provide an overview of the channels of transmission of the effects of policies on the economy. The economic and social impacts of the policy scenarios (external shocks; policy changes and changes in socio-economic structures) can also be assessed using DCGE models. Moreover, the model used in this study is the same model used in Cabral et al. (2017).

a) Model specification

The structure of the production

The structure of the production is common in CGE models. Equations 1 and 2 represent the top level of the structure. The total aggregate output of industry j ($XST_{j,t}$), is a combination of value-added of industry j ($VA_{j,t}$) and total intermediate consumption of industry j ($CI_{j,t}$) in fixed shares, which is strictly complementary and follows a Leontief production function for value-added (v_j) and intermediate consumption (io_j). The time script or period is represented by t:

$$VA_{j,t} = v_j XST_{j,t} \quad (1)$$

$$CI_{j,t} = io_j XST_{j,t} \quad (2)$$

Equation 3 represents the second level, where an industry's value-added consist of composite capital for industry *j* ($KDC_{j,t}$) and composite labour for industry *j* ($LDC_{j,t}$). The value-added is a constant elasticity of substitution (CES) function: (B_j^{VA})—scale parameter; (β_j^{VA})—share parameter; and (ρ_j^{VA})—elasticity parameter ($-1 < \rho_j^{VA} < \infty$):

$$VA_{j,t} = B_j^{VA}\left[\beta_j^{VA} LDC_{j,t}^{-\rho_j^{VA}} + \left(1-\beta_j^{VA}\right)KDC_{j,t}^{-\rho_j^{VA}}\right]^{\frac{1}{\rho_j^{VA}}} \quad (3)$$

On the intermediate consumption side of the same level, equation 4 illustrates that aggregate intermediate consumption of commodity *i* is a combination of various goods and services ($DI_{i,j,t}$). Also, it is assumed that intermediate inputs follow a Leontief production function and are perfectly complementary. The input-output coefficient is: ($aij_{i,j}$):

$$DI_{i,j,t} = aij_{i,j} CI_{j,t} \quad (4)$$

At the bottom level, equation 5, equation 6, equation 7, as well as equation 8 are represented—and their parameters follow a CES function. In equation 5, the various categories of labour are combined following a CES technology, and there is imperfect substitutability among the different types of labour. Equation 6 shows that labour demand of each type ($LD_{l,j,t}$) derives from a first-order condition of cost minimization by enterprises. The wage rate paid by industry *j* for type labour *l* is represented by: ($WTI_{l,j,t}$). As in the case of labour, different categories of capital are imperfect substitutes (equation 7), and demand for each type of capital ($KD_{k,j,t}$) is as a result of cost minimization (equation 8). The rental rate paid by industry *j* for capital type *k* is represented by ($RTI_{k,j,t}$):

$$LDC_{j,t} = B_j^{LD}\left[\beta_{l,j}^{LD} LD_{l,j,t}^{-\rho_j^{LD}}\right]^{\frac{-1}{\rho_j^{LD}}} \quad (5)$$

$$LD_{l,j,t} = \left[\frac{\beta_{l,j}^{LD} WC_{j,t}}{WTI_{l,j,t}}\right]^{\sigma_t^{LD}} \left[B_j^{LD}\right]^{\sigma_t^{LD}-1} LDC_{j,t} \quad (6)$$

$$KDC_{j,t} = B_j^{KD}\left[\beta_{k,j}^{KD} LD_{k,j,t}^{-\rho_j^{KD}}\right]^{\frac{-1}{\rho_j^{KD}}} \quad (7)$$

$$KD_{k,j,t} = \left[\frac{\beta_{k,j}^{KD} RC_{j,t}}{RTI_{k,j,t}}\right]^{\sigma_t^{KD}} \left[B_j^{KD}\right]^{\sigma_t^{KD}-1} KDC_{j,t} \quad (8)$$

It is also important to note that some assumptions of an exogenous growth rate are set for variables such as Government expenditure, labour supply and transfers. One of the advantages of this dynamic model specification is the ability to be able to assess structural changes in the economy, as well as evaluate the impact of shocks in the medium and long term. The model is applied to a country like The Gambia, where the prices of factors, goods and services are given (that is, a price-taking behaviour). Also, cost minimization by enterprises ensures that they employ labour and capital where the value of marginal product of each product is equal to its price.

The model includes four sectors, namely: agriculture, industries, private service and non-tradable Service. It is important to note that the 10% shock was not applied to the non-tradable sector, because the scope of this study is to understand the impact of the productive sectors on economic development in The Gambia. However, the simulation results will show the impact our shocks will have on public service. The specificity of the model is discussed in greater detail below.

Total factor productivity

In order to be able to effectively access the impact of the 10% shock on the Gambian economy, the model was modified to include a total factor productivity function, which comprised of human capital, physical investment, and research and demand.

The productivity factor $\left(B_j^{VA}\right)$ is a function of human capital $\left(KH_{j,t}\right)$; research and development $\left(RD_{j,t}\right)$; physical investment $\left(IP_{j,t}\right)$; the ratio of overall

public capital to private sector capital $\left(\frac{KDpubG_t}{KDpriv_{j,t}}\right)$; with these respective elasticities: (τk), (τr) and (τi). The global stock of public capital $(KDpubG_t)$ creates for each productive activity a positive externality that affects the total factor productivity in the sector. The productivity factor will thus be affected by the distribution of the public investment flow between human capital $(KH_{j,t})$, research and development $(RD_{j,t})$ and physical investment $(IP_{j,t})$, but also by the magnitude of externalities the sector benefits, as well as the elasticity of productivity:

$$B_j^{VA} = \overline{B}_{j,t}\left[\left(KH_{j,t}\right)^{\varepsilon_k}\left(RD_{j,t}\right)^{\varepsilon_r}\left(IP_{j,t}\right)^{\varepsilon_i}\left(\frac{KDpubG_t}{KDpriv_{j,t}}\right)^{\varepsilon_k}\right] \quad (9)$$

Dynamic model

The end-of-period for private sector capital stock $(KD_{k,j,t+1})$ is equal to the start of stock period $(KD_{k,j,t})$, and net of fixed capital consumption (or depreciation) of the period at a rate $\delta_{k,j}$, which is added to the volume of capital accumulated during the period $(IND_{k,j,t})$:

$$KD_{k,j,t+1} = KD_{k,j,t}\left(1-\delta_{k,t}\right) + IND_{k,j,t} \quad (10)$$

Public investment demand is the product of the average price of public capital and the sum of investment demand from the public sector (and the same applies to the private investment demand):

$$IT_t^{PUB} = PK_t^{PUB}\sum_{k,pub} IND_{k,pub,t} \quad (11)$$

$$IT_t^{PRI} = PK_t^{PRI}\sum_{k,bus} IND_{k,bus,t} \quad (12)$$

The average price of capital (public or private) is a weighted sum of consumer prices—the weighting coefficient being the relative share of demand for good or service *i* in aggregate investment demand (by origin):

$$PK_t^{PUB} = \frac{1}{A^{K-PUB}}\prod_i\left(\frac{PC_{i,t}}{\gamma_i^{INVPUB}}\right)^{\gamma_i^{INVPUB}} \quad (13)$$

$$PK_t^{PRI} = \frac{1}{A^{K-PRI}}\prod_i\left(\frac{PC_{i,t}}{\gamma_i^{INVPRI}}\right)^{\gamma_i^{INVPRI}} \quad (14)$$

The sector accumulation rate of private capital $\left(\frac{IND_{k,bus,t}}{KD_{k,bus,t}}\right)$ of period *t* is an increasing function of the cost-benefit ratio of capital $\left(\frac{R}{U}\right)$ in the same period, but the rate of increase of the rate of accumulation, under the effect of this ratio decreases:

$$\frac{IND_{k,bus,t}}{KD_{k,bus,t}} = \varphi_{k,bus}\left[\frac{R_{k,bus,t}}{U_{k,bus,t}}\right]^{\sigma_{k,bus}^{INV}} \quad (15)$$

The cost of usage of capital in a sector is equal to the average price of capital (PK) that multiplies the sum of the interest rate (IR) and the depreciation rate (δ_k):

$$U_{k,pub,t} = PK_t^{PUB}\left(\delta_{k,pub} + IR_t\right) \quad (16)$$

$$U_{k,bus,t} = PK_t^{PRI}\left(\delta_{k,bus} + IR_t\right) \quad (17)$$

Equilibrium and closure rules

The supply of the composite product (Q) is the sum of the final consumption of households (C), public expenditure, intermediate demand (DIT), private investment (INV), stock changes (STK) and margins (MRGN):

$$Q_{i,t} = \sum_h C_{i,h,t} + CG_{i,t} + INV_{i,t} + VSTK_{i,t} + DIT_{i,t} + MRGN_{i,t} \quad (18)$$

Labour supply equals labour demand:

$$\sum_j LD_{l,j,t} = LS_{l,t} \quad (19)$$

Supply of capital and demand for capital are equal:

$$\sum_j KD_{k,j,t} = KS_{k,t} \quad (20)$$

The sum of total investment and inventories in value is equal to the sum of savings of households (SH), firms (SF), Government (SG), and the rest of the world (SROW) (valued in local currency):

$$IT_t = \sum_h SH_{h,t} + \sum_f SF_{f,t} + SG_t + SROW_t \quad (21)$$

$$IT_t^{PRI} = IT_t - IT_t^{PUB} - \sum_i PC_{i,t} VSTK_{i,t} \quad (22)$$

Supply of local products and demand for local products in the domestic market are equal:

$$\sum_j DS_{j,i,t} = DD_{i,t} \quad (23)$$

Supply of export products and the demand for export products are equal:

$$\sum EX_{j,i,t} = EXD_{i,t} \quad (24)$$

b) SAM of The Gambia

The first SAM developed in The Gambia was developed by Jabara et al. (1992) in 1990. The SAM was built from the bottom-up using the 1989/1990 household income and expenditure survey of The Gambia, conducted by the Cornell Food and Nutrition Policy Programme (CFNPP) Africa Economic Project funded by the United States Agency for International Development (USAID). This approach was mainly due to the fact that there was no input-output table available for The Gambia. Moreover, there is a vast amount of literature that articulates the processes involved in developing SAMs—Pradhan et al. (2006), Van Leeuwen and Nijkamp (2009), Pyattand Round (1977), Kjosev and Novkovska (2017), Keuning and De Ruuter (1988), Pyatt (1991), Round (2003), and Thiele and Piazolo (2002).

Due to the changes in the socio-economic characteristics since the development of the 1990 SAM, Fofana et al. (2014) updated the 1990 SAM to a 2009 SAM based on the 'top-down' approach, using data from The Gambia Bureau of Statistics (GBOS), and data from regional and international institutions. The SAM featured the private institutions (households and corporations) account, Government account, rest of the world account, and a capital account split into GFCF and change in inventories.

Moreover, in order to be more useful for research, the 2009 SAM was updated based on the method in ibid, using data from Food and Agriculture Organization, African Statistical Yearbook, The Gambia Integrated Household Survey, and The Gambia Bureau of Statistics. The new 2015 SAM (see Annex 1) has been disaggregated into four activities and commodities accounts (agriculture, industries, private service and non-tradable Service); five factors of production accounts (rural labour, urban labour, public capital, private capital and land); and five accounts of institutions, namely: urban households, rural households, firms, government and the rest of the world.

IV. Simulations and Results

a) Simulations

In order to assess the impact of the 10% increase of public expenditure on economic growth and

welfare in The Gambia over five years—three different scenarios were simulated—one for agriculture, one for service, and the final for industry. This helped to understand the impact of public investment increases in all these three areas, as it relates to GDP, sectoral value-added, nominal income (in urban and rural households), consumer prices (in urban and rural households), welfare (in urban and rural households) and labour demand (urban and rural areas).

In the dynamic model, the economy grows, even without the existence of a shock. This will provide the baseline or business as usual (BAU) scenario, which will be used in calculating the simulation results. In the first simulation, a 10% increase in the service industry was introduced. Thereafter, the BAU results were subtracted from the simulation results, in order to capture the variation caused by the 10% shock in the service sector. The same process was repeated for the other two productive sectors of the Gambian economy.

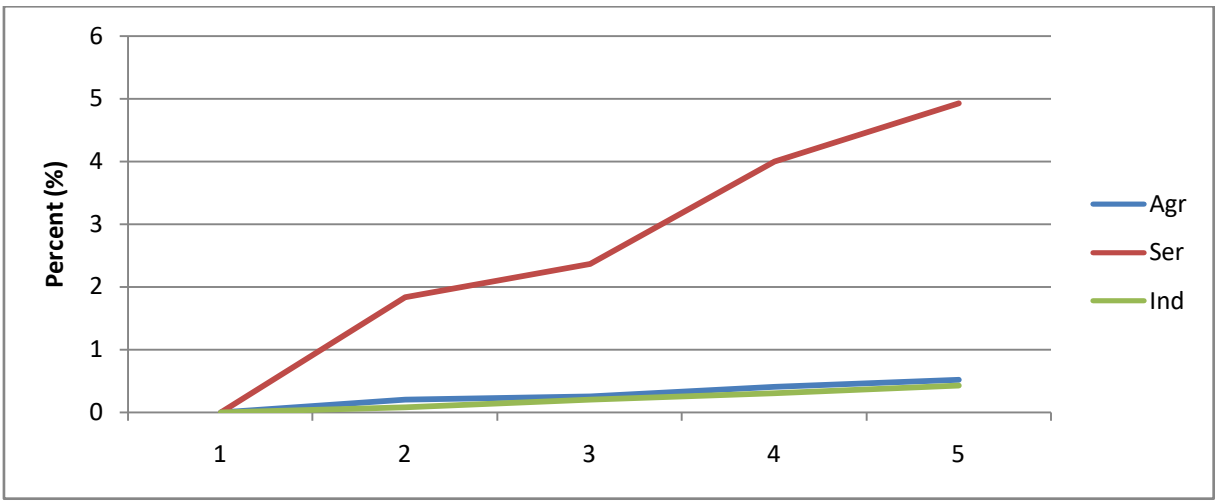
b) Results

The dynamic effects of the implementation of a 10% increase in Government budget allocation across agriculture, industry and service sector was simulated. This model assessed the impact of the shock on economic growth, welfare, and other development indicators in the urban and rural areas.

Impact on GDP

Due to the expansion of service production as a result of the increase in TFP, there was an increase in GDP by 4.9% (see Figure 6), after the 10% shock was introduced in the service sector. Baumol (1967) indicated that an increase in the proportion of the service sector leads to productivity change in the service sector alone, which will negatively affect total productivity or economic growth. However, this has been the contrary in The Gambia (also see the impact of the service sector shock on value-added).

The 10% expenditure in the industry and agriculture sector does not contribute much to GDP, because both sectors are input-intensive. Agriculture is the most labour-intensive sector in the rural area (at 89%), and industry is the most labour-intensive sector in the urban areas (64%). Their contribution to GDP is also minimal[3].



Source: Authors' simulation results

Figure 6: Change in GDP (%), 2015-2019

Impact on value-added

The 10% increase in the service expenditure leads to a value-added growth across all sectors. By the fifth year, value-added for service increased by 5.5%; industry by 3.8%; agriculture by 1.4% and non-tradable service by 5.7%. This shows the there is a strong linkage between service sector and the other sectors, and it, therefore, has the potential to become the main driver of sustainable growth in the Gambian economy. Evidence from Beck et al. (2000) also notes that financial development improves economic growth. This could be an opportunity for The Gambia, given that financial service and communications sub-sector is about 10% of the overall Gambian GDP (GBOS, 2015). In the case of agriculture, a 10% increase in agricultural expenditure benefits the agriculture sector more. This shows that the agriculture value chain in the country is not fully developed. There is a slower value-added growth across the other sectors (see Table 1). For the industry sector, the 10% shock did not have any significant impact on the agriculture sector. This shows a weak link between two major labour-intensive sectors in the country.

[3] This labour-intensity calculation is based on calculations from the 2015 SAM of The Gambia.

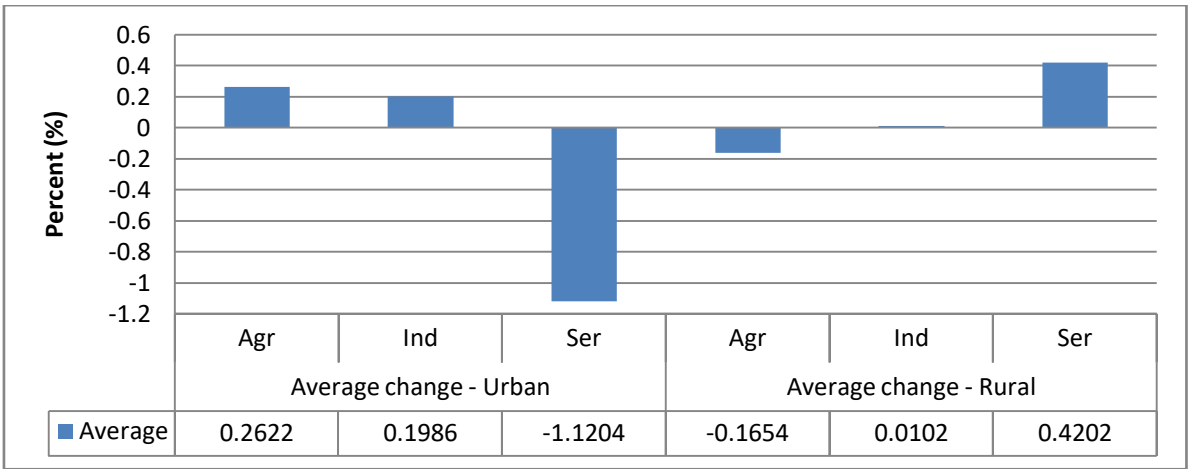
Table 1: Change in value-added (%), 2015-2019

	10% increase in agriculture expenditure				10% increase in service expenditure				10% increase in industry expenditure			
	Agr	Ind	Ser	NtSer	Agr	Ind	Ser	NtSer	Agr	Ind	Ser	NtSer
2015	0	0	0	0	0	0	0	0	0	0	0	0
2016	0.402	0.226	0.179	0.116	0.525	2.15	1.932	2.001	0.008	0.392	0.051	-0.064
2017	0.845	0.151	0.214	0.053	0.765	1.991	2.598	2.651	0.02	0.892	0.146	-0.085
2018	1.351	0.233	0.347	0.085	1.166	3.603	4.364	4.552	0.025	1.37	0.214	-0.14
2019	1.898	0.2	0.433	0.049	1.423	3.883	5.456	5.747	0.031	1.908	0.299	-0.182

Source: Authors' simulation results

Impact on labour demand

At present, the labour-intensity of the service sector in rural areas is 10%. However, the increase in the service expenditure will increase the opportunity for more employment in rural areas by an average of 0.4% in five years. This will be helpful to the rural population, given that the wages in the service sector may be higher than the wages from agriculture, which is seasonal, due to its dependence on rainfall. The low wages; lack of security in agricultural jobs; and job availability in the service sector will cause rural households to seek employment in service-related jobs. The introduction of these types of jobs in rural areas will also be helpful, because it will expose rural households to new forms of employment, and therefore develop their skills in order to be more employable. Additionally, it is important to note that the migration of jobs to rural areas will decrease the demand for service-related jobs in urban areas by 1.1% (see Figure 7). On the other hand, a 10% increase in the industry expenditure will increase rural labour demand by 0.01% (on average), in comparison to a 10% increase in agricultural expenditure which will decrease rural labour demand by 0.16% on average.

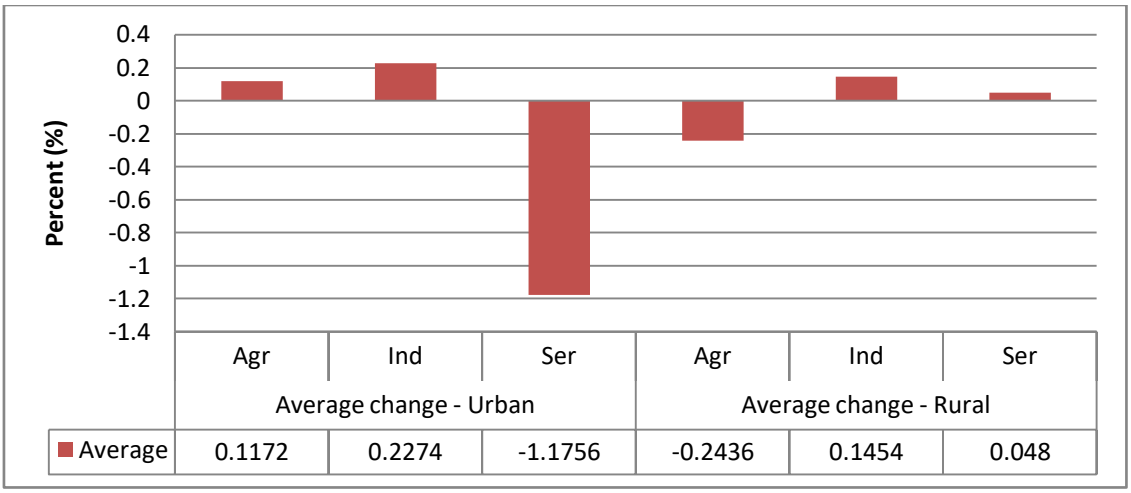


Source: Authors' simulation results

Figure 7: Average change in labour demand (%), 2015–2019

Impact on nominal income

The pattern of nominal income closely follows the labour demand pattern. A decrease in urban labour demand leads to a reduction in urban income, while an increase in rural labour demand leads to an rise in rural income. Generally, an average decrease of 1.1% urban labour leads to an average of 1.1% decrease in urban income, and the same trend is applicable to the industry and agriculture sectors (see Figures 7 and 8).

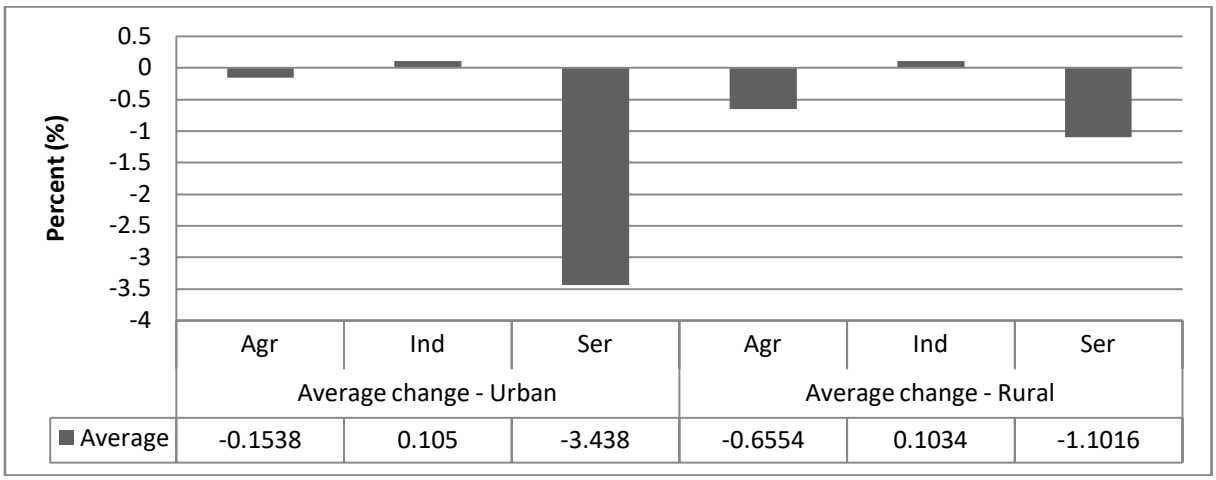


Source: Authors' simulation results

Figure 8: Change in nominal income (%), 2015-2019

Impact on consumer prices

An expansion of the service sector through the 10% increase in expenditure will lead to a higher decrease in the prices of services which both urban and rural households depend on. However, given that the consumption basket of rural households has less service-related items than urban areas, there is a higher decrease in average urban consumer prices at 3.4%, compared to 1.1% in rural areas. With regards to the 10% shock in agriculture, consumer prices reduced more in rural areas (see Figure 9). This is mainly due to the fact that rural household's consumption basket mostly contains food products. After the 10% shock in the industry sector, consumer prices increased in both urban and rural areas.



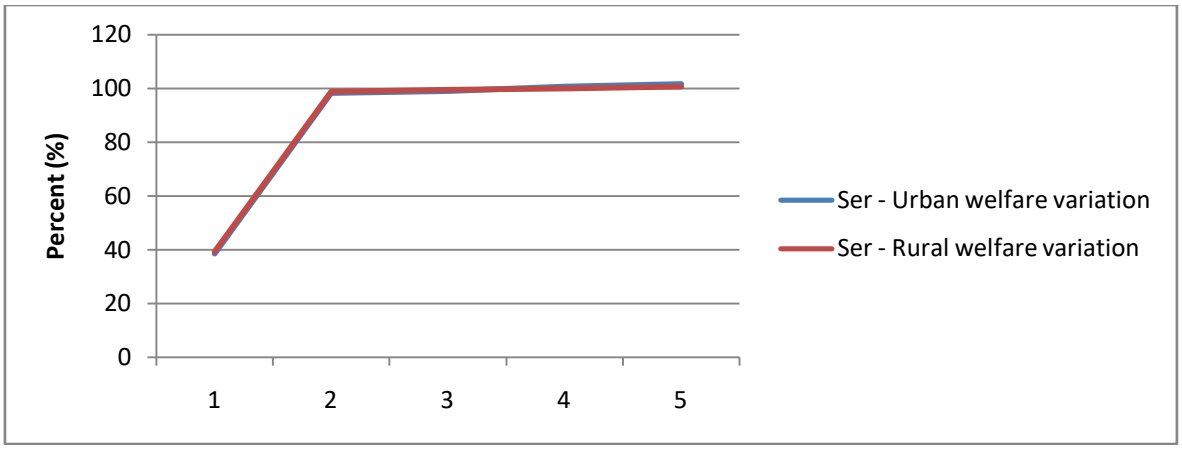
Source: Authors' simulation results

Figure 9: Change in consumer prices (%), 2015-2019

Impact on welfare

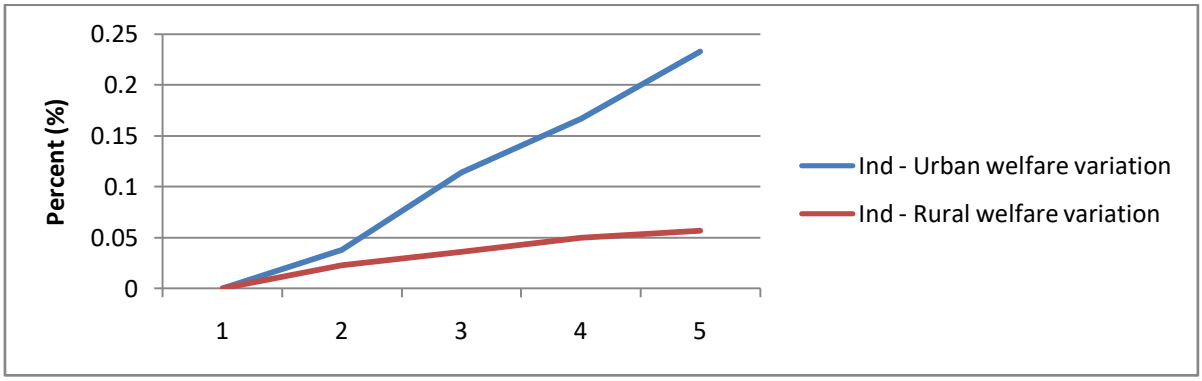
The results of the various simulations for service, industry and agriculture has varying impacts on household welfare. For the service sector[4], it could be seen that the welfare of both urban and rural households increased in the second year. An important point to note is that the growth in the welfare of the urban and rural areas is more equitable. The shock in the industry sector shows that more people in urban areas will experience an increase in welfare, from the 10% increase in Government expenditure. After the 5th year, it is clear that there will be a higher level of inequality between the urban and rural populations. The simulation for agriculture shows that there will be a welfare increase of about 1% for the rural population, while the increase in welfare of the urban population will be about 50% less than the rural area.

[4] Note that the high indices of the service sector's simulation are as a result of the high share of value-added of service in comparison to the other sectors of the Gambian economy.



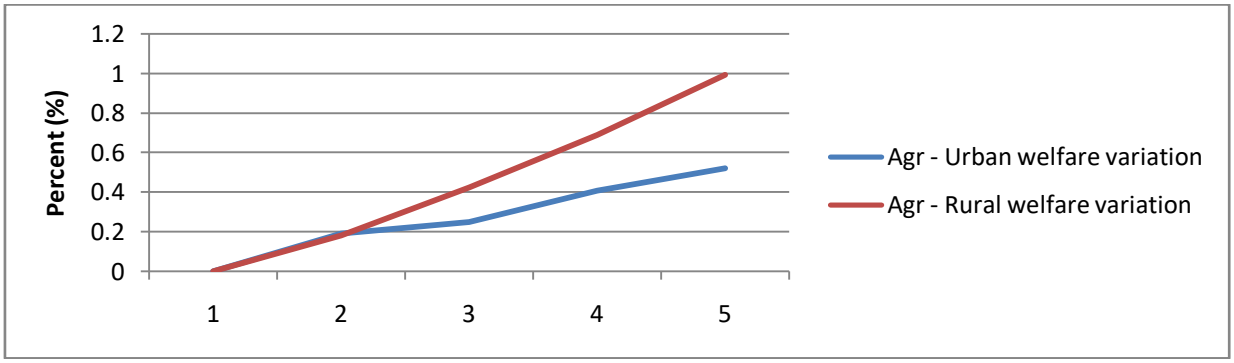
Source: Authors' simulation results

Figure 10: Service sector, change in welfare (%), 2015-2019



Source: Authors' simulation results

Figure 11: Industry sector, change in welfare (%), 2015-2019



Source: Authors' simulation results

Figure 12: Agriculture sector, change in welfare (%), 2015-2019

V. Conclusion

The importance of public intervention in ensuring economic equality in a country cannot be over-emphasized. Public expenditure has a great potential of facilitating growth, and the decision by African countries to agree to commit 10% percent of public expenditure on agriculture to facilitate inclusive economic growth is a laudable project. However, before this study, the impact of that 10% public expenditure increase on various sectors of the Gambian economy, was yet to be understood. The results show that the sector that can most promote economic growth, as well as increase welfare in both urban and rural areas, is the service sector.

With regards to GDP and value-added, the study shows that an increase of 10% in public expenditure on the service sector has a greater impact

on GDP than any other sector. As a result, if the Government of The Gambia wants to increase its GDP, it should increase its spending in the service sector. Compared to the other sectors, the service sector also has the potential to pull along the agriculture sector and industry sector. In order words, when the service sector expands, industry and agriculture will also expand, due to its value chain linkages. The same does not apply to the industry and agriculture sectors.

In addition, considering that the service sector is technology-driven—a 10% increase in service expenditure will increase the rural labour demand, but decrease urban labour demand. Rural households will benefit from the increase in new types of jobs, and a positive impact on rural income and welfare will be experienced where the poorest people in The Gambia reside. Given that there will be a negative impact on urban areas, the Gambian Government should create policies to ensure that some of the jobs in the service sector remain in the urban area.

The consumer prices also decreased (in both urban and rural areas), as a result of the 10% shock in the service sector, as compared with a similar shock in any other industry. This shows that the service sector has a huge potential to reduce prices in the consumption basket of the country.

The fact that general public agriculture investments did not out-perform the service sector in our analysis sheds light on the point that even if The Gambia had met its 10% CAADP commitment between 2006 and 2015, the gains on economic growth and welfare would have been more positive through investments in the service sector.

The results of this study also reaffirm the assertion of Fan et al. (2000), that targeted agricultural spending in specific sub-sectors has a greater poverty-reduction impact on rural households. In The Gambia, general public expenditure on agriculture may not get the desired result for poverty reduction, specifically in rural areas. In order to get the desired result, public agricultural spending should be targeted across various agriculture sub-sectors like irrigation, among others.

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Annex 1: 2015 Social Accounting Matrix (SAM) of The Gambia

	Rural Labor	Urban Labor	Public Capital	Private Capital	Land	Rural households	Urban households	Entreprise	Government	Rest of the world	Govt direct tax	Govt sales tax	Govt import tax	Agriculture	Industries	Private services	Non-tradable Services	Agriculture	Industries	Private services	Non-tradable Services	Agriculture	Industries	Private services	Gross FCF	Total
Rural Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	6589	1243	1803	20	0	0	0	0	0	0	0	0	9655
Urban Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	621	3213	12475	318	0	0	0	0	0	0	0	0	16627
Public Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	170	476	3822	371	0	0	0	0	0	0	0	0	4839
Private Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	27	75	599	59	0	0	0	0	0	0	0	0	760
Land	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	22
Rural households	9655	0	0	0	22	0	648	1351	64	1009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12749
Urban households	0	16627	0	0	0	0	0	1029	355	648	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18659
Entreprise	0	0	4839	760	0	0	0	0	1024	644	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7267
Government	0	0	0	0	0	0	0	0	0	1226	1320	2116	1504	0	0	0	0	0	0	0	0	0	0	0	0	6166
Rest of the World	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	932	11440	132	0	0	0	0	0	12504
Govt direct tax	0	0	0	0	0	0	307	1013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1320
Govt sale tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	578	159	1379	0	0	0	0	0	2116
Govt import tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	1390	0	0	0	0	0	0	1504
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12493	0	0	0	414	0	0	0	12907
Industries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	747	0	0	0	6488	0	0	7235
Private services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26870	0	0	0	96	0	26966
Non-tradable Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3396	0	0	0	0	3396
Agriculture	0	0	0	0	0	7286	1556	0	0	0	0	0	0	4247	6	1022	0	0	0	0	0	0	0	0	0	14117
Industries	0	0	0	0	0	1974	2610	0	0	0	0	0	0	545	183	1321	289	0	0	0	0	0	0	0	6814	13736
Private services	0	0	0	0	0	3149	12873	0	0	0	0	0	0	686	2039	5924	2339	0	0	0	0	0	0	0	1371	28381
Non-tradable Services	0	0	0	0	0	0	0	0	3197	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199	3396
Agriculture	0	0	0	0	0	0	0	0	0	414	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414
Industries	0	0	0	0	0	0	0	0	0	6488	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6488
Private services	0	0	0	0	0	0	0	0	0	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96
Gross FCF	0	0	0	0	0	340	665	3874	1526	1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8384
Total	9655	16627	4839	760	22	12749	18659	7267	6166	12504	1320	2116	1504	12907	7235	26966	3396	14117	13736	28381	3396	414	6488	96	8384	