

# Between Financial Support and Performance: What Are Subsidies to Public Companies in Sub-Saharan African Countries Worth?

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## Abstract

The purpose of this study is to analyse the effects of financial subsidies on the productivity of public enterprises in Sub-Saharan Africa. Based on theories of public enterprise management and stylised facts, we formulate the hypothesis that financial subsidies improve the productivity of public enterprises in Sub-Saharan Africa. To test this hypothesis, the work uses secondary data and estimation techniques such as the generalized method of moments. It finds that financial subsidies have positive and significant effects on the productivity of public enterprises in SSA, thus confirming the initial hypothesis. In view of these results, governments must regularly monitor the outcomes, encouraging a dynamic allocation of resources to the best-performing sectors and companies. These subsidies should be strategically directed towards emerging industries and small and medium-sized enterprises, in order to boost the local economy and create sustainable jobs.

## Keywords

Financial Subsidies, Productivity of Public Companies, Sub-Saharan Africa

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## 1. Introduction

Since the 1929 crisis and, more recently, the 2008 crisis, the role of the state has expanded considerably beyond its regalian functions, incorporating economic, social and productive responsibilities (Benedict & Parry, 2018). The global financial crisis highlighted the limits of market self-regulation and the need for public intervention to stabilise economies (IMF, 2009). Among the instruments used by governments, financial subsidies occupy a central place. They aim to correct market

failures, encourage certain economic activities deemed strategic and improve the efficiency of public enterprises (Stiglitz, 1989; Tirole, 2014a).

In the context of Sub-Saharan Africa (SSA), subsidies are often used to support public enterprises, which play a key role in the provision of essential services. However, their effectiveness is open to debate. The aim of this study is to assess the effects of financial subsidies on the productivity of public enterprises in SSA. It is based on the following hypothesis: financial subsidies improve the productivity of public enterprises in Sub-Saharan Africa.

The productivity of public companies refers to their ability to efficiently transform resources into useful goods or services, while pursuing public interest objectives. However, this productivity varies widely across the region. According to World Bank (2020), some public enterprises are relatively efficient, while others are characterised by poor performance, often linked to poor governance, low adoption of innovations and excessive dependence on public funding (Oduro & Agyapong, 2019; Moyo & Banda, 2021).

From a theoretical point of view, there are several approaches that shed light on this issue. Agency theory (Jensen & Meckling, 1976) highlights the conflicts of interest between managers and public authorities, which can lead to opportunistic behaviour and poor performance. Shirley and Walsh (2001) show that the absence of effective control mechanisms in public companies in SSA hampers their productivity.

At the same time, incentive theory (Niskanen, 1971; Dewatripont & Maskin, 1995) suggests that well-designed mechanisms, such as performance contracts, can improve productivity. Reforms based on this approach have produced encouraging results in some African countries. Similarly, the theory of the transformation of public enterprises (Messerlin, 1995), defended by Vickers and Yarrow (1988), highlights the positive effects of privatisation and restructuring policies on performance.

However, there are important limitations. Poorly targeted or poorly administered subsidies can have perverse effects. According to OECD (2021), they can encourage the maintenance of inefficient businesses, create dependency on the State and slow down innovation. Amsden (2001) notes that aid often benefits established companies, to the detriment of new initiatives. Birdsall and Hamoudi (2002) highlight the risk of misappropriation of public funds. Furthermore, the lack of reliable data and rigorous evaluations hampers objective analysis of their effectiveness (World Bank, 2020).

It should be noted that, although financial subsidies can be a strategic lever for improving the productivity of public enterprises in Sub-Saharan Africa, their impact is highly dependent on governance, the targeting of aid and the existence of effective evaluation mechanisms. Structural reform of these subsidies is therefore essential to maximise their positive effects.

## 2. Theoretical and Empirical State of the Art

Assessing the effects of financial subsidies on the productivity of public enter-

prises in Sub-Saharan Africa is an essential area of study for understanding the region's economic and institutional dynamics. Public enterprises, which often face specific challenges such as rigid bureaucratic structures, limited resources and multiple objectives, have distinct characteristics compared to private enterprises. The aim of this study is to examine how financial subsidies influence the productivity of these enterprises, taking into account the relevant economic theories and local institutional contexts.

Incentive theory and public ownership theory, developed by economists such as Vickrey (1996), Buchanan (1996), Laffont and Tirole (2014), and Holmström (2016), provide a framework for understanding the governance mechanisms and performance of public enterprises. These theories emphasise the importance of aligning the interests of managers with those of the owning state, in order to improve the efficiency and productivity of public enterprises. In the context of Sub-Saharan Africa, where institutions can be fragile, putting in place effective incentive mechanisms is crucial to optimising the use of public resources.

The theory of fiscal bureaucracy, formulated by Niskanen (1971), suggests that public officials act primarily in their own self-interest, which can undermine the efficiency of public enterprises. This perspective is particularly relevant in Sub-Saharan Africa, where bureaucratic structures can hamper the responsiveness and innovation of public enterprises. Financial subsidies, if poorly managed, can exacerbate these problems by reinforcing rentier behaviour and reducing incentives to improve performance.

The theory of incentive contracts, developed by Hart and Holmström (1983), proposes performance-based remuneration structures to align the interests of agents with those of owners. In the context of African public enterprises, the application of incentive contracts could improve productivity by reducing the problems of asymmetric information and moral hazard. However, the implementation of such mechanisms requires solid institutions and effective supervision, which are often lacking in certain regions of Sub-Saharan Africa.

Privatisation theory, explored by Stiglitz (1988), examines the conditions under which privatisation can improve the efficiency and performance of public enterprises. In some cases, privatisation has led to productivity gains, as observed in the electricity sector in Cameroon, where the privatisation of the Société Nationale d'Électricité (SONEL) led to an improvement in technical and financial performance. However, privatisation is not a panacea and can entail risks, particularly in terms of universal access to services and public control.

The theory of state regulation of public enterprises, developed by Laffont and Tirole (1993), suggests that in certain sectors the state must intervene to regulate enterprises in order to ensure efficient and fair provision of services. This regulation aims to correct market failures, such as natural monopolies, where competition is difficult to establish. In Sub-Saharan Africa, where many essential services are provided by state-owned enterprises, effective regulation is crucial to guarantee the quality and accessibility of services.

Agency theory, formulated by [Jensen and Meckling \(1976\)](#), is an essential theoretical framework for understanding management relationships within public companies. This theory is based on the idea that public companies are often faced with conflicts of interest between the principals (the owners, often the state) and the agents (the managers or directors of public companies). Information asymmetry, in particular, plays a key role in these conflicts, as managers often have more information about the day-to-day activities of the company than the owners or state supervisors. Financial subsidies, if poorly targeted or managed, can exacerbate these problems by reducing incentives to improve performance and reinforcing opportunistic behaviour.

Although financial subsidies can potentially improve the productivity of public enterprises in Sub-Saharan Africa, their effectiveness depends largely on the quality of institutions, the design of incentive mechanisms and appropriate regulation. Economic theories provide useful frameworks for analysing these dynamics, but their application requires adaptation to the specific contexts of each country. Thus, an integrated approach, taking into account local institutional and economic specificities, is essential to maximise the impact of financial subsidies on the productivity of public enterprises in Sub-Saharan Africa.

### **3. Methodological Framework**

#### **3.1. Economic Model Used and Justification for the Choice of Variables**

The model we have used to formalise the relationship between financial subsidies and the productivity of public enterprises draws mainly on work in the theory of incentives and the management of public enterprises, in particular the work of [Holmström \(1979\)](#) and [Besley and Ghatak \(2003\)](#). These models emphasise the importance of incentive mechanisms in aligning the objectives of public enterprise managers with those of the state, in order to improve their performance and productivity.

We have incorporated the idea that financial subsidies can play a key role in providing resources for public enterprises to invest in infrastructure, build employee capacity and improve efficiency. In addition, our model takes into account the impact of external variables such as political stability, infrastructure investment, and economic inequality, following the principles of the public sector production model ([Ménard & Klein, 2004](#)).

In this sense, our model seeks to analyse in a holistic way how subsidies influence the productivity of public enterprises, taking into account the structural and contextual factors specific to each country. The objective of this analysis is to assess the effects of financial subsidies on the productivity of public enterprises in Sub-Saharan African countries. In this respect, the productivity of public enterprises is chosen as the dependent variable. As a variable of interest, financial subsidies are considered as a determining factor.

These subsidies can be measured by the financial aid, direct or indirect, allo-

cated by a public enterprise to finance an activity of general interest. The integration of these variables makes it possible to study their direct impact on the efficiency and performance of public enterprises, in a constantly changing economic context in Sub-Saharan Africa.

➤ **Functional form of the model**

The functional form of the model may vary depending on the nature of the assumed relationship between financial subsidies and the productivity of public enterprises. A simple linear specification might be as follows:

$$PEPUB_{it} = \beta_0 + \beta_1 FGRA_{it} + \varepsilon_{it}$$

A more complex specification of the model could include interactions between financial subsidies and other relevant variables. Firstly, the variable takes into account the context and structural characteristics of countries, such as political stability (POSTA), making it possible to measure the impact of political stability on the effectiveness of financial subsidies allocated to public companies.

Secondly, variables reflecting economic and social aspects, such as physical investment (MAIN) and education (EDUC), can modulate the impact of financial subsidies on the productivity of public enterprises. Thirdly, a variable representing income inequality (INCI), measured by the Gini index, could be used to assess how the distribution of wealth influences the effectiveness of subsidies and productivity.

Fourth, control variables such as trade openness (COPEN) and public health (RHEA), which respectively measure the impact of trade policies and health conditions on the productivity of public enterprises, taking into account the wider economic environment. These variables will make it possible to test interactive effects and better understand the underlying mechanisms linking financial subsidies to productivity in a diversified context.

Fifth, interactive variables, such as the interaction between financial subsidies (FGRA) and public health (RHEA), will be included. These interactions will make it possible to examine the extent to which financial subsidies can influence the productivity of public enterprises as a function of public health, and whether these effects are amplified or attenuated by other economic and social factors.

Sixthly, the measure of financial subsidies (FGRA) is the main explanatory variable in this analysis, as it is at the heart of the study. This variable can be measured by the amounts of direct or indirect financial aid allocated by the state or other public institutions to finance general interest activities within public companies. This variable of interest makes it possible to study the direct impact of financial subsidies on the productivity of public companies and to examine whether these effects are modified by variables specific to each country or sector.

With regard to the structural characteristics of countries, several factors can influence the effects of financial subsidies on the productivity of public enterprises. Among these, the level of economic development, physical infrastructure, national economic policies and political stability play a key role. These

characteristics can modulate the way in which financial subsidies affect the productivity of public enterprises, for example, a stable and well-developed economic environment is more conducive to better use of subsidies to increase productivity.

Thus, studying the effects of financial subsidies on the productivity of public enterprises provides a better understanding of how public financing policies can improve the efficiency of public enterprises, taking into account their economic, political and social specificities. This analysis is essential to guide public policies aimed at optimising the use of financial subsidies to boost productivity, while taking into account the specific challenges of each country in Sub-Saharan Africa.

The functional form of the model is carefully chosen to capture the potential complexities of the relationship between financial subsidies and the productivity of public enterprises. Two main specifications are proposed to test the hypothesis that financial subsidies positively influence the productivity of public enterprises in Sub-Saharan Africa (SSA).

The first specification examines the direct impact of financial subsidies on the productivity of public enterprises, taking into account control variables such as the level of economic development, political stability and physical investment. This specification makes it possible to analyse how subsidies, as the main variable, directly affect the performance of public enterprises in different economic contexts.

The second specification includes interactive variables to assess the moderating effect of certain factors. For example, the interaction between financial subsidies and public health could reveal how a favourable health environment amplifies or attenuates the impact of financial subsidies on productivity. These two specifications aim to test the validity of the main hypothesis, while offering a more nuanced understanding of the impact of financial subsidies on the productivity of public enterprises in Sub-Saharan Africa, taking into account local specificities and contextual factors.

***Direct relationship:***

$$\text{PEPUB}_{it} = \beta_0 + \beta_1 \text{PEPU}_{it-1} + \beta_2 \text{FGRA}_{it} + \beta_3 \text{MAIN}_{ij} + \beta_4 \text{EDUC}_{ij} + \beta_5 \text{POSTA}_{ij} \\ + \beta_6 \text{COPEN}_{ij} + \beta_7 \text{PHEA}_{it} + \beta_8 \text{INCI}_{ij} + \varepsilon_{it}$$

This specification focuses on the direct impact of financial subsidies on the productivity of public enterprises while controlling for other relevant factors. The coefficient  $\beta_1$  represents the direct effect of financial subsidies on the productivity of public enterprises.

***Indirect relationship:***

$$\text{PEPUB}_{it} = \beta_0 + \beta_1 \text{PEPUB}_{it-1} + \beta_2 \text{FGRA}_{it} + \beta_3 \text{MAIN}_{ij} + \beta_4 \text{EDUC}_{ij} + \beta_5 \text{POSTA}_{ij} \\ + \beta_6 \text{COPEN}_{ij} + \beta_7 \text{PHEA}_{it} + \beta_8 \text{INCI}_{ij} + \beta_9 (\text{FGRA} * \text{PHEA}) + \varepsilon_{it}$$

This specification extends the direct relationship by incorporating interaction terms between financial subsidies and other variables:

- FGRA\*RHEA: Interaction between financial subsidies and public health.

This interaction term makes it possible to explore indirect effects, where financial subsidies influence the productivity of public companies through their impact on other factors. The coefficient  $\beta_8$  represents this indirect effect (**Table 1**).

**Table 1.** Sources of variables used in the econometric model and expected signs.

Variables	Variable sources	Expected signs
FINANCIAL GRANT (FGRA)	Tarp, F. (2013). The Impact of Subsidies on Economic Growth in Developing Countries. African Development Review.	Positive (+)
MATERIAL INVESTMENT (MAIN)	Krugman, P., & Obstfeld, M. (2009). International Economics: Theory and Policy. Addison Wesley (uses physical investment in economic impact analysis).	Positive (+)
EDUCATION (EDUC)	Barro, R. (2001). Human Capital and Growth. American Economic Review.	Positive (+)
POLITICAL STABILITY (POSTA)	Acemoglu, D., & Robinson, J. (2012). Why Nations Fail: The Origins of Power, Prosperity, and Poverty. Crown Publishing.	Positive (+)
COMMERCIAL OPENING (COPEN)	Frankel, J. A., & Romer, D. (1999). Does Trade Cause Growth? American Economic Review.	Positive (+)
PUBLIC HEALTH (RHEA)	Bloom, D. E., & Canning, D. (2000). The Health and Wealth of Nations. Science.	Positive (+)
INCOME INEQUALITY (INCI)	Deininger, K., & Squire, L. (1996). A New Data Set Measuring Income Inequality. World Bank Economic Review.	Negative (-)

Source: Authors.

These references are based on works and authors who have examined these variables in their research and are commonly used in studies of socio-economic effects and public policy. If you want more specific sources or recent articles, you can search for recent publications in academic journals.

### 3.2. Description of Selected Variables

The productivity of public enterprises (PEPUB) is a central concept that reflects the efficiency with which these entities utilise inputs “primarily labour and capital” to deliver goods or services in alignment with public interest goals. Following [Baumol and Oates \(1988\)](#), the multiplicity of objectives pursued by public enterprises “ranging from economic to social missions” can complicate both the measurement and the optimization of their performance.

To ensure a laborious and operational measurement of PEPUB in this study, Total Factor Productivity (TFP) is adopted as the main indicator. In line with [Harrison \(1994\)](#) and [Sheshinski and López-Calva \(2003\)](#), TFP captures the portion of output not explained by the amount of inputs used in production, thereby

serving as a proxy for efficiency gains from better resource use or technological progress.

TFP is computed using an aggregate Cobb-Douglas production function of the form:

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{1-\alpha}$$

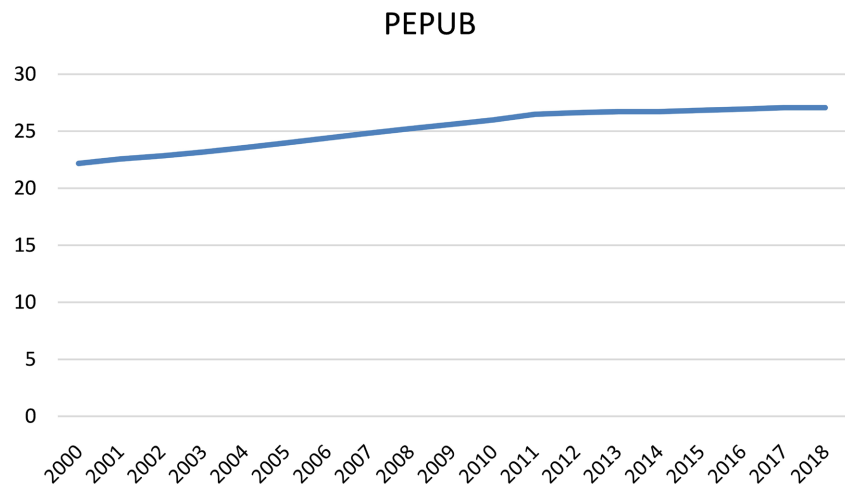
where:

- $Y_{it}$  is the total output (proxied by value added of public enterprises);
- $K_{it}$  is capital input;
- $L_{it}$  is labour input;
- $\alpha$  is the output elasticity of capital;
- $A_{it}$  represents TFP, calculated as:

$$Y_{it} = Y_{it} / K_{it}^{\alpha} L_{it}^{1-\alpha}$$

The data for  $Y_{it}$ ,  $K_{it}$ , and  $L_{it}$  are extracted from the World Bank's World Development Indicators (WDI) and IMF Government Finance Statistics (GFS), where available. The TFP index is standardized across countries and years to allow for meaningful comparison.

Regarding the key explanatory variable, financial subsidies to public enterprises (FGRA), it is scaled as a percentage of GDP in order to standardize across economies of different sizes. Thus, a one-unit change in FGRA corresponds to a 1 percentage point increase in the share of GDP allocated to subsidies for public enterprises. This scaling enables a clear interpretation of the marginal effect of subsidies on productivity, independent of country size (Figure 1).



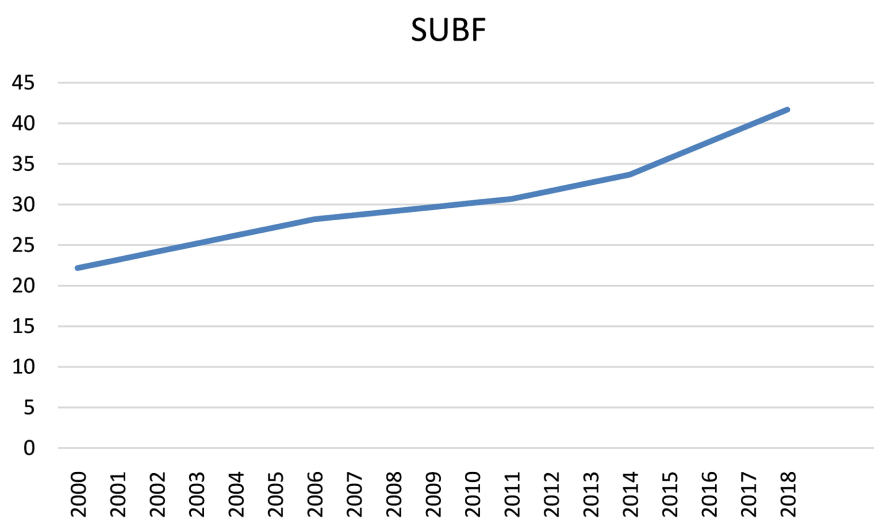
**Figure 1.** Productivity trends of public companies in SSA. Source: Authors.

The evolution of the productivity of public enterprises (PEPUB) in Sub-Saharan Africa shows an overall positive trend over the period from 2000 to 2018, with a slow progressive increase. This increase reflects continuous but moderate growth. It suggests efforts to improve operational efficiency and resource management within public enterprises in the region, although minor fluctuations are observed

from year to year.

➤ **The variable of interest: financial subsidies**

Subsidies are defined as monetary transfers or cost reductions granted by the government to correct market failures and promote economic activities considered beneficial to society, according to [Tirole \(2014b\)](#). He specifies that these aids can take the form of direct payments, tax reductions or other forms of financial support ([Figure 2](#)).



**Figure 2.** Financial subsidies. Source: Authors.

Based on the WDI database, this figure shows a steady increase in FGRA in Sub-Saharan Africa over the period 2000 to 2018. Initially aligned with the productivity of public enterprises (PEPUB) in 2000, subsidies increased steadily over this period. This trend suggests a growing reliance on financial subsidies to support SOE operations, which could indicate persistent challenges in terms of financial self-sufficiency and efficient resource management. The steady increase in subsidies could also reflect increased needs for public funding to maintain the operation and growth of the sectors concerned.

### 3.3. Data Sources and Expected Signs

The data used to estimate the model comes from various secondary sources. The data used in the study are panel data comprising a total of 43 countries over the period 2000-2018, selected on the basis of data availability. Most of the data used in this study comes from the World Development Indicators (WDI), the World Bank (WB) and the World Bank Enterprise Survey (WBES). The sample covers Sub-Saharan African countries. The inclusion of these 43 countries in the same sample can be justified by their strong historical and cultural roots, in addition to the economic links of being part of economic integration zones.

**Table 2** shows the expected signs of the explanatory variables, based on existing theories.

**Table 2.** Expected signs of parameters.

Variables	Measures	Parameters
FINANCIAL GRANT (FGRA)	Measured by the direct or indirect financial aid allocated to a public company to finance an activity of general interest.	$\beta_1$
MATERIAL INVESTMENT (MAIN)	Acquisition of sustainable production assets and creation of physical infrastructure.	$\beta_2$
EDUCATION (EDUC)	Measured by the secondary school enrolment rate.	$\beta_3$
POLITICAL STABILITY (POSTA)	Measured by the political stability index	$\beta_4$
COMMERCIAL OPENING (COPEN)	Measured by the Squalli and Wilson index (2011).	$\beta_5$
PUBLIC HEALTH (RHEA)	Measured by the public health index.	$\beta_6$
INCOME INEQUALITY (INCI)	Measured by the Gini index.	$\beta_7$
INTERACTIVE VARIABLE BETWEEN RHEA AND FGRA (RHEA*FGRA).	It will make it possible to test the validity of the interactive effects between public health and the financial subsidy.	$\beta_8$

Source: Authors.

### 3.4. Basic Estimating Technique

The specification adopted in this study highlights two potential sources of endogeneity that can bias the results if they are not properly taken into account.

The first source of endogeneity arises from the inclusion of the lagged variable, thus introducing a time dependence into the relationship between the productivity of public enterprises (PEPUB) and financial subsidies. The inclusion of the lagged productivity variable in the model can lead to a correlation between the dependent variable and the specification error, as the effect of past productivity can influence both financial subsidies and current productivity.

The second source of endogeneity lies in the inverse causality between the productivity of public enterprises (PEPUB) and financial subsidies. It is indeed plausible that an increase in the productivity of public enterprises leads to an increase in financial subsidies, or that these subsidies have an effect on current productivity. This bidirectional relationship complicates the estimation of causal effects, as it introduces a bias into the relationships between the variables in the model.

To deal with these endogeneity problems, the Generalised Method of Moments (GMM) proves to be the most appropriate technique. This method, developed by [Arellano and Bond \(1991\)](#), is based on the use of instruments to overcome endogeneity problems by resorting to exogenous or instrumental variables. This approach has been widely used in similar empirical work, particularly in studies that focus on dynamic panel data models where the explanatory variables may be correlated with the errors in the model.

The first estimator used in the MMG method is the Diff-MMG estimator proposed by [Arellano and Bond \(1991\)](#), which is based on first differences of the dependent variable and the use of instruments from the lagged variables. This estimator is particularly suited to situations where the number of periods ( $T$ ) is relatively high compared with the number of units ( $N$ ). However, in the case of this study, where  $T = 19$  and  $N = 43$ , this estimator may have limitations. Indeed, when the number of periods is low, it becomes necessary to use a more robust version of the estimator.

The Sys-MMG estimator, developed by [Blundell and Bond \(1998\)](#), is an important improvement on the Diff-MMG method. It combines both first differences and variable levels to provide more robust and less biased estimates, especially in cases where the number of periods is small and the explanatory variables are not strictly exogenous. This approach is particularly suitable in contexts where conventional instrumentation may not be powerful enough to solve endogeneity problems ([Blundell & Bond, 1998](#)).

In addition, this estimator has been widely used in empirical studies dealing with the impact of economic policies on economic performance in panel data, as in the work of [Roodman \(2009\)](#), who proposed an improvement to the estimation methodology using the MMG method to resolve endogeneity problems.

Building on this previous work, this study applies the MMG method to address endogeneity problems due to the lagged variable and reverse causality between public firm productivity and financial subsidies. For example, the work of [Arellano and Bond \(1991\)](#) showed that this technique is particularly effective in dealing with endogeneity in dynamic panel data models, and [Blundell and Bond \(1998\)](#) demonstrated that the Sys-MMG estimator improves estimates when the explanatory variables are correlated with the model errors.

The Diff-GMM and Sys-GMM estimators are therefore applied in this study to produce reliable, robust and consistent estimates, overcoming endogeneity problems and dealing with reverse causality between financial subsidies and the productivity of public enterprises. This methodological choice is supported by a large literature that has shown the effectiveness of this approach in similar contexts, notably in the work of [Arellano and Bond \(1991\)](#), [Blundell and Bond \(1998\)](#) and [Roodman \(2009\)](#), all of whom have used the MMG method to address endogeneity issues in dynamic economic models.

## 4. Presentation and Discussion of Results

As preliminary tests are not necessary for the estimation technique chosen, it is necessary, if not imperative, to carry out the analysis of the descriptive statistics and the correlation matrix before proceeding with the estimation of the model.

### 4.1. Descriptive Statistics and Correlation Matrix

According to [Table 3](#), PEPUB over the study period has a mean of 5.292; a standard deviation of 0.664; with a minimum and maximum of 3.487 and 7.098, respec-

tively. Financial subsidies in SSA have an average of 0.324 with a standard deviation of 0.095; a minimum value of 0.051 and a maximum value of 0.568 for the period under consideration. Trade openness has an average of 0.201; standard deviation of 0.401, with a minimum of 0.121 and a maximum of 0.952. Education has an average of 0.420 and a standard deviation of 0.130, with a minimum and maximum value of 0.011 and 0.923.

**Table 3.** Descriptive statistics.

Variable	Observations	Variables	Standard Error	Minimum	Maximum
PEPUB	817	5.292	0.664	3.487	7.098
FGRA	817	0.324	0.095	0.051	0.569
MAIN	817	0.427	0.276	-0.096	0.998
EDUC	817	0.420	0.130	0.011	0.923
POSTA	817	0.171	0.219	0.019	1.014
COPEN	817	0.201	0.401	0.121	0.952
RHEA	817	0.524	0.250	0.007	1.383
INCI	817	0.620	0.160	0.126	0.918

Source: Auteurs.

**Table 4** shows the correlation between the various main variables. The correlation matrix is used as a statistical measure that expresses the notion of a linear relationship between variables (meaning that they move together at a constant rate). It is a common tool for describing simple relationships without worrying about cause and effect. In the majority of cases, the cross-correlation is significant, positive, but less than 0.50, which removes the threat of multi-collinearity between the control variables.

**Table 4.** Correlation matrix between variables (significance level = 5%).

	PEPUB	FGRA	MAIN	EDUC	POSTA	RHEA	COPEN	INCI
PEPUB	1							
FGRA	0.225	1						
MAIN	0.096	0.062	1					
EDUC	-0.282	0.295	-0.094	1				
POSTA	0.381	0.295	-0.021	-0.421	1			
RHEA	0.102	0.101	0.006	-0.010	0.047	1		
COPEN	0.089	0.194	0.045	0.086	-0.060	-0.017	1	
INCI	-0.329	0.026	0.118	0.178	-0.553	-0.039	-0.006	1

Source: Authors.

## 4.2. Presentation, Interpretation and Discussion of Results

This section presents the results, their interpretation, as well as discussions and

policy recommendations. Robustness analysis will also be carried out. **Table 5** presents the results of the basic regression model using the full sample specification. This specification includes the two-stage MMG-System estimator incorporating Windmeijer's (2005) finite sample standard error correction method. In addition, other consistent but potentially less efficient estimators are sent in advance. These estimators all deal with econometric problems induced by unobserved country-specific effects and potential endogeneity.

**Table 5.** Results of regressions on the effects of financial subsidies on the productivity of public enterprises in Sub-Saharan Africa.

Variables	(1)	(2)	(3)
PEPUB <sub>t-1</sub>	0.949 <sup>***</sup> (0.014)	0.944 <sup>***</sup> (0.011)	0.721
FGRA	0.681 <sup>***</sup> (0.147)	0.613 <sup>***</sup> (0.067)	0.533
MAIN	0.921 <sup>***</sup> (0.095)	0.905 <sup>***</sup> (0.110)	0.423
EDUC	0.770 <sup>***</sup> (0.080)	0.294 <sup>***</sup> (0.038)	0.213
POSTA	0.041 <sup>**</sup> (0.02)	0.094 (0.081)	0.208
COPEN	0.018 <sup>***</sup> (0.002)	0.016 <sup>***</sup> (0.004)	0.401
RHEA	0.004 <sup>**</sup> (0.002)	0.008 <sup>***</sup> (0.002)	0.312
INCI	-0.014 <sup>***</sup> (0.002)	-0.012 <sup>***</sup> (0.004)	0.364
(RHEA*FGRA)	//	0.402 <sup>***</sup> (0.045)	0.852
Comments	817	817	817
Number of countries	43	43	43
Instruments	15	153	//
Tests (probability values)			
AR(1)	0.006	0.002	//
AR(2)	0.835	0.736	//
Sargan/Hansen test	0.900	0.999	//

Source: Authors. Note: Column (1) (MMG in system; direct relationship) considers the maximum of the predetermined variables as instruments of order 2. Column (2) (MMG in system; indirect relationship) presents the result of the two-stage interactive variable. Column (3) presents the result of the marginal effects obtained from the direct relationship. The fixed effects by period and by country are used but not reported in this table. The estimates were carried out in the second stage. The figures in brackets correspond to the robust standard deviations. (\*, \*\*, \*\*\*) represent significance at the 10%, 5% and 1% thresholds respectively ( $p < 0.1$ ,  $p < 0.05$ ,  $p < 0.01$ ).

In Columns (1), (2) and (3), there is a positive relationship between financial subsidies and the productivity of public enterprises. The results of the method of generalized moments in system (direct relationship, indirect relationship and marginal effect) will be interpreted. The lagged dependent variable is significant and its magnitude reveals that the productivity levels of public enterprises change only slowly over time and depend on past levels. This result also justifies the specification of the dynamic model and the use of the MMG approach in system, be-

cause of the problem of the weakness of the instruments associated with the MMG in difference when the series is very persistent.

Firstly, by taking into account the delayed PEPUB, it is possible to calculate the direct *long-term* effect of FGRA on PEPUB. The estimates given in Column (1) of the table imply that the long-run effect of a one-unit change in FGRA is to increase PEPUB by about 13.353 ( $=0.681/(1 - 0.949)$ ). The coefficient on the lagged productivity variable for public enterprises ( $PEPUB_{t-1}$ ) is highly significant (0.949) with a standard deviation of 0.014, which means that the productivity of public enterprises is highly autocorrelated over time.

In other words, past productivity strongly influences the current productivity of state-owned enterprises in Sub-Saharan Africa. This result is consistent with that of [Balisacan et al. \(2011\)](#), who found a positive and significant relationship between the productivity of SOEs over time. However, our study adds novelty by highlighting that this relationship is particularly strong in the context of developing countries, showing the high dependence of SOEs on past performance to maintain their efficiency.

Second, the validity of the interactive effects between FGRA and public health was tested. In Column (2), the analysis of the interactive effects between financial subsidies (FGRA) and public health shows a coefficient of 0.402 for the interactive variable, indicating a positive and significant effect on the productivity of public enterprises (PEPUB). In concrete terms, a one-point increase in the interactive variable between FGRA and public health leads to a 40.20% increase in PEPUB.

This result suggests that financial subsidies and public health are complementary. In other words, financial subsidies improve the productivity of public enterprises only by strengthening public health. This result is in line with the work of [Smith and Haddad \(2002\)](#), who highlighted the impact of subsidies on the productivity of public enterprises through health-related channels. Nevertheless, our study offers a unique contribution by demonstrating that this effect is particularly marked in the context of Sub-Saharan Africa, where public health is a key factor in the performance of public enterprises.

Thirdly, the marginal effects were calculated in order to see the effect of each of the explanatory and interactive variables independently of the others (*ceteris paribus*). We observe that the increase of one unit of financial subsidy (FGRA) leads to a direct increase of 67.70% in the productivity of public enterprises, all other things being equal. This result highlights the direct impact of financial subsidies on the productivity of public enterprises in Sub-Saharan Africa.

However, when we consider the interactive effects, it appears that the emphasis must be placed on improving public health in order to reinforce the effects of subsidies on productivity. This finding is in line with the idea that healthy individuals are more likely to work and produce more than sick individuals. This point is in line with the research of [Bloom and Canning \(2000\)](#), who demonstrated that health has a direct impact on productivity. In the case of Sub-Saharan Africa, integrating public health policies into financial subsidy strategies could therefore maximise the

impact on the productivity of public enterprises.

As the results show, the coefficient on financial subsidies (FGRA) is positive and highly significant (0.681), suggesting that an increase in the financial subsidies allocated to public enterprises has a positive effect on their productivity. In other words, as financial subsidies increase, SOEs in Sub-Saharan Africa become more productive.

This finding is consistent with the work of [Tarp \(2013\)](#), who has shown that subsidies have a direct impact on firm productivity in developing countries. The difference here is that our study shows the magnitude of this impact in a specific regional setting, Sub-Saharan Africa, where subsidies play a crucial role in supporting state-owned enterprises, compared to other regions that are less dependent on public subsidies.

The coefficient on physical investment (MAIN) is also positive and significant (0.921), indicating that the increase in physical investment in public companies leads to a substantial increase in their productivity. This result supports the idea that investment in infrastructure and equipment is essential for improving the productive capacity of companies.

A similar result was found by [Krugman and Obstfeld \(2009\)](#), who emphasise that physical investment is a key driver of economic growth. However, our study highlights that this effect is even more pronounced in the context of Sub-Saharan Africa, where infrastructure is often inadequate and investment is crucial to economic development.

The empirical results also confirm that education and public health can be important determinants of the productivity of public enterprises. The coefficient on education (EDUC) is positive and significant (0.770), which shows that an increase in the secondary school enrolment rate leads to better productivity in public enterprises. This reflects the importance of human capital in improving the performance of public enterprises.

This result is consistent with the work of [Barro \(2001\)](#), who demonstrated that human capital is an essential determinant of economic growth. However, in our study, the impact of education is more marked in countries in the Sub-Saharan African region, where improving education can have a greater direct effect on the productivity of state-owned enterprises, which are often characterised by a less skilled workforce.

However, the coefficient on political stability (POSTA) is positive and significant at the 5% level (0.041), suggesting that greater political stability is associated with higher SOE productivity. Greater political stability promotes a more predictable economic environment, which is essential for the efficiency of public enterprises.

This result is in line with [Acemoglu and Robinson \(2012\)](#), who have shown that political stability is a key factor for economic growth. Nevertheless, our study makes a significant contribution by highlighting that, in the context of Sub-Saharan Africa, political stability has a particularly important impact on state-owned enter-

prises, which are often affected by frequent political instabilities.

Income inequality has a negative and significant effect on the productivity of public companies. The coefficient on income inequality (INCI) is negative and significant ( $-0.014$ ), suggesting that higher income inequality has a negative effect on the productivity of public enterprises. This reflects the idea that excessive inequality can generate social tensions and reduce the overall efficiency of public enterprises by lowering the general well-being of the population.

This result is consistent with the work of [Deininger and Squire \(1996\)](#), who showed that income inequality has negative effects on economic growth. However, our study stands out by highlighting the impact of inequality on the productivity of state-owned companies in Sub-Saharan Africa, a region where inequality is particularly high and can exacerbate social and political tensions.

The coefficient of trade openness (COPEN) is positive and highly significant ( $0.018$ ), indicating that trade openness has a positive effect on the productivity of public enterprises. This suggests that trade liberalisation and integration into world markets contribute to increasing the efficiency of public enterprises by exposing them to increased competition and new export opportunities. This result is consistent with the work of [Frankel and Romer \(1999\)](#), who found a positive link between trade openness and economic growth. Our contribution lies in the specific application to Sub-Saharan Africa, where trade openness has more visible effects due to growing regional integration and initiatives such as the African Continental Free Trade Area (AfCFTA).

The coefficient on public health (RHEA) is positive and significant at the 5% level ( $0.004$ ), indicating that improving public health has a positive impact on the productivity of public companies. A healthier population leads to a more productive and fitter workforce, which promotes the growth of public companies. This result is in line with the work of [Bloom and Canning \(2000\)](#), who demonstrated the link between health and economic productivity. However, our study differs in its focus on Sub-Saharan Africa, where health challenges are particularly pronounced and where improvements in this area can have a more direct and visible impact on the productivity of public enterprises.

In addition, as can be seen in the lower part of the table, the model specification is supported by all available specification tests, so that misspecification or poor instrumentation do not appear to be driving the results. The first-order autocorrelation, AR(1), is present in the data, as expected. Second-order autocorrelation AR(2) is absent from the data, which must be the case for the MMG estimator to be consistent.

The Hansen/Sargan test does not reject the over-identifying restrictions (instrument exogeneity) at conventional significance levels, indicating that the instruments are valid. The Hansen/Sargan test suggests that the (additional) MMG-System hypothesis is not violated and that the additional instruments introduced are valid, which further strengthens the statistical properties of the results.

In Column (1) of the table, two steps are taken to limit the number of instru-

ments. Firstly, the lag ranges are limited and only three appropriate lags of each endogenous explanatory variable are used in the difference equation and the first contemporaneous difference as an instrument in the levels equation. Secondly, the set of instruments has been “collapsed”, which is equivalent to combining the columns of the instrument matrix by addition.

The estimation procedure then uses a common variance-covariance of the moment conditions across periods (Roodman, 2009). At the cost of reduced efficiency, these two steps can significantly reduce the problems caused by instrument proliferation by accounting for cases where the unrestricted variance-covariance is too large for estimation and inversion (Loayza et al., 2012). This can be particularly crucial in the case of a large number of explanatory variables and the presence of multiple time periods.

### 4.3. Robustness Analysis

In order to make a comparison and assess the robustness of the results according to different model specifications, the results are presented according to level of economic development and region. The study distinguishes between Least Developed Countries (LDCs) and Developing Countries (DCs). This distinction is based on the work of Churchill and Yew (2017), who suggest that the effects of financial subsidies may differ between countries depending on their level of development.

To do this, the study adopts the United Nations classification, as defined in the 2024 World Economic Situation and Prospects report. The advantage of this system over that of the World Bank is that it is not limited solely to national income. It also takes into account various other criteria to determine whether a country can be considered developed. This approach enables a more detailed analysis of the disparities between countries and a better identification of the factors that have a variable influence on their food security (Table 6, Table 7).

**Table 6.** Estimation results for the least developed countries.

Variable	(1)	(2)
PEPU <sub>t-1</sub>	0.854 <sup>***</sup> (0.016)	0.866 <sup>***</sup> (0.026)
FGRA	0.715 <sup>***</sup> (0.155)	0.821 <sup>**</sup> (0.430)
MAIN	0.881 <sup>***</sup> (0.123)	0.705 <sup>***</sup> (0.105)
EDUC	0.945 <sup>***</sup> (0.056)	0.882 <sup>***</sup> (0.120)
POSTA	0.665 <sup>**</sup> (0.313)	0.649 <sup>**</sup> (0.301)
COPEN	0.011 <sup>***</sup> (0.002)	0.013 <sup>***</sup> (0.001)
RHEA	0.005 <sup>***</sup> (0.001)	0.008 <sup>***</sup> (0.002)
INCI	-0.020 <sup>***</sup> (0.002)	-0.012 <sup>**</sup> (0.005)
(RHEA*FGRA)	//	0.568 <sup>***</sup> (0.076)
Observation	532	532
Number of countries	28	28
Instruments	18	18

## Continued

Tests (probability values)		
AR(1)	0.000	0.009
AR(2)	0.909	0.654
Sargan/Hansen test	0.896	0.875

Source: Authors. Note: Figures in brackets indicate robust standard errors. (\*, \*\*, \*\*\*) represent significance at the 10%, 5% and 1% thresholds, respectively ( $p < 0.1$ ,  $p < 0.05$ ,  $p < 0.01$ ). Column (1) presents the direct relationship between the financial subsidy and the productivity of public enterprises in SSA. Column (2) presents the transmission channel test.

**Table 7.** Estimation results by level of development.

Variables	(1)	(2)
PEPUB <sub>t-1</sub>	0.703 <sup>***</sup> (0.013)	0.805 <sup>***</sup> (0.013)
FGRA	0.584 <sup>***</sup> (0.078)	0.310 <sup>***</sup> (0.021)
MAIN	0.746 <sup>***</sup> (0.101)	0.917 <sup>***</sup> (0.124)
EDUC	0.801 <sup>***</sup> (0.078)	0.804 <sup>**</sup> (0.472)
POSTA	0.122 <sup>(*)</sup> (0.080)	0.103 <sup>**</sup> (0.051)
COPEN	0.014 <sup>***</sup> (0.002)	0.014 <sup>***</sup> (0.001)
RHEA	0.005 <sup>**</sup> (0.002)	0.009 <sup>***</sup> (0.003)
INCI	-0.015 <sup>***</sup> (0.004)	-0.010 <sup>**</sup> (0.005)
(RHEA*FGRA)	//	0.475 <sup>***</sup> (0.087)
Comments	285	285
Number of countries	15	15
Instruments	13	13
Tests (probability values)		
AR(1)	0.000	0.000
AR(2)	0.692	0.541
Sargan/Hansen test	0.689	0.966

Source: Authors. Note: Figures in brackets indicate robust standard errors. (\*, \*\*, \*\*\*) represent significance at the 10%, 5% and 1% thresholds, respectively ( $p < 0.1$ ,  $p < 0.05$ ,  $p < 0.01$ ). Column (1) presents the direct relationship between the financial subsidy and the productivity of public enterprises in SSA. Column (2) presents the transmission channel test.

In order to compare the effect of the FGRA on the PEPUB by level of economic development of the countries, the sample is made up first of the least developed countries and then of the developing countries in SSA. The “MMG-type” instruments have been replaced by their main components. The results remain qualitatively the same in LDCs and DCs. The coefficients of the “FGRA” variable remain positive and significantly different from zero in both cases (**Table 6**, **Table 7**).

However, it should be noted that the FGRA has a greater effect (direct and in-

direct) in the least developed countries than in the developing countries. It emerges that a one percent increase in FGRA leads to a direct increase in PEPUB of 85.40% in the LDCs compared with an increase of 70.30% in the DCs. The need for FGRA is therefore higher in LDCs. This can be explained by the fact that developing countries have the best public health indices. As mentioned above, a healthy person is more willing to work than a sick person. A FGRA access policy based on people's health should be favoured more in the LDCs than in the DCs in order to catch up with the DCs.

The remainder of this paper carries out a number of additional analyses to assess the sensitivity of the results to regional characteristics. To do this, the model will be re-estimated by grouping countries according to SSA economic communities. As the conditions for applying the MMG as a system are not met, the models will be re-estimated using the double least squares method and the POOLED OLS method to resolve the potential endogeneity problem. Referring to the World Bank classification, we group the sample countries into five economic communities, namely ECCAS, ECOWAS, COMESA, EAC and SADC (**Table 8**).

**Table 8.** Regression results by region.

Variables	ECCAS	ECOWAS	COMESA	CAE	SADC
FGRA	0.896 <sup>***</sup> (0.200)	0.899 <sup>***</sup> (0.158)	0.941 <sup>***</sup> (0.132)	0.751 <sup>***</sup> (0.161)	0.938 <sup>***</sup> (0.192)
MAIN	0.050 <sup>***</sup> (0.002)	0.174 <sup>**</sup> (0.089)	0.639 <sup>***</sup> (0.135)	0.534 <sup>***</sup> (0.146)	0.928 <sup>***</sup> (0.131)
EDUC	0.307 <sup>***</sup> (0.011)	0.978 <sup>***</sup> (0.299)	0.814 <sup>***</sup> (0.296)	0.818 <sup>***</sup> (0.131)	0.426 <sup>***</sup> (0.068)
POSTA	0.348 <sup>**</sup> (0.183)	0.397 <sup>***</sup> (0.089)	0.724 <sup>***</sup> (0.021)	0.311 <sup>***</sup> (0.038)	0.507 <sup>*</sup> (0.361)
COPEN	0.187 <sup>**</sup> (0.080)	0.094 <sup>***</sup> (0.008)	0.164 <sup>*</sup> (0.088)	0.666 <sup>**</sup> (0.390)	0.594 <sup>*</sup> (0.291)
RHEA	0.850 <sup>***</sup> (0.148)	0.041 <sup>*</sup> (0.031)	0.166 <sup>***</sup> (0.002)	0.596 <sup>***</sup> (0.009)	0.545 <sup>***</sup> (0.050)
INCI	-0.903 <sup>***</sup> (0.222)	-0.173 <sup>***</sup> (0.081)	-0.326 <sup>**</sup> (0.146)	-0.821 <sup>**</sup> (0.461)	-0.842 <sup>***</sup> (0.011)
Tests (probability values)					
Number of observations	152	284	190	171	266
R <sup>2</sup>	0.613	0.768	0.543	0.635	0.885
R <sup>2</sup> adjusted	0.594	0.534	0.525	0.620	0.771
Durbin-Watson	0.367	0.086	0.070	0.388	0.138
Stat (prob of F)	32.564 (0.000)	31.999 (0.000)	30.887 (0.000)	40.583 (0.000)	34.742 (0.000)
Second level					
Stat (prob SSR)	17.414 (0.000)	42.120	41.950	35.658 (0.000)	88.453 (0.000)
Rank	8	8	8	8	8

Source: Authors. Note: Figures in brackets indicate solid standard errors. (\*, \*\*, \*\*\*) represent significance at the 10%, 5% and 1% thresholds, respectively ( $p < 0.1$ ,  $p < 0.05$ ,  $p < 0.01$ ).

The sub-regional results reveal that financial subsidies are positively associated with the productivity of public enterprises across the various economic communities in Sub-Saharan Africa (SSA). An increase in financial subsidies leads to a

statistically significant rise in public enterprise productivity, and this pattern remains qualitatively consistent with the results obtained for SSA as a whole. This overall trend may be partly explained by the widespread impact of recent health and security crises, which have compelled many governments to strengthen their financial support for state-owned enterprises.

However, the magnitude of this effect varies across regions, reflecting underlying economic, institutional, and structural differences. The results indicate that the impact of financial subsidies is most pronounced in Eastern and Southern Africa, specifically within COMESA (Common Market for Eastern and Southern Africa) and SADC (Southern African Development Community). In these regions, a 1 percentage point increase in financial subsidies as a share of GDP is associated with a remarkable 94.10% and 93.80% increase in the productivity of public enterprises, respectively.

By contrast, in Central Africa (ECCAS) and West Africa (ECOWAS), the effects, while still positive and significant, are somewhat less substantial. A 1 percentage point rise in subsidies corresponds to an 89.60% and 89.90% increase in productivity in these regions, respectively. The lowest effect is observed in East Africa (outside SADC), where the same increase in financial support leads to a 75.10% rise in productivity.

These regional disparities may be attributed to several contextual factors. Regions such as COMESA and SADC may benefit from more effective institutional frameworks, greater administrative capacity, and stronger policy coordination mechanisms, which enhance the efficient use of financial resources. Furthermore, these regions have made notable progress in public sector reform and infrastructure development, potentially enabling public enterprises to better leverage financial subsidies. Conversely, ECCAS and ECOWAS face enduring challenges such as institutional fragility, governance deficits, and underperforming state-owned enterprises, which may limit the effectiveness of subsidies in stimulating productivity.

Importantly, all control variables retain their expected signs and statistical significance, reinforcing the robustness of the empirical findings. Overall, the results suggest that financial subsidies are a crucial tool for enhancing the performance of public enterprises, but their impact is highly contingent on regional governance capacity and structural conditions.

## **5. Conclusion and Economic Policy Implications**

This study assesses the impact of financial subsidies on the productivity of State-Owned Enterprises (SOEs) in Sub-Saharan Africa, employing panel data and the two-step System Generalised Method of Moments (GMM) estimator. This methodological approach corrects for endogeneity, dynamic bias, and unobserved heterogeneity, thereby improving the robustness of the results. The empirical findings indicate that financial subsidies exert a positive and statistically significant net effect on productivity, suggesting that, on balance, their benefits outweigh their po-

tential distortions or inefficiencies.

In addition to subsidies, other determinants such as physical investment, political stability, economic development, and public health also contribute positively to productivity. In contrast, income inequality appears to hinder performance, highlighting the importance of inclusive growth policies.

The study underscores that while financial subsidies remain essential to support the functioning and reform of SOEs, poorly designed or untargeted subsidies may foster inefficiencies or dependency. The heterogeneity in the effects across enterprises and regions suggests a need for stronger governance mechanisms, transparent allocation procedures, and rigorous performance monitoring, in order to maximise productivity gains.

In terms of policy recommendations, it is critical to strengthen the targeting of subsidies, particularly in strategic sectors such as infrastructure, energy, and industry, where multiplier effects are highest. Equally important are investments in capital equipment and the expansion of high-quality technical and vocational education, which can enhance workforce productivity. Improvements in political stability, trade openness, and public health systems are also key enabling conditions. Finally, the study highlights the need to tackle income inequality through effective redistributive policies, thereby fostering a more inclusive and resilient economic environment.

Nonetheless, this study is not without limitations. First, the quality and consistency of data on state-owned enterprises across countries remain uneven, which may affect the precision of the TFP estimations. Second, while the GMM approach addresses endogeneity, it relies on certain assumptions about instrument validity that cannot be fully verified. Lastly, the analysis focuses on average effects across countries and sectors, potentially masking firm-level variations in performance. These limitations suggest avenues for future research, including firm-level studies and qualitative assessments of institutional quality and governance structures within SOEs.

Taken together, the study's findings and recommendations offer a comprehensive and pragmatic framework for sustainably enhancing the productivity of public enterprises in Sub-Saharan Africa.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- Acemoglu, D., & Robinson, J. A. (2012). Why Nations Fail: The Origins of Power, Prosperity and Poverty. *Asean Economic Bulletin*, 29, Article 168.
- Amsden, A. H. (2001). *The Rise of "the Rest": Challenges to the West from Late-Industrializing Economies*. Oxford University Press.
- Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58, 277-297. <https://doi.org/10.2307/2297968>

- Balisacan, A. M., Hill, H., & Piza, S. F. (2011). *The Dynamics of Public Enterprise Productivity in Developing Economies*. Asian Development Bank.
- Barro, R. J. (2001). Human Capital and Growth. *American Economic Review*, 91, 12-17. <https://doi.org/10.1257/aer.91.2.12>
- Baumol, W. J., & Oates, W. E. (1988). *The Theory of Environmental Policy*. Cambridge University Press. <https://doi.org/10.1017/cbo9781139173513>
- Benedict, M., & Parry, J. (2018). *Public Sector Economics and the Role of Government*. Routledge.
- Besley, T., & Ghatak, M. (2003). Incentives, Choice, and Accountability in the Provision of Public Services. *Oxford Review of Economic Policy*, 19, 235-249.
- Birdsall, N., & Hamoudi, A. (2002). *Commodities, Governance and Economic Development in Sub-Saharan Africa*. Center for Global Development.
- Bloom, D. E., & Canning, D. (2000). The Health and Wealth of Nations. *Science*, 287, 1207-1209. <https://doi.org/10.1126/science.287.5456.1207>
- Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87, 115-143. [https://doi.org/10.1016/s0304-4076\(98\)00009-8](https://doi.org/10.1016/s0304-4076(98)00009-8)
- Buchanan, J. M. (1996). *The Demand and Supply of Public Goods*. Liberty Fund.
- Churchill, S. A., & Yew, S. L. (2017). Do Financial Subsidies Improve Productivity in Developing Countries? *World Development*, 97, 48-61.
- Deininger, K., & Squire, L. (1996). A New Data Set Measuring Income Inequality. *The World Bank Economic Review*, 10, 565-591. <https://doi.org/10.1093/wber/10.3.565>
- Dewatripont, M., & Maskin, E. (1995). Credit and Efficiency in Centralized and Decentralized Economies. *The Review of Economic Studies*, 62, 541-555. <https://doi.org/10.2307/2298076>
- Frankel, J. A., & Romer, D. (1999). Does Trade Cause Growth? *American Economic Review*, 89, 379-399. <https://doi.org/10.1257/aer.89.3.379>
- Harrison, A. E. (1994). Productivity, Imperfect Competition and Trade Reform. *Journal of International Economics*, 36, 53-73. [https://doi.org/10.1016/0022-1996\(94\)90057-4](https://doi.org/10.1016/0022-1996(94)90057-4)
- Hart, O., & Holmström, B. (1983). The Theory of Contracts. In *Advances in Economic Theory* (pp. 71-156). Cambridge University Press. <https://doi.org/10.1017/ccol0521340446.003>
- Holmström, B. (1979). Moral Hazard and Observability. *The Bell Journal of Economics*, 10, 74-91.
- Holmström, B. (2016). *Understanding the Theory of the Firm: Managerial Incentives and Corporate Structure*. Nobel Prize Lecture.
- IMF (International Monetary Fund) (2009). *Global Financial Stability Report*. International Monetary Fund.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3, 305-360. [https://doi.org/10.1016/0304-405x\(76\)90026-x](https://doi.org/10.1016/0304-405x(76)90026-x)
- Krugman, P. R., & Obstfeld, M. (2009). *International Economics: Theory and Policy* (8th ed.). Pearson Education.
- Laffont, J. J., & Tirole, J. (1993). *A Theory of Incentives in Procurement and Regulation*. MIT Press.
- Laffont, J. J., & Tirole, J. (2014). *Public-Private Partnerships and Incentives*. MIT Press.

- Loayza, N. V., Schmidt-Hebbel, K., & Servén, L. (2012). What Drives Private Saving across the World? *Review of Economics and Statistics*, *82*, 165-181.  
<https://doi.org/10.1162/003465300558678>
- Ménard, C., & Klein, P. G. (2004). Organizational Issues in the Public Sector: Toward a Comparative Institutional Analysis. *Journal of Institutional Economics*, *1*, 1-29.
- Messerlin, P. (1995). Privatisation and Regulation: What Are the Issues? *OECD Economic Studies*, *25*, 145-172.
- Moyo, B., & Banda, H. (2021). State-Owned Enterprises in Sub-Saharan Africa: Performance and Reform Challenges. *African Development Review*, *33*, 123-139.
- Niskanen, W. A. (1971). *Bureaucracy and Representative Government*. Aldine-Atherton.
- Oduro, I., & Agyapong, D. (2019). Productivity Performance of Public Enterprises in Africa: The Ghanaian Experience. *Journal of African Business*, *20*, 519-536.
- OECD (Organisation for Economic Co-Operation and Development) (2021). *Subsidies, Competition and Trade: Towards a Better Understanding of the Trade and Competition Impacts of Subsidies* (OECD Trade Policy Papers, No. 259). OECD Publishing.
- Roodman, D. (2009). A Note on the Theme of Too Many Instruments. *Oxford Bulletin of Economics and Statistics*, *71*, 135-158. <https://doi.org/10.1111/j.1468-0084.2008.00542.x>
- Sheshinski, E., & López-Calva, L. F. (2003). Privatization and Its Benefits: Theory and Evidence. *CESifo Economic Studies*, *49*, 429-459. <https://doi.org/10.1093/cesifo/49.3.429>
- Shirley, M. M., & Walsh, P. (2001). *Public vs. Private Ownership: The Current State of the Debate*. World Bank Policy Research Working Paper No. 2420.
- Smith, L. C., & Haddad, L. (2002). How Important Is Improving Food Availability for Reducing Child Malnutrition in Developing Countries? *Agricultural Economics*, *22*, 1-16.
- Stiglitz, J. E. (1988). Privatization: The Wrong Answer to the Wrong Question. *The World Economy*, *11*, 103-123.
- Stiglitz, J. E. (1989). Markets, Market Failures, and Development. *The American Economic Review*, *79*, 197-203.
- Tarp, F. (2013). The Impact of Subsidies on Economic Growth in Developing Countries. *African Development Review*, *25*, 72-85.
- Tirole, J. (2014a). *Economics of the Common Good*. Princeton University Press.
- Tirole, J. (2014b). *The Theory of Corporate Finance*. Princeton University Press.
- Vickers, J., & Yarrow, G. (1988). *Privatization: An Economic Analysis*. MIT Press.
- Vickrey, W. (1996). *Public Economics: Selected Papers by William Vickrey*. Cambridge University Press.
- Windmeijer, F. (2005). A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators. *Journal of Econometrics*, *126*, 25-51.  
<https://doi.org/10.1016/j.jeconom.2004.02.005>
- World Bank (2020). *State-Owned Enterprises in Africa: Catalysts for Public Value Creation?* World Bank.