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Public Spending Causal Impact on Bank-Based Financial Development: Evidence from Selected African Economies

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Abstract: This work examined the causal impact of types of government spending on bank-based financial development among selected African Economies. A sample included 37 African economies between 1980-2018. Both the short –run and long –run effects are assessed using either Feasible Generalized Least Squares (FGLS), Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Common Correlated Effects Mean Group (DCCEMG) estimators. Evidences support the hypotheses that both productive and non-productive government spending contribute positively to bank-based financial development. Also, confirm the supportive roles of trade openness and GDP per capita, and illustrate the detriment of inflation to bank-based financial development.

Keywords: bank-based financial development, government spending, Africa, CCEMG

JEL Codes: O57, F65, C33

1. Introduction

In this work two aspects of literature are unavoidably considered, these are government spending and financial development. More or less other linked reviews such as economic growth, private investment, and government borrowing are also invited to enable the debate and facilitate the connection between government spending and financial development.

1.1. Financial development in Africa

Generally, various proxies are normally employed in quantifying financial development. Financial development via financial institutions is commonly

proxied by credit-bank based measures, such as domestic credit to private sector as a percentage of GDP (financial depth), deposit money bank to deposit money bank assets and central bank assets as a percentage of GDP, and deposit money bank to deposit money bank assets and central bank assets percentage, liquid liabilities as percentage of GDP and money three (M3) (Kapaya, 2021). Via stock market indicators included are stock market capitalization, stock market depth (value of share traded as a percentage of GDP), stock market turnover/efficiecny (ratio of share traded to market capitalization) (Kapaya, 2020).

Financial sectors development in Africa since indepence have moved from worse situations towards significant improvements. Gelbard and Leite (1999) indicate that significant financial development happened in 1987-1997 in sub-Sahara Africa. Progress jumped from 2 economies with relatively developed financial system to 27 in that period. The economies with completely undeveloped financial systems reduced from 8 to 2 in the same period. They show that, by the year 1997 economies which had the most developed financial systems were South Africa, Namibia, Kenya, Zambia, Ghana and Mauritius. Most economies which were repressed, by this year had done main steps in liberalizing their financial systems. By 1997, improvement in institutional environment increased from 8 to 23 economies and financial openness had increased from 2 to 30 economies. Worldbank (2019) show that between 2015-2017, based on 42 sub-Saharan African (SSA) economies, financial institutions depth as measured through private credit to GDP% was 21.6%, compared to world at 52.2%, while that of developed economies was 84.4%, and that of developing economies 36.8%. In terms of financial institutions access (account at formal financial institutions, (%, age 15+)) SSA was 30.1%, world 58.0%, developed economies 89.0% and developing economies 42.5%. In terms of financial institution efficiency (bank lending-deposit spread %) SSA was 9.3%, world 7.3%, developed economies 4.4%, developing economies 8.4%. In all counts, SSA is still struggling compared to the rest of the world, however there are significant progress since the decades of reforms.

From 1980 a declining development is witnessed, but over the recent past two decades, improvement in financial development has been witnessed for African economies (Figure 1). Tyson (2021) support this development, she notes that during 2000-2020 has been an action-packed time for bank-based financial development evidenced by significant financial deepening. The steady progress in overall financial development for SSA increased from 0.125% to 0.16% between 2000-2018. This

improvement has been mainly in the banking sector. Despite progress, the sector in SSA has been constrained by risk aversion from poor investment environments, political and legal risks, lack of adequate level of competition and resulting high cost to credits. These weaknesses in financial architecture create inefficiency in basic functions of banking system, which create fragility and shocks susceptibilities.

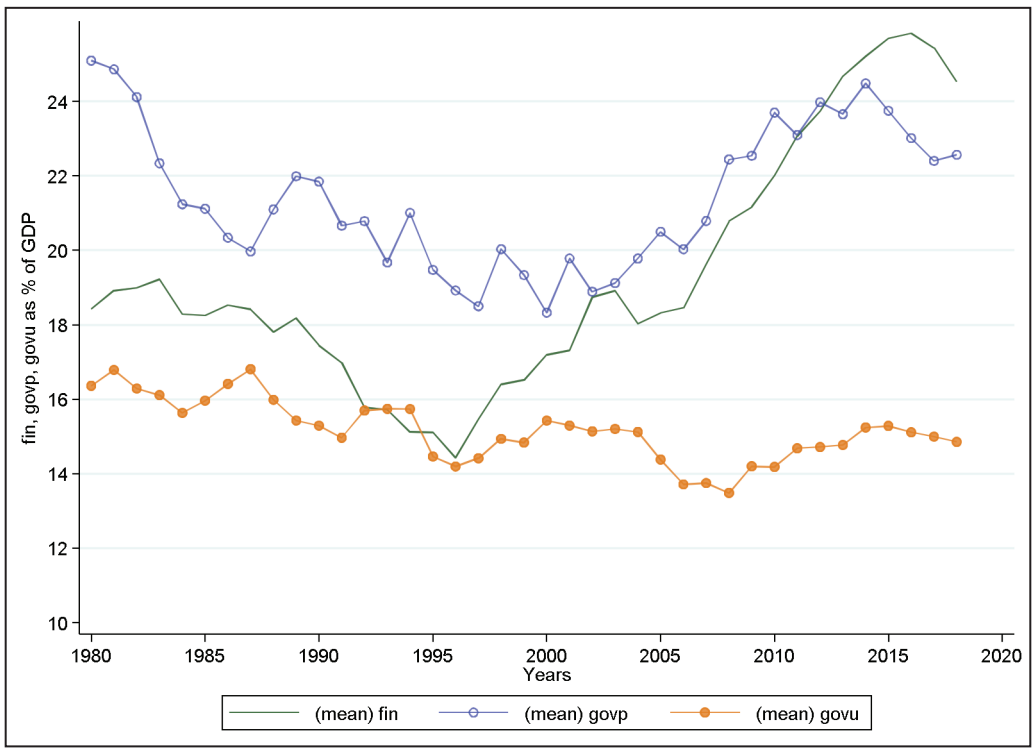

Figure 1: Financial Development and Government Expenditure Series for Selected African Economies. This figure depicts the mean values for financial development indicator which tend to incline up after 1995 and decline after 2015. Both productive and unproductive government expenditures depict parallel movements, which also tend to rise after 1995 and declines after 2015. The former is higher above the later series

1.2. Government spending and composition

Government spending as depicted in Figure 1, tend to be concentrated around productive spending with less being deployed for non-productive spending. While the former is increasing and cyclical, the later seems to be more or less declining over time in Africa. One possible reason is the government push to spearhead development by injecting more for productive investments such as infrastructures

(Michaillat & Saez, 2019). Government size plays a critical role in the development of the economy, because changes that are made in the growth of the government affects changes in the economy. As determined by research and fiscal policies government spending and economic growth are positively related (Nartea & Hernandez, 2020).

Theoretical and empirical studies, focus on the link between government size in terms of its spending and overall development of the economy (Nartea & Hernandez, 2020). The intuition is that if government size or spending relates positively to economic development, then it is logical to argue that it also relates positively to financial development since the latter is a crucial part of the former. Several factors are thought to affect the composition of government spending but not total government spending. For instance, Kotera and Okada (2017) found that democratization has an impact on government spending policy, which essentially implies that more democratization more spending on consumption, such as health, but in some case the effects are reversed, for example decrease in social protection is related to increase in democratization.

Government spending play a role in promoting economic development, particularly through resource mobilization and allocation channels (Kimaro, Keong, & Sea, 2017) through the financial system. It is thus indispensable to articulate economic development by singling out specific areas of development that are affected by government spending. One, such area would be financial development. While there are many studies done on composition of government spending, evidences show that economies with higher level of financial development tends to have lower productive spending (Chen, Lv, & Liu, 2019). Theoretically, the kind of government spending composition affect different facets of the economy differently, for example productive spending is thought to promote economic growth, while non-productive spending is considered to affect income redistribution in the economy. (Huang, 2011-a).

Both theoretically and empirically, using an endogenous model it has been possible to connect financial development and the structure of government spending in the economy (Chen, Lv, & Liu, 2019). These authors, offer supportive evidence presenting the negative impact of financial development on productive spending as a percentage of total spending. Nonetheless, to the best of this review, there has not been much interest on research on the roles of both productive and non-productive spending on financial development.

2. Literature review

2.1. Theory of public spending and composition

Adapting from Michaillat and Saez (2019) conceptualization of public spending is the expenditures done by the government on shared demands and other basic needs. It refers to expenditure on development and non-development activities such as construction of roadways, dams, railways, bridges and other activities directly influencing the whole economy and its development. The theory posits that government at all ranks attempts to raise revenue and maintain its optima size and role in the main economy from its various sources such as taxes, investments and borrowings. The principles governing this are who will benefit and who can pay for the benefits. According to this theory, the right use of public spending is a useful and important strategy in economic policy that can be used by governments to correct the existing economic condition of the nation. (Nartea & Hernandez, 2020). In this regards, fiscal policy, defined as the use of public spending and taxation to influence the economic performance, can be a means to increase needs and demand for services and goods, which in turn increases output and employment, which ultimately impact economic growth significantly (Nartea & Hernandez, 2020) as well as financial development endogenously.

It is considered that decentralization of the government creates heterogeneities in the nature of choices, tastes and preferences among individuals in various jurisdictions (Granado, Martinez-Vazquez, & McNab, 2012). Thus, through the decentralization channel government spending may affect financial development in a certain way. Since decentralization affects the way spending are structured, then it is reasonable to assume an effect of government spending type on financial development through spending decentralization channel, especially from publicly provided goods such as health and education. Chu, Hölscher, and McCarthy (2020) confirm that, government spending shifts from non-productive to productive types of spending is related to higher growth levels in middle and high income economies. They show that, the level of mix between productive and non-productive spending matters in promoting growth. For instance, productive government spending is known to increase productivity of private sector and a direct impact on growth. While, non-productive spending is demonstrated to have zero or negative impact on growth.

The distinction between the two types of spending was pioneered by Devarajan, Swaroop, and Zou (1996), they show that an economy's desire to attain

more optimal growth rate achievable by growing the proportion of productive government spending against non-productive spending. Empirical evidences are numerous indicating a positive influence of productive government spending on economic growth, and either a negative or zero influence exerted by non-productive government spending (Afonso & Alegre, 2011). Others like Gemmell, Kneller, and Sanz (2016) found that reallocating more on infrastructure and education (productive spending) has a positive effect on output levels in the long-run, while re-allocating more towards social welfare (non-productive) may be connected to moderate negative effects on output levels in the long-run.

2.2. Government spending and financial development

2.2.1. Fiscal volatility and interest rates channels

The major two channels on which the theoretical case for fiscal variables is founded are the volatility of the tax burden and/or the volatility of the supply and price of public bonds. Therefore, the primary sources of funding for government spending are taxes or debt. Regardless of the method of funding, the unpredictable nature of government expenditure is a glaring source of uncertainty that sends signals to the financial markets and creates various forms of uncertainty. (Brzozowski & Siwinska-Gorzelak, 2013). They demonstrate how private actors in the financial markets must deal with the possibility of an unforeseen increase in government spending, which may be accomplished through the issuing of bonds at enticing interest rates or a dramatic increase in taxes. Instead of using "reserve capital" to finance the purchase of these erratic bonds, agents must empty-sell as many stocks or other financial assets as they can on the financial markets in order to purchase bonds or pay higher taxes. Due to the fact that assets traded on financial markets are never truly "perfectly liquid," this can only be achieved after illiquidity costs have been taken into account. An increase in interest rates will be necessary due to the lag between "sale and buy executions" of the assets. A liquidity premium may be used to describe this increase. This results from financial investors requesting liquidity premium to fulfill short-term, unforeseen cash needs when the government raises taxes or releases alluring bonds on the financial markets. Investors sell their assets to make room in their stock holdings for treasury securities as a result of the abundance of government bonds on the financial markets and the increase in taxation, driven by profit and liquidity considerations, respectively. Therefore,

fiscal policy volatility is "a monotonically increasing function" of the chance of an increase in government taxes and/or a public offering of alluring government bonds. As a result, these conduits help to reduce the financial sector's depth.

The connection between public spending policies and financial markets development, have been studied for the most part in isolations. However, few studies have attempted this linkage, for intance, Brzozowski & Siwinska-Gorzelak (2013) studied both developed and developing economies between 1960 and 2009. They discover proof that the unpredictability of government expenditure and its financing result in high interest rates, uncertainty about the timing and price of asset sales, and restrictions on the availability of credit to individuals and enterprises in the financial markets. They especially discover evidence that there is a bad correlation between the volatility of government spending and financial development. They contend that the financial markets' depth is dampened by the irregular course of fiscal factors. Demystifying the channel(s) via which fiscal policy on government expenditure influences financial development is the key innovation in their study. Both theoretically and empirically, they were able to demonstrate that variability of government spending' channel triggers higher borrowing interest rates, leading to lowered bank credit activities.

Fiscal volatility translates into many facets of the economy, mainly into government spending volatility in this respect. As stated earlier, ideas advanced by Brzozowski and Siwinska-Gorzelak (2013) show that, investors in financial markets are faced with two situations in relation to government financing options for its spending; these options are tax and or debt source of finance. In the first situation, they are not faced with uncertainty from the government, as it manifests predictability in government actions. They are therefore not forced to sell securities before maturity date in response to government tax raise moves. A second related argument extended by Brzozowski and Siwinska-Gorzelak (2013) shows that an increase in market interest rates triggered by government spending volatility, reduces the amount of loanable funds that could be extended to private agents. The reduce availability of credit in financial markets, implies a reduction of financial market depth which is an important indicator of financial market development. So, a plausible proposition from this discussion is that, fiscal or government spending volatility negatively affects level of credit or financial depth. Therefore, the government spending volatility channel has detrimental impacts on financial development.

Further, Brzozowski and Siwinska-Gorzelak (2013) identify a second channel, the balance sheet channel to base the link between fiscal volatility and financial development. Higher interest rates as a result of unpredictable fiscal policy dwindles net worth of borrowers. Conversely, collaterals are normally required to buffer financial market imperfections and mediate the agency problem between borrowers and lenders. The rise in interest rates reduce assets values from the borrower's perspective, leading to weakening of the borrower's balance sheet which limits him access to external finance. This is termed as the 'financial accelerator mechanism' in monetary policy transmission channels. Therefore, two channels can be summarized; first, expected costs of sales of securities prior to their maturity dates raise the interest rate; second, resulting higher interest rates lessen assets value, which reduce the ability of firms to access external financing and both hamper financial development.

2.2.2. Public borrowing channel

One of the hot subjects in economic policy research in both developing and developed nations is the crowding-out of the private sector by government borrowing. (Haikala, Abdelbary, & Samira, 2021). They note three strands of literature in aggregate effect of fiscal policy narratives. The Keynesians contend that more government spending boosts the economy and attracts private sector investments by causing an increase in economic activity. On the other hand, the neoclassical school of thought is in favor of the idea that as government spending rises, private investment becomes more and more crowded out. Through the Loanable Funds Theory, they attribute the crowding-out effect to an increase in interest rates brought on by the public deficit, which restores equilibrium to the capital markets. Therefore, Increased interest rates curtail private investment. The final strand is based on the Ricardian Equivalence, contending that increase in public deficit to private investment shift is translated into increased future taxation to cover the gap, thereby leaving private spending unchanged.

Mbate (2013) demonstrated that government domestic borrowing hinders capital accumulation and private sector growth and crowds out private sector financing. He contends that SSA's dependence on domestic debt financing has increased as a result of the region's low tax revenues and heavy infrastructure spending. Because it lessens currency mismatch losses, reversals in capital outflows, and accumulation of debt denominated in foreign currencies, which have an increased

impact on an economy's access to global capital markets, the use of domestic debt financing has been encouraged. On the other hand, he warns that an excessive reliance on domestic debt may result in financial instability and the exclusion of the private sector in general and loans to the private sector in particular. The stability of external indebtedness and the development of private sector investment depend on sound regulatory financial policies and well-developed domestic debt markets. Contrariwise, deficiency in sound regulatory mechanism may lead to debt crunch and dissuade both economic growth and financial sector growth. Similarly, Anyanwu, Gan, and Hu (2017) found evidence for crowding –out effect of government domestic borrowing to finance its spending. They discovered that domestic government borrowing had a negative effect on private sector credit but had no effect on bank lending rates. They suggest the slowdown of the private sector credit through a private credit channel and not lending rate channel.

Regulatory measures such as regulatory oversight on rate of interest, high reserve ratios, direct credit allocation procedures, public ownership and or control of financial institutions, and entry barriers by the government can all have an impact on the equilibrium interest rate in economies with less developed financial systems. Government borrowing affects private investments through changes in lending rates. Therefore, the degree of crowding-out will rely on the banks' endogenous reactions to increased government borrowing. These reflexes are corroborated by Adeyemi, Babatola, Awe, Samuel, and Oluwa (2022) who assessed the sensitivity between government capital spending and private investment in the Sub-Saharan nations. They found the impact of capital spending on private investment to be negative in both west and southern African sub-regions, significant and positive impact in east African sub-region and no significant impact in central Africa. They credit the east African sub-region's effects to the high sensitivity to economic reform, the region's strong institutional foundation, and the comparatively high quality of government investment. In a similar line, Bikefe, Ajayi, and Onah (2022) found that government borrowings crowds –out private sector credit. They note a significant decrease in credit to the private sector but ascribe higher government borrowing to higher government spending. Similar defenses of the Lazy Bank theory demonstrate that banks are probably shifting their credit portfolios toward less risky investments, particularly in government and household lending. This conduct may ultimately result in the crowding-out of financing available to the private enterprise sector. (Haikala, Abdelbary, & Samira, 2021). These authors argue for a significant

crowding –out effect of public internal borrowing from banks on credit to business private sector. They attribute this consistent to the neoclassical theory which agree with the idea that government spending crowds –out private investment.

2.2.3. Private investment channel

Wang (2005) attests that influence of government spending on private investment, for a long time, has been an important fiscal and policy debate issue. Although many positions have been advanced on the issue, it still stands indeterminately controversial. Private investments are represented significantly these days through financial markets, specifically via stock and bond markets. Thus, government spending and bank-based financial development linkages can be modelled via the private investment channel. Xu and Yan (2014) list evidences showing that, higher taxes reduce real profit of private agents, and that, fiscal and budget deficit cause higher interest rates, both leading to crowding –out effects on private investment.

Productive government investment spending positively affects private investments, and particularly infrastructural spending crowds –in private investment, this is the case because productive investment increases private investments through provision of services to government productive infrastructural spending. Whereas, non-productive government investment spending and non-infrastructural spending crowds –out private investment leading to negative effects to it. Arguably, productive (non-productive) government investment spending may lead to crowding –in (out) effects in both bond and stock markets investments from private agents. This condition, through the private investment channel, may lead to a positive (negative or zero) impact on bank-based financial development in an economy, in turn through banking and stock markets complementarities, demand for credit from private agents may rise to compensate private business financing for funds invested in financial markets. This is the case, because in market economies both stock markets and the private sector normally plays a major role in influencing the banking sector (Xu & Yan, 2014).

2.3. Review propositions

Proposition – I. *Productive spending encourages private sector credit demand by a way of complementarity*

African economies strive to grow, there is more spending in productive investments. Policies that encourage public private partnership through productive government investments such as construction of major assets crowd –in the private

agents, who expand their capital through private credits from bank. Similarly, based on Keynesians argument, augmented government spending may influence an increase in private sector agents' undertakings and thereby crowd –in private investments which create demand for credit by private agents, this effect is mostly manifested through productive rather than unproductive spending.

Proposition – II. *Non-productive spending stimulates private credits demand through increased income re-distribution, money supply and liquidity in the economy.*

Higher non-productive government spending stimulates income re-distribution, money supply, and liquidity in the economy. Similarly, depending on the level of crowding –in or –out of private investments, it is proposed based on Keynesians idea that, enlarged public spending leads to an increase in private agents' activities which increase demand for private credit by private agents. Thus, since private agents' study and wait on government spending moves, frequent and increase in non-productive government spending stimulates opportunistic borrowing and investment activities by private agents in the short run, which stimulates demand for credit from banks by private agents thereby fostering bank-based financial development.

While the former trend may be entertained in the short-run, in the long-run comprehensive financial policies and well-built domestic debt markets may be key to promotion of private sector investment. Contrariwise, deficiency in sound regulatory mechanism may lead to debt crisis and deter bank-based financial development. Otherwise, government interferences such as supervisory controls on high reserve ratios, interest rates, direct credit distribution involvements, high levels of government ownership and or control of banks and barrier to entry by the state may act a part in hiding the influence of non-productive public spending on bank-based financial development in the long-run.

3. Data, Variables and Empirical Methods

3.1. Data and variables

This article employed data from World Bank Development Indicators (WDI), the series span from 1980 to 2018. A total of 39 years by 37 selected economies. The panel composes a maximum observations of 1443 data points. Table 1 summarizes the variables details. These are Bank-based financial development (fin) as the dependent variable, and two independent variables coming from government spending, these are Productive government spending (govp) and Non-productive government spending (govu); and other related control variables of interest appropriate to this

specific setting were inflation (infl), trade openness (open), and GDP per capita (grow). The variables were log transformed for scaling and normalization purposes.

Bank-based financial development is usually captured by credit-bank based measures, the current study applies domestic credit to private sector as percentage of GDP (capturing financial depth), (Kapaya, 2021). It has been noted previous that banks are the main section representing the financial development disposition in African countries (Worldbank, 2019). As such, the development of the banking sector is commonly identical to financial development of a country. Thus "bank credit to private sector" is always in this context used both as the best channel and measure of financial development in an economy (see Table 1).

Table 1: Variables and Measurements

Variable	*Bank-based financial development*	*Productive spending*	*Non-productive spending*	*GDP per capita*	*Trade Openness*	*Inflation*
Symbol:	**fin**	**govp**	**govu**	**grow**	**open**	**infl**
Description:	Natural log of domestic credit to private sector by banks, as percentage of GDP.	Natural log of gross government capital formation, as percentage of GDP.	Natural log of government final consumption spending, as percentage of GDP.	Natural log of GDP per capita.	Natural log of the sum of exports and imports divided by GDP.	Natural log of inflation, as annual percentage.
Review Source:	(Hauner, 2009), (Kotera & Okada, 2017), (Brzozowski & Siwinska-Gorzelak, 2013) (Kapaya, 2021)	(Xu & Yan, 2014) (Adeyemi, Babatola, Awe, Samuel, & Oluwa, 2022), (Ouedraogo & Sawadogo, 2020)	(Ouedraogo & Sawadogo, 2020)	(Kotera & Okada, 2017)	(Kotera & Okada, 2017)	(Kotera & Okada, 2017)

Note: This table summarizes the variables and their respective measurements. Both variables are transformed using natural logarithms to maintain uniform scaling and easy interpretation of the results. The sources from which these are adapted are also indicated in the last row.

3.2. Estimation strategies and techniques

3.2.1. Cross-sectional dependence, non-stationarity and panel co-integration

It is common practice when dealing with country panels to assess the presence of cross-sectional dependence, panel unit routs and panel co-integration. (Bilgili &

Ulucak, 2018; Pesaran, 2004; Grossman & Krueger, 1995). Certainly, more or less of the causes that may lead to *cross-sectional dependence* in this African panel are such as shared economic pressure wielded by the western nations in favor of deregulation of the economies, promotion of free market economy and liberalization policies, regional blocks policies on common infrastructure spending, common patterns on government consumption spending due to large young dependent populations, and shared International Monetary Fund (IMF)'s policy on bank-based financial development among developing countries. If cross-sectional dependence is not controlled the data may lead to correlation in the residuals, as a results it will impair estimation efficiency and inference validity (Krieger & Meierrieks, 2020). To test for cross-sectional dependence (CD), the Pesaran (2004) CD-tests was applied, this tests the null hypothesis of presence of "cross-sectional independence". It is also worth noting that CD-test is robust to non-stationarity (Pesaran, 2004).

The presence of a unit root in data series is a common challenge. The presence of two or more non-stationary variables may lead to spurious regression results, this quashes the regression results. Some aspects that my cause this problem in data are political regime change effects which may cause swing in government spending, exposure from exterior stimulus towards weaker economies which may cause substantial borrowing which in turn cause extraordinary spending at times. Secretive spending military equipment and arms during war times. The cross-sectionally augmented Im-Pesaran-Shin is part of second generation panel unit tests, which are accurate in the presence of cross-sectional dependence (CIPS) (Pesaran, 2007), and Maddal and Wu (MW) (Maddala & Wu, 1999) panel unit root tests were used to test against the null hypothesis of "presence of a unit root".

The CD-tests indicated the presences of cross-sectional dependence in our data as expected, and presented in Table 2. Thus justifying the use of estimation methods discussed later which account for this dependence. The stationarity tests indicated that most series were integrated of order 0, while some were integrated of order 1, and some with trend, thus, offering a further justification of using the methods.

In the process the Westerlund (2007) panel co-integration test, in the presence of cross-sectional dependence is suitably applied, it is actually based on the error-correction model (ECM) (Persyn & Westerlund, 2008), which assumes the data generating process similar to the ECM (ref. model (3)). Where the existence of co-integrating effect is ascertained by a negative and significant error correction coefficient in the ECM. Several test for robustness sake were run (Table 3). The

Table 2: Unit root and cross-sectional dependence tests

Variable	*Name of Test*	*(A) Maddala and Wu (1999) Panel Unit Root test (MW)*		*(B) Pesaran (2007) Cross-sectionally augmented Im-Pesaran-Shin (CIPS) Panel Unit Root test*		*(C) Pesaran (2004) Cross-Section Dependence-Test*		
Specifi-cation	*Integration*	*without trend*	*with trend*	*without trend*	*with trend*	*CD-Test*	*Average Correlation*	*Coeffi-cients*
	Order	chi_sq	chi_sq	Zt-bar	Zt-bar	CD-test	corr	abs(corr)
fin	1	1024.161***	901.626***	-23.71***	-22.483***	33.57***	0.234	0.452
govp	0	138.32***	145.168***	-5.385***	-6.468***	7.01***	0.049	0.285
govu	0	165.23***	125.212***	-4.053***	-3.186***	0.86	0.006	0.319
infl	0	483.904***	501.16***	-16.519***	-15.696***	23.01***	0.16	0.223
Grow	1	841.3***	762.097***	-20.882***	-19.734***	27.7***	0.193	0.544
open	0	116.863***	124.702***	-2.142**	-1.703***	10.77***	0.075	0.300

Note: This table presents cross-sectionally augmented Im-Pesaran-Shin (CIPS) (Pesaran, 2007), and Maddal and Wu (MW) (Maddala & Wu, 1999) panel unit root tests were used to test against the null hypothesis of "presence of a unit root". The significant tests indicated most series were integrated of order 0, and 1. The CD-tests indicated the presences of cross-sectional dependence Thus justifying the use of estimation methods which account for this dependence.

tests support the presence of panel co-integration in the sample, which allow and justify the next step of estimating both short –run and long –run estimations for our variables.

Table 3: Panel co-integration tests

Types tests	*Westerlund (2007)*	*Pedroni (1999)*		*Kao (1999)*				
	VR	*MPP*	*PP*	*MDF*	*DF*	*ADF*	*UMDF*	*UDF*
Statistic	3.541***	3.716***	0.047	-2.198**	-3.085***	-2.729***	-5.642***	-4.813***
H0: Not co-integrated	na	na.	NO	na.	na.	na.	na.	na.
Ha: All panels co-integrated	na.	YES	na.	YES	YES	YES	YES	YES
Ha: Some panels co-integrated	YES	na.	na.	na.	na.	na.	na.	na.

Note: This table present several tests for co-integration, namely Westerlund's Variance ratio (VR) test, Pedroni's Modified Phillips–Perron (MPP) and Phillips–Perron (PP) tests; and Kao's Modified Dickey–Fuller (MDF), Dickey–Fuller (DF), Augmented Dickey–Fuller (ADF), Unadjusted modified Dickey–Fuller (UMDF) and Unadjusted Dickey–Fuller (UDF) tests. These test support the robustness of the results which indicate strong indications for co-integration in the series.

3.2.2. Empirical models estimation strategies

In the estimation approach the general linear model is estimated as follows:

$$fin_{it} = \beta_i^P govp_{it} + \beta_i^U govu_{it} + \beta_i^I \inf l_{it} + \beta_i^o open_{it} + \beta_i^G grow_{it} + u_{it} \quad (1)$$

$$where;\ u_{it} = \alpha_i + \lambda_i f_t + \varepsilon_{it}$$

The variables in equation (1) represent the observable part of the model along sides respective parameter coefficients $\beta_i^j (for \;\; j = P,U,I,O,G)$ being permitted to vary between nations The second portion lists α_i which are intercepts specific to a country and f_t captures a set of unobserved common factors with country specific factor loadings λ_i.

When the data have unequal variances and there is a specific degree of correlation between the observations, the feasible generalized least squares (FGLS) estimator has historically been seen to be an effective method for estimating the coefficients of a linear regression model. (Kantar, 2015). FGLS is here considered to accommodate violations of the basic assumptions of ordinary least squares (OLS) which in most cases do not hold when dealing with country panels. FGLS has capability to handle heteroscedasticity, cross-sectional dependence across panels and serial correlation along time (Reed & Ye, 2011).

$$FGLS \rightarrow \widehat{\beta} = (X' \widehat{\Omega}^{-1} X)^{-1} X' \widehat{\Omega}^{-1} y; \; Var(\widehat{\beta}) = (X' \widehat{\Omega}^{-1} X)^{-1} \tag{2}$$

where $\widehat{\beta} \& Var(\widehat{\beta})$ are its beta estimates and respective variances, and $\widehat{\Omega}$ incorporates underlying assertions for auto correlation, cross-sectional dependence, and error heteroscedasticity.

It is well established that under the presence of cross-sectional dependence the traditional regression estimators are possibly biased and highly inconsistent (Pesaran & Smith, 1995 and Paramati, Mo, & Gupta, 2017). To deal with this situation, scholars have further proposed the mean group (MG) estimator (Pesaran & Smith, 1995), which allows all slopes coefficients and errors variances to change across the panels or countries, using the OLS estimation for each panel or country and then draws averages for all countries coefficients (Huang, 2011-a). The approach applies the ordinary least square estimation techniques for each country or panel to arrive at each panel's slope and then average all the panel specific coefficients.

The MG and PMG estimators both allow for significant variation between country panels, however the PMG estimator is primarily suited to panels with extended time series and broader cross-sectional dimension. The PMG estimator only places cross-sectional homogeneity requirements on the long-run coefficients, in contrast to the MG. (Huang, 2011-a). Pesaran (2006) and Pesaran & Yamagata (2008) demonstrate that the PMG estimator is consistent and asymptotically normal irrespective of presence of underlying regressors being *I* (1) or *I* (0), and it is very robust to outliers. The PMG approach necessitate that the coefficients for

long –run cause be common across countries (Eberhardt & Bond, 2009; Eberhardt & Teal, 2010).

The weighted cross-sectional means of the dependent variable and the regressors are incorporated into the Common Correlated Effects Mean Group (CCEMG) estimator, which uses OLS to generate a secondary regression one per country. The coefficients and standard errors are then computed as usual. (Huang, 2011-a). The CCEMG estimator, it a generalization of the MG estimator of Pesaran and Smith (1995), it is employed due to its ability to account for cross section correlation if present (Huang, 2011-b). The CCEMG estimator (Pesaran, 2006) is considered to be robust and can be adapted to dynamic CCEMG application which accounts for time series bias not accounted by CCEMG (Chudik & Pesaran, 2013). It is considered to be robust to cross-sectional dependence and slope homogeneity, the dynamic CCEMG estimator has been shown to be asymptotically consistent and unbiased as time and size of panel approach to infinity, and have finite sample properties as well (Huang, 2011-a). Huang (2011-b) states that the MG, PMG and CCEMG permit short-run coefficients to vary across countries. This assumption is considered to be more realistic given the nature of country panel data.

The following formulation is adopted where the chosen strategies are known to estimate models following OLS, where all features needed to be controlled when applying to OLS are handled, such as non-stationarity, cross-sectional correlation, heterogeneity across countries non-linearity and asymmetry are captured. (Eberhardt & Presbitero, 2015). Considering the importance of these time series characteristics and dynamics in macro panel data analysis, the error correction model (ECM) formulation was employed for the above equation (1) above. This method helps separate short-run from long-run characteristics, investigates the error correction process, ascertains how quickly the long-run equilibrium will adjust, and tests for co-integration in the ECM via the error correction term's negative statistical significance. (Eberhardt & Presbitero, 2015). The ECM formulation is presented as follows:

$$\Delta fin_{it} = \alpha_i + \rho_i (fin_{i,t-1} - \beta_i^P govp_{i,t-1} - \beta_i^U govu_{i,t-1} - \lambda_i f_{t-1}) + \gamma_i^P \Delta govp_{it} + \gamma_i^U \Delta govu_{it} + \gamma_i^I \inf l_{it} + \gamma_i^o open_{it} + \gamma_i^G grow_{it} + \gamma_i^F \Delta f_{t-1} + \varepsilon_{it} \quad (3)$$

$$\Leftrightarrow \Delta fin_{it} = \pi_{0i} + \pi_i^{EC} fin_{i,t-1} + \pi_i^P govp_{i,t-1} + \pi_i^U govu_{i,t-1} + \pi_i^F f_{t-1} + \pi_i^{p'} \Delta govtp_{it} + \pi_i^{u'} \Delta govu_{it} + \pi_u^{l'} \inf l_{it} + \pi_i^{o'} open_{it} + \pi_i^g grow_{it} + \pi_i^{f'} \Delta f_t + \varepsilon_{it} \quad (4)$$

The β_i^j in equation (3) represents the long run equilibrium relationship between bank-based financial development (fin) and measures of independent variables in the model. While γ^j_i represents the short-run relationships. The ρi is the short –run speed of convergence towards its long-run equilibrium. The entries enclosed in the brackets represents co-integrating relationship to be identified. The f represents unobservable common factors in the model's long –run model. The π_i^{EC} represents the speed at which short –run estimates returns to the long-run equilibrium and provide light on the presence of a long-run equilibrium relationship.

$$\Delta f\ in_{it} = \pi_{0i} + \pi_i^{EC} fin_{i,t-1} + \pi_i^{P} govp_{i,t-1} + \pi_i^{U} govu_{i,t-1} + \pi_i^{p'}\ \Delta govp_{it} + \pi_i^{u'} \Delta govu_{it} + \pi_i^{l'}\ in\ fl_{it} + \pi_i^{o'}\ open_{it} + \pi_i^{g'} grow_{it} \ldots$$

$$+ \pi_{1i}^{CA}\ \overline{\Delta fin_t} + \pi_{2i}^{CA} \overline{fin_{t-1}} + \pi_{3i}^{CA} \overline{govp_{t-1}} + \pi_{4i}^{CA} \overline{govu_{t-1}} + \pi_{5i}^{CA} \overline{govp_t} + \pi_{6i}^{CA} \overline{\Delta govu_t} + \sum_{\ell=2}^{P} \pi_{7i\ell}^{CA} \overline{\Delta fin_{t-\ell}} + \sum_{\ell=1}^{P} \pi_{8il}^{CA} \overline{\Delta govp_{t-\ell}} + \sum_{\ell=1}^{P} \pi_{9i\ell}^{CA} \overline{\Delta govu_{t-\ell}} + \varepsilon_{it}$$

In equation [iv], line one and two represents the MG estimator (Pesaran & Smith, 1995) with control variables (infl, open, and grow) loaded, the added third and fourth lines represent the CCEMG estimator with cross-section averages (Pesaran, 2006), while the whole model formulation taken together produce the DCCEMG estimator (Chudik & Pesaran, 2013). As a result, the PMG estimator can be seen as a bridge between an MG estimation with heterogeneous coefficients and a strictly pooled estimator with homogenous coefficients. The CCEMG estimator assumes that heterogeneous coefficients are distributed around a common mean, whereas the PMG assumes that regressors have homogeneous long-run and heterogeneous short-run effects on the dependent variables. The idea for CCEMG is to eliminate unobserved common factors differential effects through cross-sectional averages (Pesaran, 2006). Thus the compact short form representation for the dynamic CCEMG would be: $y_{it} = \alpha_i + \lambda_i y_{i,t-1} + \beta'_i x_{it} + \Sigma_{l=0}^{PT} \delta_{il} \overline{z}_{t-l} + e_{it}$. Where $\overline{z}_t = (\overline{y}_{t-1}, \overline{x_t})$ and stack λ_i and β_i into $\pi_i = (\lambda_i, \beta_i)$, $PT = \sqrt[3]{T}$ denoting the floor of number of lags of the cross-section averages and the strictly exogenous variables to be added to gain efficiency, and the MG estimates are given by $\widehat{\pi}_{MG} = 1/N\ \Sigma_{i=1}^{N}\ \widehat{\pi}_i$.

4. Findings and Discussion

4.1. Descriptive and correlations estimates

Values for descriptive statistics (not log transformed) indicate higher levels of productive government spending compared to non-productive government

spending (Table 4). That means the economies' spending are more into investing for long –run outcomes, these results are comparable to those of Ouedraogo and Sawadogo (2020) who found similar results. The proportions for bank-based financial development and spending types account for a considerable 'comparative' portion of the GDP in the economy. The 'comparative' share of trade openness to the GDP (63%), the GDP per capita which capture the individual's economic output (2,079.68 US$) and high inflation (11.02%) all highlight progress and digress in these economies. The considerable mean values of the variables in the sample highlights their economic significance, and expected impacts among connected sectors. Average bank-based financial development over the study period is more pronounced with high means in North African states (i.e. Algeria, Egypt, Morocco and Tunisia), Kenya (Eastern), Namibia, Mauritius, and South Africa (Southern), Senegal, Togo, and Cote d'Ivoire (Western). Countries performing high in terms of measures of variables over the selected period are highlighted based on minimum bench marks. Certain economies seem to perform better over time across indicators, these are Algeria, Morocco, Tunisia, Seychelles, Namibia, Mauritius, South Africa, Mauritania and Cote d'Ivoire on at least three or four indicators highlighted (see Appendix 1).

Table 4: Descriptive statistics and correlation matrix

Statistics	*Fin*	*govp*	*Govu*	*infl*	*open*	*grow*
Mean	19.301	21.417	15.169	11.022	63.775	2079.68
Standard Deviation	16.781	9.695	6.153	18.454	30.658	2557.628
Minimum	0.403	-2.424	0.000	-27.049	6.32	164.192
Maximum	106.26	89.381	51.975	219.003	225.023	14417.06
Number of Observations	1443	1443	1443	1443	1443	1443
Variables						
Fin	1					
Govp	0.277***	1				
Govu	0.372***	0.04	1			
Infl	-0.225***	-0.023	-0.127***	1		
Open	0.436***	0.279***	0.409***	-0.099***	1	
Grow	0.530***	0.359***	0.243***	-0.144***	0.539***	1

Note: This table presents both descriptive statistics in the upper rows and correlation values in the lower rows. The descriptive statistics are untransformed emphasizing their size while correlations are based on log-transformed values emphasizing uniformity in interpretation. The ***, **, and * denote variables significance at 1%, 5% and 10% levels for two sided tests.

The positive significant correlation between bank-based financial development with most of the variables highlights its anticipated responses based on these independent variables' movement. Inflation is evidently not good for bank-based financial development while the types of government spending, trade openness and GDP per capita are good for bank-based financial development.

4.2. Baseline causal estimates

Two samples are compared in the results, that of Africa and that of Sub-Sahara Africa. Causal results are presented in Tables 5 and 6. Estimates 1 to 3 represents model [ii] estimates (FGLS), while estimates 4 to 6 represent first part of the model [iv] MG estimates which is considered more realistic in that it allows for heterogeneities across country panels. Both productive spending and non-productive spending estimates are positively influencing bank-based financial development. The directions of the results are positive consistently/robust even after introducing control variables and use alternative estimation methods (refer Table 5), Figure 2 support the positive effect. Such effects are more positively steep for South Africa, Mauritius, Tunisia, Morocco, Namibia and Egypt. Government spending for countries on the far lower right position in the graphs such as Nigeria and Tanzania are expected to have lesser impact on bank-based financial development, and have relatively lower level of bank-based financial development over the sampled period. But, government spending for countries relatively on the upper left positions such as South Africa and Mauritius have the most impact on bank-based financial development, and have relatively high average level of bank-based financial development over the sample period.

The values for productive government spending are comparatively inelastic compared to elastic values for non-productive spending on bank-based financial development. Inflation was found to be steadily negative and less elastic in its impact on bank-based financial development, while economy openness and GDP per capita are consistently positively contributing to bank-based financial development. These variables account for a sizable impact on bank-based financial development at a range of 20.7% to 34.1% r-squares.

4.3. Short –run and long –run causal estimates

Evidences for presence of co-integration in Table 3 in the variables support that bank-based financial development and types of government spending share common stochastic trends towards a long –run path (Sare, Aboagye, & Mensah,

Table 5: Baseline regression results

	1	*2*	*3*	*4*	*5*	*6*
govp	0.264***	0.122***	0.108***	0.125**	0.074	0.047
	[0.032]	[0.031]	[0.031]	[0.044]	[0.061]	[0.060]
govu	0.361***	0.300***	0.299***	0.352**	0.301**	0.304**
	[0.045]	[0.041]	[0.041]	[0.107]	[0.107]	[0.114]
Infl		-0.029*	-0.013		-0.024*	-0.024*
		[0.011]	[0.012]		[0.010]	[0.009]
open		0.207***	0.226***		0.143	0.093
		[0.046]	[0.046]		[0.083]	[0.092]
grow		0.729***	0.704***		0.612*	0.668*
		[0.047]	[0.050]		[0.302]	[0.289]
trend				0.014***	0.009	0.01
				[0.004]	[0.006]	[0.005]
constant	0.906***	-4.466***	-4.561***	1.032**	-2.972	-3.246
	[0.181]	[0.358]	[0.369]	[0.361]	[1.966]	[1.927]
Observations	1443	1443	1287	1443	1443	1287
N_g	37	37	33	37	37	33
r2_w	0.076	0.27	0.28			
r2_b	0.323	0.421	0.405			
r2_o	0.207	0.341	0.327			
Chi^2	125.832	505.413	468.338	18.672	22.679	20.481
RMSE	0.478	0.429	0.416			
Sample	Africa	Africa	Sub-Sahara	Africa	Africa	Sub-Sahara
Model	GLS	GLS	GLS	MG	MG	MG
Robust	YES	YES	YES	YES	YES	YES

Note: This table presents the baseline regression results. Six models are presented side by side, label 1 to 6. Models 1 and 4 are using selected countries from the whole of Africa, while models 2, 3, 5 and 6 are using selected countries from sub-Saharan Africa. Models 1 to 3 are analyzed using Generalized Least Squares (GLS) while models 4 to 6 are analyzed using Mean Group (MG) estimator. All the models were robust. Controls variables (infl, open and grow) are introduced in subsequent models to show stability of the models. These results are consistent and robust sign are depicted across models. The ***, **, and * denote variables significance at 1%, 5% and 10% levels for two sided tests. Robust standard errors are in box parentheses. N_g, r2_w, r2_b, r2_o, Chi^2, and RMSE represents number of groups, r-square for within groups, between groups, and overall sample and rout mean square error respectively.

2018). Given this evidence and to address fully the extent of posed hypothetical expectations, short –run and long –run estimations are isolated and presented in Table 6. Two estimators are compared, the PMG which allows the short –run heteroscedasticity and the pool the long –run estimates, and the DCCEMG which

Table 6: Short –run and long –run regression results

	7	*8*	*9*		*10*	*11*	*12*
govp (short –run)	0.093*	0.036	0.006	d.govp	0.104*	0.084*	0.088*
	[0.037]	[0.039]	[0.038]		[0.044]	[0.041]	[0.036]
govu (short –run)	0.258***	0.183**	0.148***	d.govu	0.275***	0.144*	0.132
	[0.061]	[0.056]	[0.043]		[0.061]	[0.071]	[0.07]
Infl		-0.054***	-0.054***	infl		-0.042***	-0.043***
		[0.009]	[0.01]			[0.01]	[0.011]
Open		0.125*	0.137*	open		0.013	0.033
		[0.054]	[0.06]			[0.058]	[0.058]
Grow		0.216***	0.224***	grow		0.178	0.105
		[0.052]	[0.055]			[0.141]	[0.172]
constant	-0.117***	-1.507***	-1.620***	constant	-26.564	-9.752	-5.717
	[0.025]	[0.416]	[0.446]		[31.91]	[5.402]	[4.773]
_ect	-0.087***	-0.196***	-0.203***	**_ect**	-0.355***	-0.399***	-0.401***
	[0.014]	[0.03]	[0.033]		[0.037]	[0.042]	[0.047]
govp (long –run)	1.200***	0.156**	0.191***	l.govp	0.444	0.338	0.437*
	[0.136]	[0.054]	[0.058]		[0.991]	[0.208]	[0.193]
govu (long –run)	0.188	0.155**	0.159**	l.govu	2.923	0.012	0.105
	[0.19]	[0.052]	[0.055]		[2.846]	[0.213]	[0.28]
Observations	1406	1406	1254	Observations	1369	1369	1221
N_g	37	37	33	N_g	37	37	33
Log-likelihood	769.72	938.753	801.476	Years	37	37	37
Bayesian Criteria	-1495.949	-1812.269	-1538.745	cd	1.81	1.219	1.083
Akaike's Criteria	-1527.441	-1859.506	-1584.951	cdp	0.07	0.223	0.279
				F-statistic	1.384	1.557	1.63
				RMSE	0.187	0.179	0.18
				R-squared	0.601	0.485	0.474
				Adj R^2	0.409	0.134	0.114
				r2_pmg	0.263	0.324	0.334
Model	PMG	PMG	PMG	Model	DCCEMG	DCCEMG	DCCEMG
Sample	Africa	Africa	Sub-Sahara	Sample	Africa	Africa	Sub-Sahara

Note: This table presents models 7 to 12. All the models were robust. Controls variables (infl, open and grow) are introduced in subsequent models to show stability of the models. The second row depicts short –run estimates while the fifth row depicts long –run estimates. These results are consistent and robust sign are depicted across models. The ***, **, and * denote variables significance at 1%, 5% and 10% levels for two sided tests. Robust standard errors are in box parentheses. N_g, r2_w, r2_b, r2_o, Chi^2, and RMSE represents number of groups, r-square for within groups, between groups, and overall sample and rout mean square error respectively. While in models 10 to 12, cd, cdp, and r2_pmg represent cross-sectional dependence test, its probability value, which are not statistically significant supporting the fact that the models were able to control for cross-sectional dependence, and r-square is based on pooled mean group estimator's adaptation, but note the models related to these statistics are DCCEMG defined previously in methodology section. _ect in all the models represents the error correction term.

also allows for short –run heteroscedasticity, cross-sectional averaging and estimates long –run estimates, also controls for cross-sectional dependence, serial correlation if present, and allows for dynamism in the model. Both methods also estimate short –run error correction speed towards the long –run to account for such long –run convergence. The short –run estimates are robust and consistently maintain same signs for both models even after addition of control variables. Consistent to results in Table 5, bank-based financial development is robustly less sensitive to productive spending as compared to more sensitivity to non-productive spending in the short –run. Figure 2 also highlight this sensitivity difference by the degree of steepness of the fitted lines.

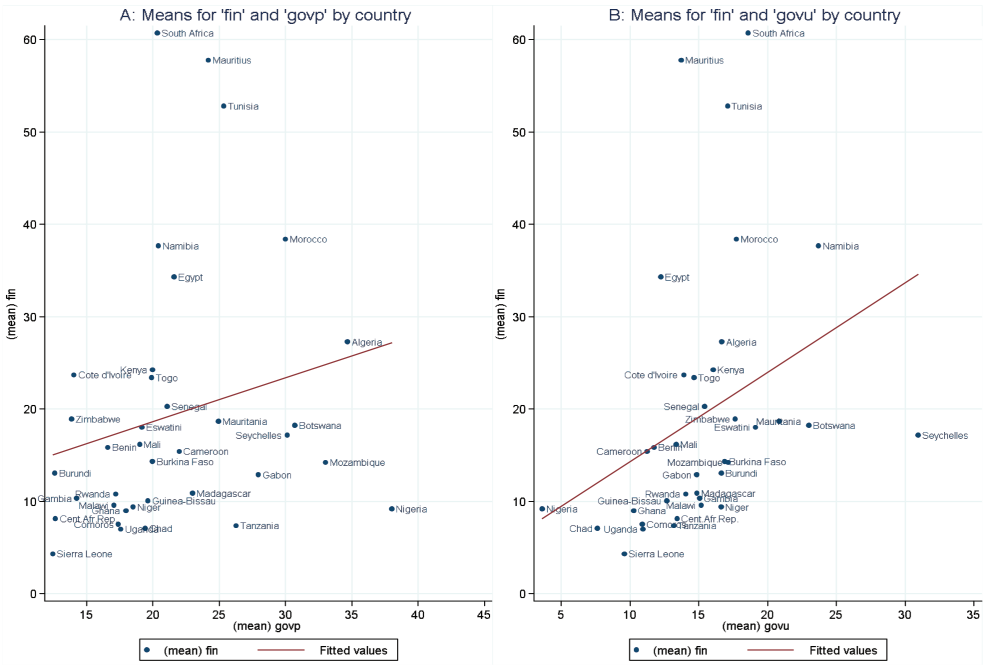

Figure 2: Financial Development and Government Expenditure Types for Selected African Economies. In this figure, two graph panels are presented. In panel A, means of financial development plotted against productive government expenditure highlighted by country. In panel B, means of financial development plotted against unproductive government expenditure highlighted by country. Government expenditure types for countries above the red-fitted lines tend to have above average (more) drive on financial development, while those below it, have less drive. More developed countries tend to dominate the above the fitted red-line. Financial development indicator tends to be more sensitive to unproductive expenditure compared to productive expenditures as depicted by the steepness of the fitted red-lines.

The long –run estimates for model [iv] later part of the equation, are consistently positive for pooled estimates with bank-based financial development being more sensitive to productive spending than non-productive spending (see Table 6). The _ect estimates represents the error correction terms which is the speed of convergence in the financial sector to its long-run equilibrium. This term as stated earlier should be negative and statistically significant for results to be considered important. Under pooling estimation circumstances (PMG) the speed of short –run adjustment towards equilibrium is shown to be slower between 0.087 and 0.203, while under the dynamic common correlated effects mean group circumstances (DCCEMG) the adjustment is shown to be faster between 0.355 to 0.401. While the PMG in this case facilitates robustness of the results directions, the DCCEMG additionally control for manifested cross-sectional dependence in the panel (see Table 2). The insignificant values for 'cd' indicated by 'cdp' of the CD-test after running regressions in Table 6 offer evidence for successful correction of cross-sectional dependence in the models.

5. Conclusion and Recommendation

This study employed innovative methods that are considered more appropriate when it comes to dealing with panel data characteristics. Both short –run and long –run estimations and error correction terms were estimated. Results supports a strong persistent positive impact of both types of spending on bank-based financial development, both in the short –run and long –run spans. Therefore, these results support both propositions that; first, *Productive spending encourages private sector credit demand by a way of complementarity* and secondly that *Non-productive spending stimulates private credits demand through increased income re-distribution, money supply and liquidity in the economy.* Particularly, the capital spending effect on private investment channel is consistent to Adeyemi, Babatola, Awe, TItilayo and Femi (2022) findings who showed similar positive effect in east Africa region. They attribute this to private investment sensitivity to macroeconomic reforms on inflation, and productive debt stock influenced by high public investment quality and good institutional frameworks.

On a policy level these findings recommend that governments in Africa should focus on both types of spending, but policies that encourage productivity to promote all sectors of the economy, because financial sector being a service sector also depends on the success of other productive sectors, while policies should

channel non-productive spending to areas in which private agents can convert these funds into investments on their part. Policies should consider the long –term impact of productive spending, they should isolate government spending based on types to be able to control and attain desired effect based on type of spending being undertaken.

Assuming stability in productive government spending and based on Keynesians' arguments the evidences are able to ascertain a positive impact, in that government spending crowd –in private sector agents, promote private investments which in turn demand credits from banks. Government spending policies that allows the participation of private sector agents or through programs such as public-private partnership (PPP) accelerate demands for credits from banks. Such policies need to be encouraged. Similarly, stability in non-productive government spending ascertains income re-distribution, money supply and liquidity, the evidence supports the positive roles of non-productive government spending on financial sector credits growth. Thus, based on Keynesians idea, government should encourage public spending that lead to an increase in private agents' activities which would increase demand for private credit by them. Governments policies need to promote spending stability, and encourage private argents activities and partnership with the government in the economies, by dong do, the banking sectors will be enhanced. Consistent to policy recommendation of Ngeendepi and Phiri (2021), to increase public expenditure efficiency in crouding–in private investments and credits, governments should increase expenditure efficiency by strengthening project appraisals, screening, selection and implimentaion. Implement procedures that limit transaction costs, control corruption and targeting effective and efficient expenditure items.

If governments spend more on taxes than borrowing, the negative impacts of government borrowing to private sector credit are reduced. If taxes are sufficient to cover for government spending, then governments will not be able to affect both the supply by curtailing it through taking a large share since governments are more trusty worth borrowers than private agents, and will not be able to cause rise in interest rates in the market for private sectors. That means, the resulting crowding –in of the private sector agents will take a large share of credits from the financial sector at affordable interests. Thus, policies that discourages heavy domestic borrowing need to be encouraged, while calibrated tax-based spending need to be encouraged for positive impacts of government spending on bank-based financial development to be sustained in the long –run.

As evidenced by negative impacts of inflation, and positive impacts of openness and GDP per capital, policies that control inflation and encourages openness of the economies and production will benefit bank-based financial development, one particular focus could be to control money supply in the economies, avoid unnecessary and discretionary spending, channeling spending where necessary and where they could have positive impacts both to the economy and financial sector. Policies that open up the economies will encourage competition, efficiency, liquidity, price stability thereby attract private agents to take credits from financial institutions. Controlling population growth and size tends to improve GDP per capita but reduce potential market power, increasing productive spending tends to increase national output, simply means positive GDP per capita will promote bank-based financial development via increased purchasing power of the working population, that means more credits could be secured by private agents. Thus policies that promotes liberalization of both trade and economy should be encouraged. Policies that foster convergence of financial markets, productive spending and private agents' investments will help a faster short –run effect convergence into long –run equilibrium, which helps a faster realization of the development agenda in this region. It is shown from our sample that both productive and non-productive spending tend to crowd –in credit to private sector. Thus it is established that bank-based financial development is favorably influenced by both productive and non-productive government spending, policies that address all three variables both in the short –run and long –run must be invented for bank-based financial development to be expanded.

References

Adeyemi, P., Babatola, M., Awe, F. D., Samuel, T. Y., & Oluwa, F. O. (2022). Government Capital Expenditure and Private Investment in Sub-Saharan Africa: A Sensitivity Analysis. *London Journal of Research in Humanities and Social Sciences, 22*(1), 53-69.

Afonso, A., & Alegre, J. (2011). Economic growth and budgetary components: a panel assessment for the EU. *Emperical Economics, 41*(3), 703-723.

Anyanwu, A., Gan, C., & Hu, B. (2017). Government Domestic Debt, Private Sector Credit, and Crowding Out Effect in Oil-Dependent Countries. *Journal of Economic Research, 22*, 127-151.

Bilgili, F., & Ulucak, R. (2018). Is there deterministic, stochastic, and/or club convergence in ecological footprint indicator among G20 countries? *Environmental Science and Pollution Research, 25*(35), 35404-35419. doi:10.1007/s11356-018-3457-1

Brzozowski, M., & Siwinska-Gorzelak, J. (2013). Public spending volatility and financial market development. *CESifo Economic Studies, 59*(1), 72–92. doi:10.1093/cesifo/ifs038

Chen, Z., Lv, B., & Liu, Y. (2019). Financial development and the composition of government expenditure: Theory and cross-country evidence. *International Review of Economics and Finance, 64*, 600–611. doi:doi.org/10.1016/j.iref.2019.09.006

Chu, T. T., Hölscher, J., & McCarthy, D. (2020). The impact of productive and non-productive government expenditure on economic growth: an empirical analysis in high-income versus low- to middle-income economies. *Empirical Economics, 58*, 2403–2430. doi:doi.org/10.1007/s00181-018-1616-3

Devarajan, S., Swaroop, V., & Zou, H.-f. (1996). The Composition of Public Expenditure and Economic Growth. *Journal of Monetary Economics, 37*(2), 313-344.

Gelbard, E. A., & Leite, S. P. (1999). *Measuring Financial Development in Sub-Saharan Africa.* International Monetary Fund, African Department. International Monetary Fund.

Gemmell, N., Kneller, R., & Sanz, I. (2016). Does the composition of government expenditure matter for long-run GDP levels? *Oxford Bulletin of Economics and Statistics, 78*(4), 522-547.

Granado, F. J., Martinez-Vazquez, J., & McNab, R. M. (2012). *Decentralization and the composition of public expenditures.* Naval Postgraduate School , Naval Postgraduate School . Monterey Ca: Naval Postgraduate School .

Haikala, G., Abdelbary, I., & Samira, D. (2021). 'Lazy Banks': the case of Egypt. *Macroeconomics and Finance in Emerging Market Economies*, 3-12. doi:10.1080/17520843.2021.1998743

Hauner, D. (2009). Public debt and financial development. *Journal of Development Economics, 88*, 171–183. doi:10.1016/j.jdeveco.2008.02.004

Huang, Y. (2011-a). Private investment and financial development in a globalized world. *Empirical Economics, 41*(1), 43-56. doi:10.1007/s00181-010-0394-3

Huang, Y. (2011-b). *Determinants of Financial Development.* New York: Palgrave Macmillan. doi:10.1057/9780230302495

Kantar, Y. M. (2015). Generalized least squares and weighted least squares estimation methods for distributional parameters. *REVSTA - Statistical Journal, 13*(3), 263-282.

Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics, 90*, 1-44.

Kapaya, S. M. (2020). Stock market development and economic growth in Tanzania: an ARDL and bound testing approach. *Review of Economics and Political Science, 5*(3), 187-206. doi:10.1108/REPS-11-2019-0150

Kapaya, S. M. (2021). Financial development and economic growth in Tanzania: an ARDL and bound testing approach. *Asian Journal of Economics and Banking, 5*(1), 46-65. doi:10.1108/AJEB-09-2020-0063

Kimaro, E. L., Keong, C. C., & Sea, L. L. (2017). Government Expenditure, Efficiency and Economic Growth: A Panel Analysis of Sub-Saharan African Low Income Countries. *African Journal of Economic Review,, 5*(2), 34 - 54.

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics, 61*(1), 631-652.

Mbate, M. (2013). Domestic Debt, Private Sector Credit and Economic Growth in Sub-Saharan Africa. *African Development Review, 25*(4), 434–446.

Michaillat, P., & Saez, E. (2019). Optimal Public Expenditure with Inefficient Unemployment. *The Review of Economic Studies, 86*(3), 1301–1331. doi:10.1093/restud/rdy030

Nartea, G., & Hernandez, J. (2020). Government Size, the Composition of Public Spending and Economic Growth in Netherland. *Journal of Accounting, Business and Finance Research, 9*(2), 82-89. doi:10.20448/2002.92.82.89

Ngeendepi, E., & Phiri, A. (2021). Do fdi and Public Investment Crowd in/out Domestic Private Investment in the sadc Region? *Managing Global Transitions, 19*(1), 3–25. doi:10.26493/1854-6935.19.3-25

Ouedraogo, S., & Sawadogo, H. (2020). Financial development, financial structure and economic growth in the Sub-Saharan African countries. *International Journal of Financial Economics*, 1-24. doi:10.1002/ijfe.2315

Paramati, S. R., Mo, D., & Gupta, R. (2017). The effects of stock market growth and renewable energy use on CO2 emissions: evidence from G20 countries. *Energy economics, 66*, 360-371. doi:10.1016/j.eneco.2017.06.025

Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels.* University of Cambridge. , Faculty of Economics . Cambridge: University of Cambridge.

Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica, 74*(4), 967-1012. doi:10.1111/j.1468-0262.2006.00692.x

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of applied econometrics, 22*(2), 265-312.

Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of econometrics, 68*(1), 79-113. doi:10.1016/0304-4076(94)01644-F

Pesaran, M. H., & Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of econometrics, 142*(1), 50-93. doi:10.1016/j.jeconom.2007.05.010

Reed, W. R., & Ye, H. (2011). Which panel data estimator should I use? *Applied Economics, 43*(8), 985–1000. doi:10.1080/00036840802600087

Sare, Y. A., Aboagye, A. Q., & Mensah, L. (2018). Financial development, sectoral effects, and international trade in Africa: An application of pooled mean group (PMG) estimation approach. *International Journal of Finance and Economics*, 1-20. doi:10.1002/ijfe.1665

Tyson, J. (2021). *Financial-sector development and inclusive and sustainable economic growth in sub-Saharan Africa.* Overseas Development Institute. London: Overseas Development Institute.

Wang, B. (2005). Effects of government expenditure on private investment: Canadian empirical evidence. *Empirical Economics, 30*, 493–504. doi:10.1007/s00181-005-0245-9

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and statistics, 69*(6), 709-748. doi:10.1111/j.1468-0084.2007.00477.x

Worldbank. (2019). *Global Financial Development Report 2019/2020: Bank Regulation and Supervision a Decade after the Global Financial Crisis.* World Bank, International Bank for Reconstruction and Development. Washington, DC:: World Bank. doi:10.1596/978-1-4648-1447-1

Appendix 1: Country list and means

Country name	*Country codes*	*Region*	*fin*	*govp*	*govu*	*infl*	*open*	*grow*
Chad	TCD	CA	7.079	19.407	7.635	4.505	61.466	634.611
Central African Republic	CAF	CA	8.128	12.632	13.421	5.011	45.878	453.908
Uganda	UGA	EA	6.988	17.562	10.948	33.633	34.915	590.817
Tanzania	TZA	EA	7.365	26.257	13.186	16.271	45.044	609.395
Rwanda	RWA	EA	10.788	17.178	14.060	7.961	35.179	485.763
Burundi	BDI	EA	13.062	12.595	16.643	10.084	34.419	261.600
Kenya	KEN	EA	24.249	19.964	16.056	10.331	55.004	909.111
Algeria	DZA	NA	27.288	34.660	16.665	11.404	57.248	3950.717
Egypt, Arab Rep.	EGY	NA	34.306	21.587	12.247	10.895	50.156	1960.568
Morocco	MAR	NA	38.398	29.985	17.735	3.619	62.702	2174.518
Tunisia	TUN	NA	52.809	25.331	17.098	5.691	89.829	3048.777
Comoros	COM	SA	7.528	17.379	10.901	4.110	36.660	1344.756
Malawi	MWI	SA	9.580	17.052	15.166	22.005	60.081	403.519
Madagascar	MDG	SA	10.889	22.984	14.863	14.209	43.717	510.040
Mozambique	MOZ	SA	14.217	33.004	17.128	20.952	63.585	332.983
Seychelles	SYC	SA	17.176	30.128	30.937	5.742	126.679	9190.614
Eswatini	SWZ	SA	18.018	19.157	19.129	9.143	132.568	3212.886
Botswana	BWA	SA	18.226	30.690	22.998	8.924	101.401	5098.862
Zimbabwe	ZWE	SA	18.916	13.863	17.646	2.925	63.106	1245.449
Namibia	NAM	SA	37.674	20.397	23.692	9.226	98.273	4483.783
Mauritius	MUS	SA	57.764	24.169	13.728	6.618	116.422	5695.534
South Africa	ZAF	SA	60.718	20.322	18.589	10.161	52.802	6547.387
Sierra Leone	SLE	WA	4.311	12.440	9.600	31.168	51.764	403.302
Ghana	GHA	WA	8.994	17.966	10.277	30.295	62.688	1066.954
Nigeria	NGA	WA	9.184	38.005	3.624	22.080	32.674	1766.332
Niger	NER	WA	9.399	18.489	16.630	4.770	40.817	501.806
Guinea-Bissau	GNB	WA	10.059	19.611	12.677	26.784	51.073	584.410

Country name	*Country codes*	*Region*	*fin*	*govp*	*govu*	*infl*	*open*	*grow*
Gambia, The	GMB	WA	10.337	14.243	15.072	12.970	68.974	816.418
Gabon	GAB	WA	12.893	27.932	14.848	5.790	88.779	10446.789
Burkina Faso	BFA	WA	14.325	19.949	16.875	3.476	41.408	515.887
Cameroon	CMR	WA	15.398	21.970	11.244	4.558	48.199	1340.846
Benin	BEN	WA	15.849	16.589	11.747	5.229	51.990	951.231
Mali	MLI	WA	16.165	18.994	13.364	5.097	54.050	582.075
Mauritania	MRT	WA	18.672	24.937	20.844	8.290	78.615	1615.756
Senegal	SEN	WA	20.279	21.064	15.428	3.721	62.296	1181.080
Togo	TGO	WA	23.405	19.897	14.655	4.475	85.776	577.826
Cote d'Ivoire	CIV	WA	23.690	14.027	13.909	5.698	73.431	1451.837
Benchmark minimum (highlighted)			20≤fin	20≤govp	20≤govu	infl≤10	50≤open	1500≤grow

Note: This table summarizes each country involved in the analysis by depicting mean values for each variable used in the analysis. The countries are grouped into five regions, CA, EA, NA, SA, and WA, representing central, eastern, northern, southern, and western Africa countries. Values above selected minimums are highlighted to show the performance of each region on these variables.