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# Government expenditure impacts on financial development: Do population age structures moderations matter?

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## Abstract

**Purpose** – This study examined the roles of public spending and population moderating characteristic structure of selected African economies on bank-based financial development through credit to private sector.
**Design/methodology/approach** – The study sampled 37 selected African economies for the years 1991–2018, and it applied a pooled mean group (PMG) estimator to account for short-run and long-run causal effects, and confirmed short-run adjustments towards the long-run convergences between the variables. Specific suitable tests were also applied.
**Findings** – Evidence confirms positive impacts of both capital formation and final consumption expenditures on financial development in the short run and long run. The moderation of population structures on expenditure structures help to speed up convergences.
**Originality/value** – This work attests its innovation by accounting for the separate effects of the expenditure types, the moderation effects of young and mature populations for capital and final consumption expenditure on financial development among selected economies in Africa.

**Keywords** Financial development, Credit to private sector, Capital and consumption expenditure, Young and mature population
**Paper type** Research paper

## 1. Introduction

Financial development has of now received a dedicated effort from around the world (e.g. Kapaya, 2021; Abubakar and Kassim, 2018; Agyapong and Bedjabeng, 2020; Arif and Rawat, 2019; Aghughu *et al.*, 2022). In Africa, the main branches of financial sector development are characterized as follows: the stock markets, as being small and branded by poor liquidity, insufficient market infrastructures and highly concentrated (Otchere *et al.*, 2017). Notably, after independence, governments in Africa captured financial institutions. Banks in Africa are frequently perceived as being less effective but more profitable since they compete in marketplaces that are less intense. This is a functional performance based on market limitations, viz. – small size, dominance of informal sector, volatility, maladministration, which lead to high cost structures (Verhoef, 2017). These are appropriately considered as challenges that are facing the African financial system; These banks as a result failed to bring the anticipated progress (Verhoef, 2017). As a consequence, an unavoidable progress towards financial sector reforms succeeded.

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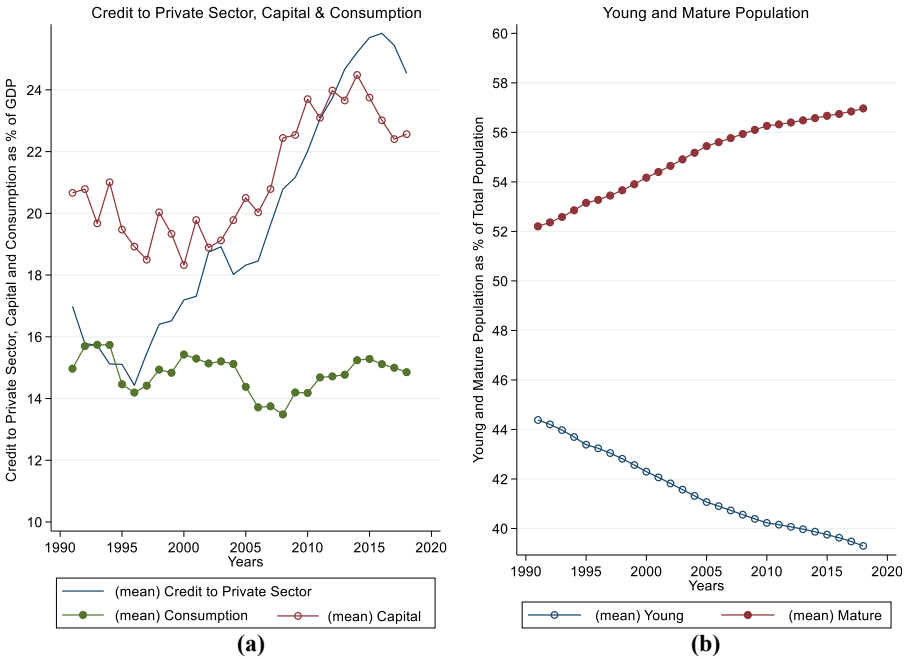
Statistics indicate that, by 2020, the extent of financial depth was higher in east African economies (42.8%) and Southern Africa Development Community (SADC) economies (40.5%), while in Economic Community of West African States (ECOWAS) (35%) and East Central African (ECA) states (30.7%) it was low. More development in the financial sector is evidenced in East and Southern parts of Africa compared to central and western part of Africa (Yusheng *et al.*, 2020). They also show that, in terms of financial intermediation, Southern Africa economies lead by 14.7%, followed by Central African States (11.5%), Western African States (10.1%) and East Africa economies (8.9%). These contrasts extend to other financial market properties such as credit supply to private sector which was in the Western States (7.03%), for East and Central African States as high as 24.4% and for Southern African States (32.5%) and East African States (31.0%). This highlights the fact that credit to private sector is more constrained in the West as compared to Eastern, Southern and Central African nations. While the West seems to crowd out, the rest seem to crowd in credit to the private sectors.

The development of financial sector overtime, post 1990 towards 2020 has been increasing from around 15% to above 25%. The trend seems to be sustained (Figure 1), and there are factors that are ascribed to this trend, some of which are the role of reforms, liberalization, institutions and other macroeconomic variables (e.g. Agyapong and Bedjabeng, 2020; Asratie, 2021; Beck and Maimbo, 2012; Fiador *et al.*, 2021). These observations are consistent to financial development index for middle and lower income economies in Africa, which was 0.1578 (0.11) and 0.0899 (0.04) averages and (standard deviation), respectively, for a scale of 0–1, for years 1980–2017, while financial structure was 0.21 (0.28) and 0.07(0.12), respectively (Ouédraogo *et al.*, 2020). More financial development and corresponding variability are witnessed in middle compared to lower income economies.




**Source(s):** Figure by author

**Figure 1.** Financial development, capital and consumption expenditures and young and mature population for selected African economies

Capital spending (K) has been sustained around 20% and little below 25%, while consumption spending (C) has remained around 15% over time during this period all as percentages of Gross Domestic Product (GDP). This observation is consistent to Ouédraogo *et al.* (2020)'s findings for years 1980–2017, who found C and K measured as "General government consumption expenditure" and "Gross capital formation" as percentage of GDP (and respective standard deviations) respectively, to be averages of 13.52% (8.52) and 20.66% (12.86) respectively for middle income economies and 12.04% (6.19) and 17.04% (9.52) for lower income economies, respectively (Ouédraogo *et al.*, 2020). More K compared to C are witnessed for each group, and more variability for K compared to C in each group. Population structures as percentages of total population between young (Y) and mature (M) tend to widen over time starting a little below 45% and about 52%, respectively. Young population tends to decline towards a little below 40%, while mature population tends to rise towards above 55% over this range of time (Figure 1).

## 2. Related literature review

### *2.1 Cyclical pattern of public spending*

Compared to other emerging nations, Sub-Saharan Africa's (SSA) fiscal policy is more significantly pro-cyclical and has an elasticity of public spending to GDP growth above one (Lledo *et al.*, 2009). This condition does not pass without penalties; Brzozowski and Siwinska-Gorzelak (2013) indicate that pro-cyclical fiscal policy has a negative consequence to economic growth. The cyclicality in public expenditure has been typically justified by the fact that during bad times countries lacked access to aid, thus the flow in of debt has a hand in reducing pro-cyclicality in public expenditure in this region. In the context of shallow financial markets dominance and especially low financial depth, pro-cyclicality is optimal, because expansionary fiscal policy leads to too much crowding out of private investments. Pro-cyclicality tends to escalate non-productive expenditure in economies with high debt risk (Lledo *et al.*, 2009).

Lledo *et al.* (2011) contend that persistent gains in macroeconomic conditions and structural changes over the last 3 decades toward 2010 are primarily responsible for the shift in public spending in SSA toward countercyclical, or at least with less pro-cyclical financial policies. They found reminiscent evidence that greater fiscal size, indicated by lower external debt, and better concessional financing access, indicated by large aid inflows have contributed to declining public spending pro-cyclicality in SSA. They contend that such stability improvement led most SSA into the "post-post-stabilization phrase". These economies have been characterized by sustainable fiscal and foreign positions, single-digit inflation, better financial institutions and better deeper domestic financial markets.

The difficulty in accessing financial markets to borrow during the downturn in the pre-stabilization phrase is thought to account for the pro-cyclicality of fiscal policy. However, based on empirical evidence (Lledo *et al.*, 2011), it appears that performance of domestic debt and generally other financial markets is not relevant for the observed cyclicality, as the coefficients of depth in financial markets and the cost of domestic credit are economically close to zero, which underpin the fact that SSA underdeveloped domestic financial markets during the time restricted government financing independently of business cycle.

### *2.2 Public spending and financial development: government borrowing channel*

Shetta and Kamaly (2014) evidence a heavy reliance of public spending on debt-financing. They show that there is a significant government borrowing crowding out effect on credit to private sector. The endogenous banking sector response to increased government borrowing

to finance expenditure demand accounts for this crowding out effect (Shetta and Kamaly, 2014). Similarly, in line with the "lazy bank" hypothesis and consistent to the neo-classical theory, Haikala *et al.* (2021) found significant crowding out effects of private sector by government domestic borrowing. However, Hauner (2009) contrasts a "safe asset" idea from a "lazy banks" idea on the role of public debt in financial development. The safe asset idea is based on the proposal that public debts (as a safe asset to private agents) play key endogenous effects in the financial system by developing the financial sector through curtailing of institutional imprecations, creation of liquid collateral for development of derivatives market, payment and settlement systems, facilitation of pricing of both corporate bonds and equities (via government bonds), and provision of kind of collateral for funds intermediated in a riskier environment. Thus, without the "safe asset" (public debt), less saving could be utilized, higher borrowing cost and shorter maturity would face borrowers. In support to the lazy bank idea, it is found that increased public debt holding in domestic banks increases their profitability but decreases both their efficiency and financial deepening progressively. Conversely, the safe asset idea is partly supported in that financial sector growth appears to be favored by public debt.

In a recent study, Mwakalila (2020) indicates that public spending crowd out credit to private sector by swelling rate of lending in the long-run in Tanzania. The level of domestic government borrowing to finance public spending seems to crowd out the private sector and weakens financial sector growth. Similarly, Bikefe *et al.* (2022) found that government borrowing to finance its expenditure crowds out private sector credits. In economies that have less developed financial markets, there is a high chance that consumers are highly credit constrained and the impacts of government spending is higher. Similarly, Naceur *et al.* (2014) found that government spending absorbs liquidity from financial markets, thereby reducing the ability of financial intermediation in mobilizing savings needed to finance private sector investments. Thus, lower levels of financial development are associated with higher government spending and vice versa. Further, Naceur *et al.* (2014) found that government consumption has a negative impact on the expansion of the financial sector. Government consumption was discovered to be an important negative predictor of liquid liabilities and credit to private sector, which are significant predictors of the development of the banking sector as well as a significant adverse predictor of stock market size and stock market liquidity, which are indicators of stock market development.

The effect is such that increased government spending necessitates more domestic financing. This in turn crowds out private activity and unfavorably impacts financial sector growth. Naceur *et al.* (2014) further demonstrate how increasing government consumption depletes the financial system's domestic liquidity, making it more difficult for financial intermediation to effectively mobilize funds to finance private sector activity. Similarly, Maghfiroh and Purwono (2021) found the effect of public spending to be negative but had no significant impact on financial development. They account for the lack of statistical evidence to more reliance on foreign aids and international loans to finance expenditure. They futher argue that increasing public spending may lead to detrimental effect in developing countries because it suppresses private investment, dwindle economic stimulus in the short-run and curtail capital accumulation in the long-run, and that public spending volatility increases fluctuations among economic variables. Thus, public spending has to be done with private sector in mind due to its likely effects in crowding out private sector (Omodero, 2019). It is noted that, when government borrow domestically, they decrease credits that would be available for private sector and causes a hike in interest rates (Emran and Farazi, 2009), and may lead to financial instability (Mbate, 2013). Therefore, while the "lazy bank" and "safe asset" ideas may dominate the short run, the negative effects of government borrowing may take over in the long run due to decreased efficiency in the financial system if other factors such as institutional quality and economy openness are not leading.

*2.3 Public spending and financial development: market benchmarking channel*

As government spending demands financing from government bonds issuance, the later play a significant role in benchmarking issuance of private sector bonds, and these private bonds play an important role in advancing overall financial sector growth. For instance, Kagochi (2019) supports consistently that public spending enhances financial development. In the majority of developing nations, banks report an extraordinarily high percentage of their assets as public debt (Kumhof and Tanner, 2005). They argue that consistent debt management by the government for its public spending may make bank-based financial intermediation possible, particularly in regions with a poor institutional and regulatory framework. They suggest that, in addition to a banking-based financial system, stable government debt markets serve as the foundation for further financial market development. Banks and retirement funds are the largest investors in government debt in emerging economies. Thus, banks play a crucial role in financial intermediation. They contend that prudent debt management by the government is essential for protecting vulnerable domestic banking institutions.

Government bond market plays critically as it is the backbone of virtually all fixed income securities in developing economies. As public spending is financed by government debt market, its movements would also affect market depth, liquidity, returns and interest rates in financial markets and consequently financial development. Further, a deep and liquid government bond market is crucial as a benchmark for private bond markets. A government debt market facilitates financial development by either putting or mirroring in place, basic financial infrastructure, such as laws, organizations, goods, services, repo and derivative markets, and through acting as a standard for information. Thus, through it better public spending is judged as good news/information in financial markets by private agents (Afonso *et al.*, 2021). Furthermore, public debt market provide a common benefit to financial system through; first, controlling macroeconomic volatility, such as inflation volatility which has to be low for nominal yield curve to be informative about the real borrowing cost. Secondly, in a competing ground against government borrowing cost minimization, government must issue sufficient amount of debt in order to meaningfully conduct monetary policy in controlling inflation and maintaining macroeconomic stability (Kumhof and Tanner, 2005). Government debt thus serves as both an informational baseline in the securities markets and a means of infrastructure provision for the development of financial markets. Its sound financial regulatory policies and well-managed domestic markets play a role in promotion of private sector investments (Mbate, 2013). Additionally, depositors see this as a sort of security on the balance sheets of financial institutions, which improves their willingness to have their money handled riskily. In this way, it serves as collateral in an indirect way. Through risk management in derivative markets, payment and settlement systems, and repurchase agreement markets, public debt is known to be important as security in a variety of direct circumstances in the wholesale securities markets (Kumhof and Tanner, 2005).

*2.4 Public spending and financial development: private investment channel*

Private investments as part of capital expenditures, though not part of public spending, help to shed some light on what would be the relationship between public capital expenditure and financial development. Huang (2011a) show that private investments have a favorable impact on the expansion of the financial sector, which has critical repercussions for the evolution of financial markets in emerging nations. If quality of government, quality of institutional channels, trade openness and financial openness would be elevated, then this effect would be even more realized.

There are both direct and indirect impacts of public spending on financial development. The direct effects can be conceived through the growth model, while the indirect effects are

transmitted through channels such as imports, investments and labor. Expenditure impacts these channels which in turn impact financial development. The effects tend to vary between economies depending on whether the expenditure is tax-financed or debt financed; combination levels of either sources of financing expenditures may impact growth differently (Ghali, 2003). Wang (2005) contends that if government spending is backed by borrowing then interest rates are likely going to shoot up in financial markets dues to increased competition for scarce funds. Consequently, the rise in interest rates reduces private investment, as more people will move funds towards savings in bonds and banks. This is commonly referred to as the "crowding –out hypothesis", however the level of crowding out depends on levels of banks' endogenous reflexes to higher government borrowing (Anyanwu *et al.*, 2017). Alternatively, the "accelerator principle" suggests that increase in government spending promotes higher levels of income which induces more private investment, which leads to crowd in of private investment. Similarly, the "rational expectation hypothesis" contends that debt-financed public spending, in fact, might not lead to crowding out effect if private agents entirely discount present debt financed public spending by accounting for future taxes in current investment decisions. Thus, public spending decisions are irrelevant to private investment. It is further argued that the crowding out effect may be dissolved by policy instruments which may prevent interest rate rising up.

Wang (2005) indicates that neoclassical argument focuses on either the complementarity or substitutability connections between public spending and private investment. The "complementary hypothesis" stresses that public spending in infrastructure and human capital is likely to accelerate marginal productivity of private capital and hence induce more private investment, thus leading to a crowding in effect. Conversely, the "substitutability hypothesis" contends that higher public spending on capital goods raises rate of capital accumulation which private agents may at times judge to be beyond optimal, this led private agents to curtail investment to re-establish optima capital accumulation rates in the economy. Thus, working as a substitute, government spending on capital goods crowd out private investment (Mbate, 2013). An important line of argument and implication on the complementarity and substitutability hypotheses is that different types of public spending may lead to different influences on private investment. Unlike the crowding out effect, the level of crowding in of the private sector would normally have positive implications on financial development, as responding to reduced interest rates, increasing credits demand, increased profitability and re-investment rates among private agents. Thus, public spending and financial development linkages can be modeled via the private investment channel but may mostly rely on empirical evidence as dictated by contexts of studies.

### *2.5 Public spending and financial development: moderation of population age-structure*

From a theoretical point of view, starting at Malthus's (1798) theory of population, who suggested that, as population increase geometrically, food supply increases in arithmetical progression. Population increases faster than food supply, and if not checked it will result in vice and misery (Azolibe, 2022). Extending from his theory and in line with Azolibe (2022), it is proposed that increase in population increases the level and rate of urbanization and food insecurity which initially breed vice and misery. Government, in response, seeks means to plan, harmonize, order and organize urbanization, build urban infrastructures, provide social services, and expand defense and security alternatives. Such measures always lead to increasing public spending. Thus, confirming a positive effect of population growth or size on public spending is a preliminary confirmation of the active role of a government in spending means to address needs of the society, while a negative effect of population on public spending would imply active steps by the state to reduce the size and role of government in its population affairs.

Studies in Africa without using age structures, but using total population as a predictor on government spending, found positive and statistically significant results as that of Okafor and Eiya (2011), Obeng and Sakyi (2017), Jibir and Aluthge (2019), and Krieger and Meierrieks (2020). These evidences suggest that the cost of heterogeneity, congestion, crime and conflicts to be possible channels for population size effects on public spending. Žokalj (2016) results portray positive impacts of elderly population on public spending on pensions and social protection. They also demonstrate that an increase in the young population predicts health expenditure. A country that has more of population aged 0–14 and or 65+, its government will have to spend more on education, health capital and projects to absorb the unemployed dependent population. A large young population (0–14) creates a potential for large future labor force which will need to be absorbed into the employment sectors. This inevitably forces the government to create more job avenues which create more demands for wages and salaries, provision of old-age social services such as health care and monthly or quarterly payments of pensions for 65+ aged population. This way, recurrent and capital expenditures increase simultaneously as the population grows over years (Azolibe *et al.*, 2020).

From an empirical point of view, study contexts seem to dictate the nature of the research outcomes. Recent studies done in Africa signal positive results for the effect of population structure on government spending (Azolibe, 2022; Azolibe *et al.*, 2020). Based on age structure, 0–14 and 15–64 in African countries, population has a positive impact on government spending, while in Asian countries they found age structures 15–64 and 65+ to positively affect government spending. Partly, corroborating the Asian evidence is the work of Pascual-Saez *et al.* (2017) in Spain which found the effect to be positive. Tamakoshia and Hamori (2015) in Japan, tested the relationships between health-care expenditure, GDP and population share of the elderly and found the elderly population effect to be positive.

Azolibe (2022) studying together the most populous continents in the world, namely Africa and Asia, finds that in Africa age structures 0–14 and 15–64 are influential in determining the size of public spending, while age structures 15–64 and 65+ are influential in determining size of public spending in Asia, in both cases the signs were positive and statistically significant. The differences confirm a young versus an older population in respective continents. Studies (e.g. Obeng and Sakyi, 2017; Aregbeyen and Akpan, 2013; Okafor and Eiya, 2011) have shown that an increase in population generally leads to public spending increase through a public sector expansion channel. These studies deal with population and its role on public spending. While Azolibe (2022) looked at age structure and its implication on public spending, the current study seeks to not only assess the effect of population on financial sector growth but also to assess the moderation effects of age structures on the impact of public spending to financial sector growth. One significant question is does changes among population structures help to explain the impacts of public spending on financial development. To the best of my review and knowledge, this is a new study of its kind.

### *2.6 Hypothetical propositions*

*2.6.1 Proposition – I. Capital and consumption expenditures.* When tax bases are dismal, governments do borrow heavily to finance long-term investments, mainly capital expenditure. The big size of borrowing at times, in context of weak financial markets, may lead to crowding out effects. As a result, credits to private sector declines, financial system agents run towards attractive government offerings as credit to private sector becomes less attractive. Similarly, public spending crowd out credit to private sector by swelling rate of lending in the long run. Thus, through both public borrowing and interest rate channels, a negative effect between public spending and financial development occurs.

Conversely, managed regular government borrowing to finance public spending enhance a government bonds market that formally serve as a benchmark for the development

of private bonds, stock markets and banking institutions. Based on the accelerator principle and complementary hypothesis, the institutional, legal and policy environment created by government bonds market play as a benchmark for credits to private agents in financial markets. Similarly, consistent debt management by the government for its public spending may make bank-based financial intermediation possible, particularly in regions with poor institutional and regulatory framework. Stable government debt markets serve as the foundation for further financial market development. Thus, public spending may lead to a positive impact on financial development.

However, the impact of capital expenditure is expected to be more pronounced in the long run while that of consumption expenditure is expected to be more dominant in the short run, due to either impacts cycles.

*2.6.2 Proposition – II. Young and mature population.* In words of Azolibe (2022, p. 435) "[. . ..] both young and ageing populations in both continents [Africa and Asia] pose expenditure challenges for their governments in terms of provision of healthcare, education (primary, secondary and tertiary), employment, retirement benefits, pensions and old age security [. . .]". Inevitably, the growth of population triggering public spending by government might influence the level of public financing through financial markets. This may lead to either of two following possibilities: the crowding out of private sector credits or the complementing effect on the private sector credit markets. Thus, more dependent population (young population) negatively affects the relationship between either type of expenditures on financial development, while productive population (mature age) positively affects the relationship between either type of expenditures on financial development.

## 3. Data, variables and empirical methods

### *3.1 Data and variables*

The article applied a panel data of 37 sampled African economies, these are Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Cote d'Ivoire, Egypt, Arab Rep., Eswatini, Gabon, Gambia, The, Ghana, Guinea-Bissau, Kenya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, Togo, Tunisia, Uganda, and Zimbabwe. As in Agyapong and Bedjabeng (2020), the study used criterion-based sampling technique, where the sample is developed based on a set of criteria. In this case, one, as indicated earlier, the evolution in financial development in African countries has more than less similarities, such as after independence, governments in Africa captured financial institutions and have insufficient market infrastructures (Otchere *et al.*, 2017), the financial systems as such is dominated by market limitations, dominance of informal sector, high cost structures and was followed by financial sectors reforms in 1990s that was implemented (Verhoef, 2017). Two, data availability, since the study used secondary data from World Bank Development indicators it was only possible to include data series that could be obtained. The data used are sourced from World Bank Development Indicators (WDI), extending from year 1991 to 2018, total of 28 years, composing a maximum balanced panel of 1,036 data points. Table 1 presents a summary of variables measurements. The primary variable of interest was financial development (F), which was a dependent variable. Two independent variables were derived from government spending: public capital spending (K) and public consumption spending (C), as well as selected variables derived from population size: youthful population (Y) (0–14 years) and mature population (M) (15–65 years). Inflation (I), trade openness (T) and GDP per capita (G) were other factors of importance that were pertinent to this specific setting. For the goal of uniform scaling, the variables were transformed using logarithms.

**Table 1.** Variables, measurements and sources

| Variable | Symbol | Description | Review source | Data source |
|---|---|---|---|---|
| Financial development | lnF | Domestic credit to private sector, as percentage of GDP | Agyapong and Bedjabeng (2020), Hauner (2009), Kotera and Okada, (2017), Brzozowski and Siwinska-Gorzelak (2013), Kapaya (2021) | World Bank (2018) |
| Capital expenditure | lnK | Gross government capital formation, as percentage of GDP | Xu and Yan (2014), Adeyemi *et al.* (2022), Ouédraogo *et al.* (2020) | World Bank (2018) |
| Consumption expenditure | lnC | Government final consumption expenditure, as percentage of GDP | Ouédraogo *et al.* (2020) | World Bank (2018) |
| GDP per capita | lnG | GDP per capita | Kotera and Okada (2017) | World Bank (2018) |
| Young population | lnY | Population ages 0–14, as percentage of total population | Kotera and Okada (2017) | World Bank (2018) |
| Mature population | lnM | Population ages 15–64, as percentage of total population | | World Bank (2018) |
| Trade Openness | lnO | The sum of exports and imports divided by GDP | Kotera and Okada (2017) | World Bank (2018) |
| Inflation | lnI | Inflation, as annual percentage | Kotera and Okada (2017) | World Bank (2018) |

**Source(s):** Table by author

Many different proxies are used to measure financial sector growth. Credit bank-based measures are often used as proxies for financial sector growth. Examples include domestic credit to private sector as a percentage of GDP (capturing financial depth), deposit money bank to deposit money bank and central bank assets as a percentage of GDP and liquid liabilities as a percentage of GDP or money three (M3) (Kapaya, 2021) as well as other stock market-based metrics including market capitalization and size, depth (the value of traded shares as a proportion of GDP) and turnover/efficiency (the ratio of shares traded to market capitalization) (Kapaya, 2020). It is underlined that banks serve as the primary embodiment of financial development in developing nations (Kapaya, 2021). As a result, the development of the banking sector is sometimes equated with the financial development of a nation. As a result, "bank credit to the private sector" is always cited in this context as the best indicator of the financial development of a country (see Table 1). And as also, it reveals and measures in a much higher sense, the efficiency and significance of financial institutions in allocating credit to the private sector and has been singly used by other authors (Agyapong and Bedjabeng, 2020).

### *3.2 Estimation strategies and techniques*

*3.2.1 Cross-sectional dependence, non-stationarity and panel co-integration.* Cross-sectional dependence, panel unit roots and panel co-integration are postulated, investigated and confirmed in the data. Indeed, some of the factors that may cause cross-sectional dependence among the variables in the African data sets used in this study include the widespread economic pressure put on African nations by Western nations in favor of population control and depopulation stances, the continent's generally young population and population structure. Also, deregulation of the economies, free market economy and liberalization

pushes, regional blocks policies on common infrastructure expenditures, common patterns on government consumption expenditures due to large young dependent populations, common types of expenditures on security and arms due to regional conflicts, copying and learning from each other, and World Bank policies on financial development strategies are also examples. If cross-sectional dependence is not controlled in the data, it can lead to residual correlation, which can impair estimation efficiency and inference validity (Krieger and Meierrieks, 2020).

Non-stationarity in panel data is a common problem caused by the presence of a unit root (Table 2). The presence of two or more non-stationary variables may result in erroneous regression results, rendering the regression coefficients invalid (Bai and Ng, 2004). Political regime change effects, which may cause a shift in public spending, exposure to external influence towards weaker countries, which may cause heavy borrowing, which in turn causes high expenditures at times, are some of the factors that may cause this problem in data. Political or military threats and wars, which can result in more covert expenditures on arms and military equipment. Existence of population reduction demands, which may or may not be maintained by successive governments within the same country. Similarly, existence of panel co-integration, that is, the existence of a correlated linear combination of two non-stationary time series (Table 3). Such a condition may result in model misspecification,

| | | Maddala and Wu (1999) panel unit root test (MW) | | Pesaran (2007) panel unit root test (CIPS) | |
|---|---|---|---|---|---|
| Variable | Specification Lags | Without trend chi_sq | With trend chi_sq | Without trend Zt-bar | With trend Zt-bar |
| lnF | 0 | 90.097* | 111.06*** | −6.429*** | −4.56*** |
| lnK | 0 | 116.869*** | 136.42*** | −4.351*** | −3.03*** |
| lnC | 0 | 123.681*** | 96.36* | −1.4450 | −1.64* |
| lnI | 0 | 394.289*** | 388.69*** | −14.537*** | −11.94*** |
| lnO | 0 | 134.003*** | 129.01*** | −2.459** | −1.330 |
| lnG | 0 | 44.617* | 132.52*** | 0.2000* | 1.460 |
| lnM | 1 | 182.821*** | 145.06*** | −2.903*** | 1.760 |
| lnY | 1 | 145.226*** | 192.5*** | −2.48*** | 2.180 |

**Note(s):** Under the null hypothesis of series are non-stationary
**Source(s):** Table by author

**Table 2.** Panel unit root tests

| Test for co-integration | | | Kao | | | Westerlund |
|---|---|---|---|---|---|---|
| Types | Modified DF | DF | Augmented DF | Unadjusted modified DF | Unadjusted DF | Variance ratio |
| Statistic | −3.161 | −4.202 | −2.197 | −7.281 | −6.069 | −3.085 |
| *p*-value | 0.001 | 0.000 | 0.014 | 0.000 | 0.000 | 0.001 |
| No. Panels | 37 | 37 | 37 | 37 | 37 | 37 |
| No. Periods | 27 | 27 | 27 | 27 | 27 | 28 |
| H0: No co-integration | na | na | na | na | na | na |
| Ha: All panels are co-integrated | YES | YES | YES | YES | YES | na |
| Ha: Some panels are co-integrated | na | na | na | na | na | YES |

**Source(s):** Table by author

**Table 3.** Co-integration tests

resulting in incorrect inferences (Bai and Ng, 2004). Accounting for co-integration thus prevents model specification errors and yields correct inferences for both short-run dynamics and long-run relationships.

A series of tests were performed to determine, non-stationarity and panel co-integration (Pesaran, 2004). Non-stationarity (unit roots) tests were also performed. The competency of second-generation panel unit tests that are reputable in the presence of cross-sectional dependence were considered (Pesaran, 2007), namely, cross-sectionally augmented Im–Pesaran–Shin (CIPS) against the null hypothesis of "non-stationarity" Table 2. Similarly, the Westerlund (2007) panel co-integration test is likewise applied, but for robustness sake, other tests are included in Table 2. The evidence in the series demonstrates the presence of co-integrating series.

*3.2.2 Empirical models' specification.* It is generally known that classic regression estimators are potentially biased and very inconsistent when cross-sectional dependency is present (Pesaran and Smith, 1995; Paramati *et al.*, 2017). Researchers have suggested the pooled mean group (PMG) estimator as a solution to this problem. The PMG primarily accommodates panels with lengthy time series and wider cross-sectional dimensions and permits significant variation between country panels. It only places limitations on cross-sectional homogeneity on the long-run coefficient (Huang, 2011a). Pesaran (2006) and Pesaran and Yamagata (2008) show that the PMG estimator is reliable, asymptotically normal and resilient to outliers regardless of the presence of underlying repressors $I$ (1) or $I$ (0). The PMG strategy demands that the long-run coefficients be comparable across nations. Huang (2011b) suggests that, given the characteristics of the data from the nation panels, these assumptions are thought to be more plausible.

The former methods, such as mean group (MG) estimation, require doing N-independent regression calculations and extracting coefficient means, often referred to as mean group. Furthermore, implement the PMG estimator by pooling the data in the long run, assuming that the coefficients slope and variance of the errors are same in the long run (Pesaran *et al.*, 1999). The suitability of this strategy is due to different strategies produced by policies and other divergent factors that cannot be assumed to be uniform in the short run; there is a reason to expect that both errors and slopes are heterogeneous at this stage. However, over the long run, it makes sense to expect that coefficients and error variances will be the same for all groups, presumably as a result of policy, technology and information convergence, as well as due to regional economic integration and globalization of markets. Consequently, the generic econometric model below is adapted:

$$F = f(K, C, Y, M, I, O, G, K*Y, C*Y, K*M, C*M) \tag{i}$$

To address heteroscedasticity and make it easier to interpret the coefficients, all variables are converted into natural logarithms, as shown in a general form below:

$$\begin{aligned} lnFDT_{i,t} = {} & \alpha_i + \beta_1 lnK_{i,t} + \beta_2 lnC_{i,t} + \beta_3 lnY_{i,t} + \beta_4 lnM_{i,t} + \beta_5 lnI_{i,t} + \beta_7 lnO_{i,t} + \beta_8 lnG_{i,t} \\ & + \beta_9 \ln\,(K*Y)_{i,t} + \beta_{10} \ln\,(C*Y)_{i,t} + \beta_{11} \ln\,(K*M)_{i,t} + \beta_{12} \ln\,(C*M)_{i,t} \varepsilon_{i,t} \end{aligned} \tag{ii}$$

Given the PMG estimator, the intercepts, short-run coefficients, error variances and adjustment speed (error correction coefficients) are all permitted to vary per country. The long-run coefficients must be similar across all countries. The following expression is the result from applying the PMG into the panel auto-regressive distributed lags (PARDL) system of equations.

$$y_{i,t} = \sum_{j=1}^{p} \lambda_{i,j} y_{i.t-j} + \sum_{j=1}^{q} y_{i,j} X_{i.t-j} + \sum_{j=1}^{C} \varphi_{i,j} Z_{i.t-j} + \mu_i + \varepsilon_{i.t} \quad \text{(iii)}$$

This can also be put into practice using a compact representation, vector error correction model (VECM) as follows:

$$\Delta y_{i.t} = \theta_i \left( y_{i.t-1} - \beta' X_{i,t-1} \right) + \sum_{j=1}^{p-1} \lambda_{i,j} \Delta y_{i,t-j} + \sum_{j=1}^{q-1} \gamma'_{i,j} \Delta X_{i,t-j} + \sum_{j=1}^{C-1} \varphi_{i,j} Z_{i.t-j} + \mu_i + \varepsilon_{i,t} \quad \text{(iv)}$$

where $\theta_i$ are the long-run equilibrium or error correction parameters, $\theta_i = \beta_i / 1 - y$, the whole panel estimators in the case of mean group (MG) are given by $\widehat{\theta} = 1/N \sum_{i-1}^{N} \theta_i$ and its intercept given by $\widehat{\alpha} = 1/N \sum_{i-1}^{N} \alpha_i$. $\theta_i (Y_{i.t-1} - \beta' X_{i,t-1})$ represent the error correction components, $\sum_{j=1}^{p-1} \lambda_{i,j} \Delta Y_{i,t-j}$ represent the summation of $kx1$ vectors of long –run parameters estimation $(ln\,K, lnC)$, $\sum_{j=1}^{q-1} \gamma'_{i,j} \Delta X_{i,t-j}$ represent the summation of $kx1$ vectors of short –run parameters estimation $(ln\,K, lnC)$, $\sum_{j=1}^{C-1} \varphi_{i,j} Z_{i.t-j}$ represent a summation of $kx1$ vectors of the rest of variables including moderator parameters $(Y, M, I, O, G, K*Y, C*Y, K*M, C*M)$ and $\mu_i + \varepsilon_{i,t}$ represent the fixed effects and error terms respectively.

The error correction parameters tap into the speed of adjustment, and $\beta_i$ are long –run parameters. The PMG main restriction is that the $\beta_i$ are identical across countries in the whole sample (Sheereen, 2019). The error correction coefficient determines how quickly the model is adjusted in order to restore equilibrium. The percentage size of the coefficient captures the speed at which equilibrium approaches. The coefficient has to be negative and statistically significant in order to confirm presence of co-integration (Banerjee *et al.*, 1998). In the model, interactions of population age-structures are introduced to assess their contributions in explaining financial sector growth.

## 4. Results and discussion

In a stretch of 28 years from 1990 to 2018, some considerable growth is evidenced in financial sector growth, capital expenditure and consumption expenditure (Table 4). Economies are involved more in capital formation expenditure than consumption spending with averages of 21.11 and 14.8 as percentages of GDP respectively. The standard deviation for financial sector growth of 17.88% evidence both disparities and possible changes over time in the sample, Appendix 1 depict the evolution of financial development indicative of a progressing trend from 16.98% in 1991 to 24.53% in 2018, the minimum has remained more or less the same while the maximum has evolved almost by 100% from 55.21% in 1991 to about 102.3% in 2017 and 78.2% in 2018, with more variabilities in later years. The average ratio of young and mature population is 41.5 and 54.9% of total population respectively (Table 4). The average ratios for mature population seem to be higher than that of young population over the same period, the same pattern is evidence for minimum and maximum values respectively. The variation seems to be contained around 5.6 and 6.5% respectively, indicating more stability and less change over the period (Table 4). The evidences show stagnant evolutions in average, minimum and maximum capital and consumption expenditure values over the period, the variabilities seem to be less (Appendix 1).

**Table 4.** Descriptive statistics and correlation matrix

| stats | F | K | C | Y | M | I | O | G |
|---|---|---|---|---|---|---|---|---|
| MEAN | 19.653 | 21.116 | 14.805 | 41.517 | 54.960 | 9.066 | 64.825 | 2,206.017 |
| MEDIAN | 13.478 | 20.091 | 14.278 | 43.681 | 53.246 | 5.530 | 57.436 | 1,048.183 |
| S/DEV. | 17.888 | 8.943 | 5.593 | 6.574 | 5.371 | 14.024 | 30.168 | 2,672.802 |
| RANGE | 105.858 | 62.581 | 46.280 | 32.663 | 23.793 | 161.085 | 204.301 | 14,216.760 |
| MIN. | 0.403 | −2.424 | 0.911 | 17.794 | 46.982 | −27.049 | 20.723 | 200.298 |
| MAX. | 106.260 | 60.156 | 47.192 | 50.456 | 70.775 | 134.036 | 225.023 | 14,417.060 |
| NUMBER | 1,036 | 1,036 | 1,036 | 1,036 | 1,036 | 1,036 | 1,036 | 1,036 |
| lnF | 1.000 | | | | | | | |
| lnK | 0.280*** | 1.000 | | | | | | |
| lnC | 0.394*** | 0.049 | 1.000 | | | | | |
| lnY | −0.615*** | −0.289*** | −0.287*** | 1.000 | | | | |
| lnM | 0.634*** | 0.294*** | 0.277*** | −0.971*** | 1.000 | | | |
| lnI | −0.197*** | −0.063** | −0.106*** | 0.122*** | −0.104*** | 1.000 | | |
| lnO | 0.430*** | 0.330*** | 0.319*** | −0.527*** | 0.525*** | −0.048 | 1.000 | |
| lnG | 0.557*** | 0.366*** | 0.252*** | −0.732*** | 0.751*** | −0.120*** | 0.588*** | 1.000 |

**Note(s):** ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
**Source(s):** Table by author

The relationship between variables is depicted via correlation analysis. Financial development is positively related to capital expenditure, consumption expenditure, mature population, trade openness, and GDP per capita, while negatively related to young population and inflation as expected. The interactions between population types and expenditure types are all positive and statistically significant, except for capital expenditure and young population. The capital and consumption expenditures are independent and not related justifying separate treatment as variables, while mature and young population are negative, dependent and highly related as expected, thus separate regressions were implemented for the later pair. Inflation seem to be negatively related to all variables except young population, evidencing its unfavorable relations to the rest of the variables. Which confirms the significance of inflation control for better economy performance. Trade openness and GDP per capita are good for the economy as evidenced by its positive significant relationships with the rest of the variables except young population and inflation. Promoting trade openness and individual economic output relate well to both financial sector growth and other economic variables.

The regression results are based on the PMG estimator, which is presented in Table 5. The evidence for the presence of long-run co-integration in the variables (Table 3) lead to the application of this estimator which account for both short-run mean group (MG) based estimates and long-run pooled estimates. Model I is the baseline regression. Models II and III add the young and mature population variables separately. Model IV, V, VI and VII add respective interaction terms for moderation effects assessment. The separate regressions are run to avoid possible multi-collinearity from interactions. First row shows the long-run estimates for both capital and consumption expenditures. The results are consistently positive and statistically significant in most models. The economic significance of capital expenditure is as twice larger than that of consumption expenditure on financial development, the values are between 0.391 to 0.595 and 0.146 to 0.300, respectively. Financial development is more sensitive to capital expenditure than consumption expenditure in the long run.

Short-run estimates are positive and statistically significant and are presented in second row in Table 5. Consumption expenditures are more elastic and economically important than capital expenditures in the short run, evidently financial development is generally more sensitive to consumption expenditure than capital expenditure in the short run. Short-run adjustment towards long-run equilibria are negative and statistically significant meaning that the evidence supports short-run correction mechanism towards long-run convergence at the rate between 0.274 and 0.420, more speed of convergence is attained when we account for population and moderation effects from young and mature populations for capital and consumption expenditures on financial development.

In row three, the impact of inflation on financial sector growth is minimal but negative, financial sector growth is less sensitive to inflation in this sample, probably due to good policies, monetary and institutional controls through central banks that help to keep the inflation low as 9.066% on average. There is however lack of causal evidence for the positive impact of trade openness on financial development. GDP per capita, which is a measure of individual economic output, is positively causing financial development, and the results are statistically significant. Promoting GDP per capita creates capacity to borrow from private sector, but also indicates the level of individual abilities to produce which is beneficial to the financial development.

The young and mature population are not statistically significant in this sample (row 4), but in row 5, evidence support the positive interactive effect of young population against capital expenditure and mature population against capital expenditure on financial development, while support negative causality of interactive effects of young population against consumption expenditure and mature population against consumption expenditure

**Table 5.** PMG regression with moderation results

| | I | II | III | IV | V | VI | VII |
|---|---|---|---|---|---|---|---|
| *Long run* | | | | | | | |
| L.lnK | 0.595*** | 0.494*** | 0.477*** | −0.425 | 0.423*** | −0.390 | 0.391*** |
| | (0.092) | (0.064) | (0.067) | (0.269) | (0.060) | (0.261) | (0.061) |
| L.lnC | 0.146* | 0.283*** | 0.300*** | 0.270*** | 2.842 | 0.295*** | 3.053 |
| | (0.067) | (0.058) | (0.059) | (0.055) | (1.916) | (0.055) | (1.790) |
| *Short run* | | | | | | | |
| ECT | −0.274*** | −0.369*** | −0.356*** | −0.404*** | −0.420*** | −0.389*** | −0.405*** |
| | (0.034) | (0.039) | (0.038) | (0.038) | (0.040) | (0.038) | (0.040) |
| D.lnK | 0.130* | 0.132* | 0.129* | −0.211*** | 0.123* | −0.190** | 0.115* |
| | (0.058) | (0.056) | (0.057) | (0.060) | (0.052) | (0.060) | (0.052) |
| D.lnC | 0.185** | 0.214*** | 0.209*** | 0.208** | 1.275*** | 0.208** | 1.312*** |
| | (0.062) | (0.061) | (0.060) | (0.065) | (0.133) | (0.064) | (0.136) |
| lnI | −0.058*** | −0.049*** | −0.048*** | −0.053*** | −0.046*** | −0.053*** | −0.046*** |
| | (0.010) | (0.010) | (0.009) | (0.009) | (0.012) | (0.009) | (0.011) |
| lnO | 0.019 | −0.005 | 0.011 | 0.053 | −0.029 | 0.067 | −0.018 |
| | (0.057) | (0.057) | (0.057) | (0.050) | (0.062) | (0.052) | (0.062) |
| lnG | 0.300*** | 0.467** | 0.378* | 0.467** | 0.492** | 0.396* | 0.429** |
| | (0.081) | (0.175) | (0.159) | (0.181) | (0.168) | (0.157) | (0.149) |
| lnY | | −0.024 | | −0.434 | 0.956 | | |
| | | (1.275) | | (1.452) | (0.990) | | |
| lnM | | | 0.462 | | | 0.229 | 1.666 |
| | | | (1.360) | | | (1.489) | (1.113) |
| lnK*Y | | | | 0.317*** | | | |
| | | | | (0.065) | | | |
| lnC*Y | | | | | −1.072*** | | |
| | | | | | (0.139) | | |
| lnK*M | | | | | | 0.297*** | |
| | | | | | | (0.065) | |
| lnC*M | | | | | | | −1.124*** |
| | | | | | | | (0.142) |
| Constant | −1.845** | −3.086 | −4.413 | −2.807 | −2.776 | −4.881 | −4.866 |
| | (0.665) | (5.409) | (5.095) | (6.247) | (4.651) | (5.519) | (3.794) |
| Observations | 1,036 | 1,036 | 1,036 | 1,035 | 1,036 | 1,035 | 1,036 |
| N_g | 37.000 | 37.000 | 37.000 | 37.000 | 37.000 | 37.000 | 37.000 |

**Note(s):** Standard errors are in parentheses ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$
**Source(s):** Table by author

on financial development Capital formation expenditure as cited earlier are those that creates capital goods, such as expenditure on education, health and other infrastructures. Consumption expenditure relates to current expenditure that involves repairs of infrastructure, support of the legislature and legal system, security, and civil servants' salaries.

Young population growth, is declining over time, dues to possible population control measures (see Figure 1), its positive or negative interactions with expenditure exacerbate either positive or negative causal impact of expenditure on financial development in the short run, while rising mature population may as well affect government expenditure differently depending on the actions of the government towards its respective exertion on the private sector. Governments borrow or collect tax from private agents in order to spend; declining young population allows them to spend more in capital expenditures, stimulate more borrowing and tax collection, which may discourage private investments, savings and demand for credit by private agents, this way they channel negative causality on financial development in the short –run (Model IV). Also, declining young population allow them to spend more in consumption expenditures, stimulate income re-distribution, encourage private investments, savings and demand for credit by private agents, this way they channel positive causality on financial development in the short –run (Model V). While a declining young population interaction is harmful to short-run impact of capital expenditure, through consumption expenditure it benefits financial development.

A rising mature population increase tax base, increase tax collection from private sector, allow more government spending, but discourage investment and savings by private sector agents thereby dampen credit demand by private agents in the short run (Model VI). A rising mature population increase government spending on employment, health services, health insurance, welfare and security which are consumption expenditures, this way they promote income re-distribution which promote private investment and savings by private sector agents which in turn promote both demand and supply of credit by private agents in the short run (Model VII).

While a rising mature population interaction harm short-run impact of capital expenditure, through consumption expenditure it benefits financial development. Therefore, declining young population interaction with consumption expenditure and rising mature population interaction with consumption expenditure are both beneficial to financial development in the short run. Conversely, declining young population interaction with capital expenditure and rising mature population interaction with capital expenditure are both detrimental to financial development in the short run. While these moderations seem to work in the short run, in the long run there is lack of statistical evidence. The interactions are depicted in Figure 2 for an easy reference.

## 5. Conclusions

Policies that underscore the separate independent effects of capital expenditure and consumption expenditure on financial development need to be emphasized. Macroeconomic policies that affect government expenditure, such as provision of education, health and control of inflation must also account the impacts on private sector access to credit, ability to save and interest rates which channel causal effects on financial development. This can be done by controlling the detrimental impacts and promote beneficial ones possibly through institutional policies. These recommendations are consistent to Ouédraogo *et al.* (2020) that expenditures in countries with high risk of conflict, terrorism, profit repatriation are least likely to crowd in private investments which are essential for private credit growth. So, government should promote policies that ensure public–private partnership by reducing such imminent risks. Consistent to Keynesian arguments, public investments have

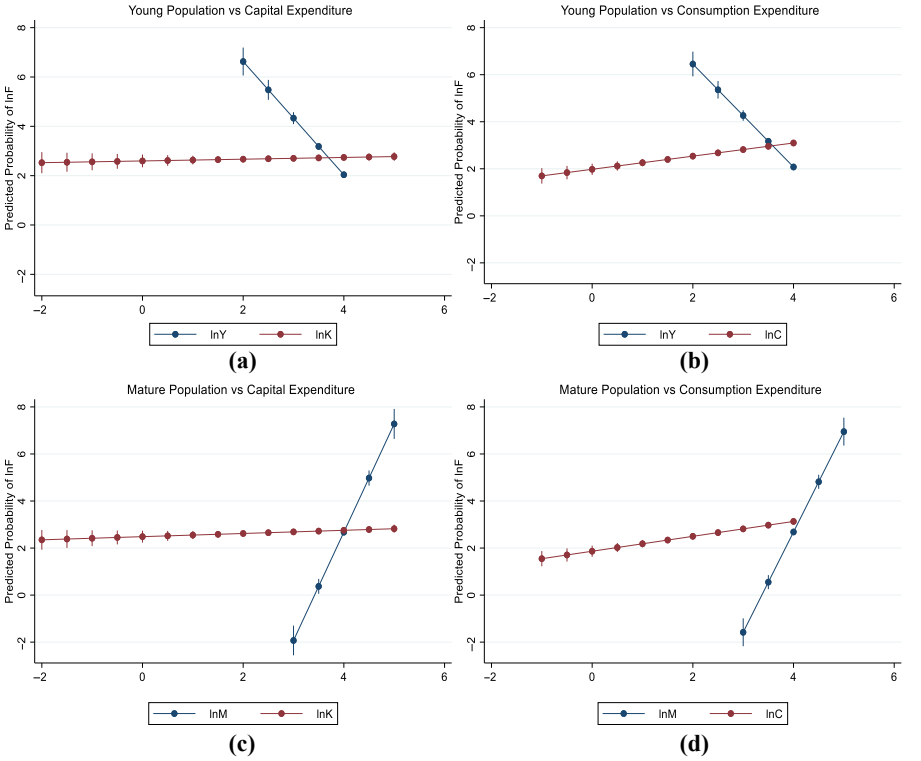



**Figure 2.** Interaction plots for young and mature populations, and capital and consumption expenditures

**Source(s):** Figure by author

complimentary effects with private investments through multiplier effects. Higher public expenditures lead to higher marginal productivity of private capital, thereby crowd in private investments and credits. Policies that account for the separate impacts of capital and consumption expenditures separately in the short run and long run need to be considered since the two types of expenditure are generally not related (Table 4). Policies that account for the interactive effects of population against public spending would facilitate more convergence in financial development.

Findings supported positive effects of both types of expenditures on financial development. The effect of capital expenditures is more pronounced, more sensitive and more economically larger than that of consumption expenditure. In line with evidences of Fujii *et al.* (2013), the study recommends two mechanisms and related policy implications which crowd in private investments. First, persistent capital expenditure shocks curtail incomes, but consumption expenditure increases savings, in response people increase labor to counter the effect on their incomes, thus persistence in these effects crowd in private investments and create demand for private credit. Secondly, persistent capital and consumption spending create demand shocks in the private sector, private firms producing and undertaking public goods responds by increasing private investments. These shocks create determined demand for private credits, thus capital and consumption expenditure crowd in private investments. Thus, policies have to foster the public–private connection, variables that are intertwined in this linkage such as interests, savings, financial

intermediation, and private sector promotion strategies must be addressed together and comprehensively.

Based on the findings, it seems that the interaction between population structure and expenditure types is a complex one, as such polices also need to be comprehensive. For the sake of financial development, policies that cautiously promote a decline in young population should also promote capital expenditure and promote indispensable consumption expenditure in the short run, while expenditure policies that responds to increased mature population such as employment policies should postpone discretionary capital expenditure but support pressing consumption expenditure in the short run. Lastly, in line with Kagochi (2019), consistent government expenditure coupled by good governance enhances financial development and corroborated by Brzozowski and Siwinska-Gorzelak (2013), and Aghughu *et al.* (2022) that public spending and its financing volatility generates high interest rates, uncertainty assets' sales cost and timing, and reduce credits extension to private agents, thereby reducing the depth of financial markets. Therefore, governments need to spend wisely, control expenditure behavior since its impacts to both the economy and particularly the private sector and financial development cannot be overemphasized. Its impacts on inflation and individual output or income can beneficially or severely impact financial development as well.

## References

Abubakar, A. and Kassim, S. (2018), "Institutional and macroeconomic determinants of financial development in the OIC countries", *Global Business and Economics Review*, Vol. 20 No. 4, pp. 410-424.

Adeyemi, P., Babatola, M., Awe, F.D., Samuel, T.Y. and 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*, Vol. 22 No. 1, pp. 53-69.

Afonso, A., Jalles, J.T. and Venâncio, A. (2021), *Do Financial Markets Reward Government Spending Efficiency? Ifo Institute*, Ifo Institute Leibniz Institute for Economic Research at the University of Munich, Munich, available at: http://hdl.handle.net/10419/233807

Aghughu, A.A., Alenoghena, R.O. and Amase, J. (2022), "Government domestic borrowing and private credit in Nigeria: testing the Lazy Bank hypothesis", *Journal of Economics and Sustainable Development*, Vol. 13 No. 7, pp. 52-62, doi: 10.7176/JESD/13-7-07.

Agyapong, D. and Bedjabeng, K.A. (2020), "External debt stock, foreign direct investment and financial development Evidence from African economies", *Journal of Asian Business and Economic Studies*, Vol. 27 No. 1, pp. 81-98, doi: 10.1108/JABES-11-2018-0087.

Anyanwu, A., Gan, C. and Hu, B. (2017), "Government domestic debt, private sector credit, and crowding out effect in oil-dependent countries", *Journal of Economic Research*, Vol. 22, pp. 127-151.

Aregbeyen, O.O. and Akpan, U.F. (2013), "Long-term determinants of government expenditure: a disaggregated analysis for Nigeria", *Journal of Studies in Social Sciences*, Vol. 5 No. 1, pp. 31-50.

Arif, I. and Rawat, A.S. (2019), "Trade and financial openness and their impact on financial development Evidence from South Asian economies", *South Asian Journal of Business Studies*, Vol. 8 No. 1, pp. 26-39, doi: 10.1108/SAJBS-06-2018-0063.

Asratie, T.M. (2021), "Determinants of financial development in Ethiopia: ARDL approach", *Cogent Economics and Finance*, Vol. 9 No. 1, pp. 1-15, doi: 10.1080/23322039.2021.1963063.

Azolibe, C.B. (2022), "Panel data comparative analysis on the influence of population age structure on the size of government expenditure in Africa and Asia", *International Journal of Emerging Markets*, Vol. 17 No. 2, pp. 433-451, doi: 10.1108/IJOEM-04-2020-0440.

Azolibe, C.B., Nwadibe, C.E. and Okeke, C. M.-G. (2020), "Socio-economic determinants of public expenditure in Africa: assessing the influence of population age structure", *International Journal of Social Economics*, Vol. 47 No. 11, pp. 1403-1418, doi: 10.1108/IJSE-04-2020-0202.

Bai, J. and Ng, S. (2004), "A PANIC attack on unit roots and cointegration", *Econometrica*, Vol. 72 No. 4, pp. 1127-1177.

Banerjee, A., Dolado, J. and Mestre, R. (1998), "Error-correction mechanism tests for cointegration in a single-equation framework", *Journal of Time Series Analysis*, Vol. 19 No. 3, pp. 267-283, doi: 10.1111/1467-9892.00091.

Beck, T. and Maimbo, S.M. (2012), *Financial Sector Development in Africa: Opportunities and Challenges*, World Bank: Directions in Development, Washington, DC. doi: 10.1596/978-0-8213-9628-5.

Bikefe, G.G., Ajayi, K.J. and Onah, A.O. (2022), "Does public borrowings crowd out private sector credit? Evidence from Nigeria", *American Journal of Humanities and Social Sciences Research*, Vol. 6 No. 4, pp. 84-93.

Brzozowski, M. and Siwinska-Gorzelak, J. (2013), "Public spending volatility and financial market development", *CESifo Economic Studies*, Vol. 59 No. 1, pp. 72-92, doi: 10.1093/cesifo/ifs038.

Emran, M.S. and Farazi, S. (2009), *Lazy Banks? Government Borrowing and Private Credit in Developing Countries*, The George Washington University, Elliott School of International Affairs. Institute for International Economic Policy, Washington, DC.

Fiador, V., Amoah, L. and Abbey, E. (2021), "The nexus between foreign bank presence and credit to the private sector: evidence from Sub-Saharan Africa", *Journal of Economic and Administrative Sciences*, Vol. 38 No. 3, pp. 455-470, doi: 10.1108/JEAS-06-2019-0068.

Fujii, T., Hiraga, K. and Kozuka, M. (2013), "Effects of public investment on sectoral private investment: a factor augmented VAR approach", *Journal of the Japanise and Intenational Economies*, Vol. 27, pp. 35-47, doi: 10.1016/j.jjie.2012.11.003.

Ghali, K. (2003), "Government spending, budget financing, and economic growth: the Tunisian experience", *The Journal of Developing Areas*, Vol. 36 No. 2, pp. 19-37, available at: https://www.jstor.org/stable/4192918

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

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

Huang, Y. (2011a), "Private investment and financial development in a globalized world", *Empirical Economics*, Vol. 41 No. 1, pp. 43-56, doi: 10.1007/s00181-010-0394-3.

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

Jibir, A. and Aluthge, C. (2019), "Modelling the determinants of government expenditure in Nigeria", *Cogent Economics and Finance*, Vol. 7 No. 1, pp. 1-23, doi: 10.1080/23322039.2019.1620154.

Kagochi, J. (2019), "Inflation and financial sector development in Sub-Saharan African countries", *Journal of Economic Studies*, Vol. 46 No. 4, pp. 798-811, doi: 10.1108/JES-10-2017-0310.

Kapaya, S.M. (2020), "Stock market development and economic growth in Tanzania: an ARDL and bound testing approach", *Review of Economics and Political Science*, Vol. 5 No. 3, pp. 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*, Vol. 5 No. 1, pp. 46-65, doi: 10.1108/AJEB-09-2020-0063.

Kotera, G. and Okada, K. (2017), "How does democratization affect the composition of government expenditure?", *Journal of Economic Behavior and Organization*, Vol. 137, pp. 145-159, doi: 10.1016/j.jebo.2017.03.004.

Krieger, T. and Meierrieks, D. (2020), "Population size and the size of government", *European Journal of Political Economy*, Vol. 61, #101837, doi: 10.1016/j.ejpoleco.2019.101837.

Kumhof, M. and Tanner, E.C. (2005), "Government debt: a key role in financial intermediation", *International Monetary Fund*, Vol. 2005 No. 057, pp. 1-29, doi: 10.5089/9781451860764.001.

Lledo, V.D., Yackovlev, I. and Gadenne, L. (2009), *Cyclical Patterns of Government Expenditures in Sub-saharan Africa: Facts and Factors*, African Department. International Monetary Fund, Washington, DC.

Lledo, V.D., Yackovlev, I. and Gadenne, L. (2011), "A tale of cyclicality, aid flows and debt: government spending in sub-Saharan Africa", *Journal of African Economies*, Vol. 20 No. 5, pp. 823-849, doi: 10.1093/jae/ejr022.

Maddala, G.S. and Wu, S. (1999), "A comparative study of unit root tests with panel data and a new simple test", *Oxford Bulletin of Economics and Statistics*, Vol. 61 No. 1, pp. 631-652.

Maghfiroh, S.I. and Purwono, R. (2021), "Determinants of financial development: impact of human capital in emerging markets countries", *Trikonomika*, Vol. 20 No. 2, pp. 97-104.

Malthus, T.R. (1798), in Johnson, J. (Ed.), *An Essay on the Principle of Population*, Project Gutenberg, London.

Mbate, M. (2013), "Domestic debt, private sector credit and economic growth in sub-Saharan Africa", *African Development Review*, Vol. 25 No. 4, pp. 434-446.

Mwakalila, E. (2020), "Crowding out of private sector in Tanzania: government expenditure, domestic borrowing, and lending rates", *Emerging Economy Studies*, Vol. 6 No. 1, pp. 123-135, doi: 10.1177/2394901520913653.

Naceur, S.B., Cherif, M. and Kandil, M. (2014), "What drives the development of the MENA financial sector?", *Borsa _Istanbul Review*, Vol. 14 No. 4, pp. 212-223, doi: 10.1016/j.bir.2014.09.002.

Obeng, S.K. and Sakyi, D. (2017), "Explaining the growth of public spending in Ghana", *The Journal of Developing Areas*, Vol. 51 No. 1, pp. 104-128.

Okafor, C. and Eiya, O. (2011), "Determinants of growth in government expenditure: an empirical analysis of Nigeria", *Research Journal of Business Management*, Vol. 5 No. 1, pp. 44-50, doi: 10.3923/rjbm.2011.44.50.

Omodero, C.O. (2019), "Domestic debt and private sector credit in Nigeria: an empirical investigation", *OECONOMICA*, Vol. 15 No. 6, pp. 188-207.

Otchere, I., Senbet, L. and Simbanegavi, W. (2017), "Financial sector development in Africa–an overview", *Review of Development Finance*, Vol. 7 No. 1, pp. 1-5, doi: 10.1016/j.rdf.2017.04.002.

Ouédraogo, R., Sawadogo, R. and Sawadogo, H. (2020), "Private and public investment in sub-Saharan Africa: the role of instability risks", *Economic Systems*, Vol. 44, pp. 1-10, doi: 10.1016/j.ecosys.2020.100787.

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

Pascual-Saez, M., Cantarero-Prieto, D. and Castañeda, D. (2017), "Public health expenditure, GDP and the elderly population: a comparative study", *International Journal of Social Economics*, Vol. 44 No. 10, pp. 1390-1400, doi: 10.1108/IJSE-03-2016-0106.

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*, Vol. 74 No. 4, pp. 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*, Vol. 22 No. 2, pp. 265-312.

Pesaran, M.H. and Smith, R. (1995), "Estimating long-run relationships from dynamic heterogeneous panels", *Journal of Econometrics*, Vol. 68 No. 1, pp. 79-113, doi: 10.1016/0304-4076(94)01644-F.

Pesaran, M.H. and Yamagata, T. (2008), "Testing slope homogeneity in large panels", *Journal of Econometrics*, Vol. 142 No. 1, pp. 50-93, doi: 10.1016/j.jeconom.2007.05.010.

Pesaran, M.H., Shin, Y. and Smith, R.P. (1999), "Pooled mean group estimation of dynamic heterogeneous panels", *Journal of the American Statistical Association*, Vol. 94 No. 446, pp. 621-634, available at: https://www.jstor.org/stable/2670182

Sheereen, F. (2019), "Energy consumption and economic growth for small island developing states: a panel ARDL approach", *Energy Economics Letters*, Vol. 6 No. 1, pp. 23-29.

Shetta, S. and Kamaly, A. (2014), "Does the budget deficit crowd -out private credit from the banking sector? The case of Egypt", *Topics in Middle E Astern and African Economies*, Vol. 16 No. 2, pp. 251-279.

Tamakoshia, T. and Hamori, S. (2015), "Health-care expenditure, GDP and share of the elderly in Japan: a panel cointegration analysis", *Applied Economics Letters*, Vol. 22 No. 9, pp. 725-729, doi: 10.1080/13504851.2014.972540.

Verhoef, G. (2017), "The rise of financial services in Africa: an historical perspective", *Developing Africa's Financial Services*, Published Online, Bingley, Vol. 3, pp. 3-42.

Wang, B. (2005), "Effects of government expenditure on private investment: Canadian empirical evidence", *Empirical Economics*, Vol. 30, pp. 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*, Vol. 69 No. 6, pp. 709-748, doi: 10.1111/j.1468-0084.2007.00477.x.

World Bank (2018), "World development indicators", available at: https://databank.worldbank.org/source/world-development-indicators (accessed 1 January 2018).

Xu, X. and Yan, Y. (2014), "Does government investment crowd out private investment in China?", *Journal of Economic Policy Reform*, Vol. 17 No. 1, pp. 1-12, doi: 10.1080/17487870.2013.866897.

Yusheng, K., Bawuah, J., Nkwantabisa, A.O., Atuahene, S.O. and Djan, G.O. (2020), "Financial development and economic growth: empirical evidence from Sub-Saharan Africa", *International Journal of Financial Economics*, Vol. 26 No. 3, pp. 3396-3416, doi: 10.1002/ijfe.1967.

Žokalj, M. (2016), "The impact of population aging on public finance in the European Union", *Financial Theory and and Practice*, Vol. 40 No. 4, pp. 383-412, doi: 10.3326/fintp.40.4.2.

## Further reading

Cherif, M. and Dreger, C. (2016), "Institutional determinants of financial development in MENA countries", *Review of Development Economics*, Vol. 20 No. 3, pp. 670-680, doi: 10.1111/rode.12192.

## Appendix 1

| Year | mean[F] | min[F] | max[F] | sdev[F] | mean[K] | min[K] | max[K] | sdev[K] | mean[C] | min[C] | max[C] | sdev[C] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1991 | 16.985 | 3.476 | 55.217 | 13.141 | 20.664 | 6.543 | 48.406 | 8.385 | 14.967 | 1.221 | 28.201 | 5.087 |
| 1992 | 15.782 | 3.020 | 55.217 | 12.551 | 20.785 | 6.924 | 48.397 | 9.553 | 15.697 | 2.048 | 30.371 | 5.503 |
| 1993 | 15.723 | 3.403 | 53.926 | 13.012 | 19.674 | 5.278 | 44.489 | 9.250 | 15.742 | 2.148 | 29.488 | 5.327 |
| 1994 | 15.121 | 3.098 | 56.038 | 13.305 | 21.006 | 4.685 | 42.084 | 7.972 | 15.737 | 1.769 | 31.554 | 6.429 |
| 1995 | 15.106 | 2.627 | 57.480 | 14.521 | 19.475 | 5.573 | 37.882 | 7.523 | 14.462 | 1.166 | 30.054 | 5.902 |
| 1996 | 14.427 | 2.388 | 59.957 | 14.209 | 18.921 | 6.779 | 39.085 | 6.958 | 14.194 | 0.911 | 29.438 | 5.590 |
| 1997 | 15.467 | 2.651 | 61.851 | 15.262 | 18.500 | −2.424 | 38.478 | 7.908 | 14.416 | 0.913 | 29.545 | 5.884 |
| 1998 | 16.404 | 2.558 | 66.452 | 16.224 | 20.033 | 4.884 | 40.615 | 8.762 | 14.936 | 1.376 | 31.237 | 6.083 |
| 1999 | 16.517 | 2.007 | 66.266 | 16.520 | 19.335 | 0.293 | 58.188 | 10.468 | 14.836 | 1.383 | 27.411 | 5.476 |
| 2000 | 17.194 | 2.032 | 67.336 | 17.143 | 18.324 | 1.097 | 43.806 | 8.341 | 15.427 | 2.123 | 42.208 | 6.596 |
| 2001 | 17.312 | 0.403 | 74.433 | 17.634 | 19.782 | 4.468 | 40.660 | 8.445 | 15.294 | 1.991 | 41.620 | 6.171 |
| 2002 | 18.745 | 1.453 | 84.052 | 19.532 | 18.891 | 3.949 | 60.156 | 10.620 | 15.138 | 1.340 | 47.192 | 6.907 |
| 2003 | 18.917 | 0.738 | 70.592 | 18.237 | 19.123 | 6.405 | 52.122 | 8.904 | 15.203 | 0.952 | 44.313 | 6.587 |
| 2004 | 18.022 | 0.935 | 70.843 | 17.641 | 19.780 | 4.509 | 35.254 | 7.628 | 15.120 | 4.788 | 38.934 | 5.911 |
| 2005 | 18.323 | 1.344 | 72.803 | 18.140 | 20.499 | 1.525 | 48.905 | 7.918 | 14.379 | 4.157 | 34.592 | 5.149 |
| 2006 | 18.455 | 2.068 | 73.625 | 18.036 | 20.030 | 1.571 | 30.902 | 6.420 | 13.713 | 4.573 | 39.451 | 5.772 |
| 2007 | 19.628 | 2.398 | 78.294 | 18.669 | 20.787 | 7.110 | 34.470 | 6.690 | 13.749 | 3.208 | 35.287 | 5.578 |
| 2008 | 20.782 | 3.051 | 81.762 | 19.186 | 22.442 | 5.128 | 39.089 | 8.489 | 13.485 | 2.047 | 27.386 | 4.817 |
| 2009 | 21.165 | 3.919 | 80.046 | 18.710 | 22.541 | 8.697 | 46.876 | 8.515 | 14.197 | 6.636 | 28.856 | 4.988 |
| 2010 | 22.012 | 4.220 | 85.278 | 19.006 | 23.701 | 10.785 | 41.432 | 7.969 | 14.182 | 6.735 | 27.288 | 4.850 |
| 2011 | 23.061 | 4.820 | 89.258 | 19.533 | 23.096 | 4.704 | 42.037 | 9.133 | 14.683 | 6.484 | 27.433 | 4.873 |
| 2012 | 23.737 | 5.779 | 98.800 | 20.408 | 23.979 | 6.699 | 49.529 | 10.349 | 14.717 | 6.876 | 27.481 | 4.958 |
| 2013 | 24.673 | 4.715 | 106.260 | 20.948 | 23.656 | 7.224 | 53.988 | 10.670 | 14.771 | 7.122 | 28.015 | 5.052 |
| 2014 | 25.213 | 4.843 | 98.732 | 20.089 | 24.484 | 9.639 | 52.855 | 10.419 | 15.241 | 6.226 | 27.904 | 5.331 |
| 2015 | 25.693 | 5.258 | 102.675 | 20.579 | 23.750 | 8.086 | 50.781 | 10.000 | 15.284 | 5.145 | 27.381 | 5.224 |
| 2016 | 25.832 | 5.716 | 96.238 | 20.004 | 23.014 | 7.823 | 50.778 | 9.841 | 15.113 | 4.212 | 27.130 | 5.538 |
| 2017 | 25.441 | 4.990 | 102.343 | 20.624 | 22.405 | 8.806 | 48.049 | 8.809 | 14.997 | 4.325 | 25.912 | 5.678 |
| 2018 | 24.535 | 3.935 | 78.226 | 18.451 | 22.567 | 6.155 | 49.026 | 9.946 | 14.854 | 3.603 | 26.210 | 5.738 |

**Source(s):** Appendix by author

**Table A.**

**About the author**
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