Effect of Financial Development on Economic Growth in sub-Saharan Africa: Does Sectoral Growth Matter?

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Abstract

This paper examines the overall economic growth effect when the growth in finance and real sector is disproportionate relying on panel data for 29 sub–Saharan African countries over the period 1980–2014. Results from the system generalized method of moments (GMM) reveal that, while financial development supports economic growth, the extent to which finance helps growth depends crucially on the simultaneous growth of real and financial sectors. The elasticity of growth to changes in either size of the real sector or financial sector is higher under balanced sectoral growth. We also show that rapid and unbridled credit growth comes at a huge cost to economic growth with consequences stemming from financing of risky and unsustainable investments coupled with superfluous consumption fueling inflation. However, the pass–through excess finance–economic growth effect via the investment channel is stronger.

Key words: economic growth, real sector, financial development, excess finance

JEL Classifications: O16; O40; E44; C33

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1 INTRODUCTION

The significance of the relationship between financial development and economic growth has received much attention both in the growth and finance literature. Early theoretical writers (Schumpeter, 1911; Kuznets, 1955; Patrick, 1966) on financial system development show divergent views on the link between financial sector development and economic growth. Schumpeter's (1911) pioneering work on finance-growth nexus argues that a well-developed financial system spurs growth in technological innovations by redistributing resources from less productive to more productive sectors. Kuznets (1955) proposes that financial markets only begin to grow as the economy approaches the intermediate stage of the growth process and develop once the economy matures. However, Lewis (1956) finds that financial markets first develop as a consequence of economic growth process and before driving real economic activity. These divergent views can be grouped into the so-called " supply-leading" and " demand-following" hypotheses. As noted by Patrick (1966), the supply-leading view hypothesizes that the development of a robust financial sector contributes to economic growth. On the other hand, the demand-following approach contends that the growth of real economic activities increases demand for financial services and consequently the development of the financial sector.

Financial development in sub-Saharan Africa (SSA) remains low although the sector continues to grow in recent times. Financial sector development in SSA remain relatively underdeveloped and shallow in the CFA franc zone (David et al., 2014). The relative backwardness of the region's financial sector has been attributed to lack of institutional quality (Singh et al., 2009), informality, weak governance, political and economic instability (Beck and Honohan, 2007) and sparse population density (Allen et al., 2012). More recently, David et al., (2014) suggest financial integration as an important conduit to financial development especially in countries with better institutional quality. Ibrahim and Alagidede (2017a) recently suggests that legal origin significantly explains cross-country differences in financial sector development in SSA. Notwithstanding the low levels of financial sector development, available data from the World Development Indicators (WDI) of the World Bank suggests that, domestic credit consistently increased over the period 1985-1989 to 2000-2004. Domestic credit also decreased by 14.36% over the past decade recording an average of 58.55%. Private credit has over the sample period non-linearly increased from 33.82% (1980-1984) to 46.97% (2010-2014) as it declined to 55.18% (2000-2004) from 59.42% (1995-1999). Both the real sector productivity indicators have increased from their initial point in 1980-1984 to relatively higher values in 2010-2014 (see Appendix

A). For instance, manufacturing value added increased from 3.49 to 4.36%. Similarly, industrial value added increased from 0.9% in 1980-1984 to 3.7% in 2010-2014. This also coincided with increased manufacturing output over the period expect for 1990-1994 where negative growth rates were recorded. Interestingly, economic growth decreased to its all-time lowers of 0.64% on the back of higher inflation. Arguably, both the financial and real sectors appear related to growth as for example, a decrease in the financial development indicators coincided with a lower real sector performance and a reduced growth rates. These patterns are noticeable over the periods spanning 2005-2009 and 2010-2014.

Levine et al.,'s (2000) cross-country study shows a positive relationship between financial intermediary development and economic growth. Rioja and Valev (2004) also found similar results. More recently, Mishra and Narayan's (2015) study of 43 developed and developing countries show that financial development positively (negatively) affects growth as long as a country's level of financial development is above (below) their cross-sectional averages. This evidence is consistent with Calderon and Liu (2003), and Masten et al. (2008) who found that financial development contributes more to growth in developing countries than in developed countries. There is also evidence that well-developed financial sector help dampen (magnify) the impact of real (monetary) shocks on business cycle and long-run volatility components (Ibrahim and Alagidede, 2017b). Given the growth-enhancing effects of financial development, some authors (see Kaminsky and Reinhart, 1999) remain pessimistic and argue that development of the financial sector does not necessarily translate into higher growth and may even distort sustained path towards development. Adu et al., (2013) conclude that the overall effect of financial development on growth is highly sensitive to the choice of indicators.

While the effect of financial development on growth is almost settled, a critical question remains. " Is finance a leading sector in economic development, or does it simply follow growth in real output which is generated elsewhere?" McKinnon (1988: 390). Empirical literature on finance-growth causality remains mixed (see Ghirmay, 2004; Odhiambo, 2004; Hassan et al., 2011). On the (non)linearity nexus between finance and growth, Deidda and Fattouh (2002) employed the threshold regression model to King and Levine's (1993) data and found evidence of non-linear relationship. Some studies (Cecchetti and Kharroubi, 2012; Arcand et al., 2012; Law and Singh, 2014) have found an inverted U-shaped relationship implying that financial development is only good up to a point after which it becomes deleterious although Adeniyi et al. (2015) disagree. Favara (2003) finds an S-shaped relationship between financial deepening and economic growth and concludes that at very low (high) levels of financial development, growth suffers (im-

proves). Ibrahim and Alagidede's (2017c) study in SSA however show that, while financial development positively and significantly influences economic growth, below a certain estimated threshold, finance is largely insensitive to growth while significantly influencing economic activity for countries above the thresholds.

Extant studies in the literature on finance-growth remain inconclusive and little is also known on the overall effect on growth via the interaction of the real and financial sector. Empirical studies are silent on the unbalanced sectoral effect on overall economic growth. Given the supply-leading hypothesis, the central theme of this paper is that the extent to which finance helps growth depends crucially on the simultaneous growth of real and financial sectors.

The question is whether resource allocation towards the real sector can spur growth in the rest of the economy and whether fast growing financial sector hurts economic growth through its impact on the real economy. The balanced growth path contends that all sectors should grow at constant rate. Lewis (1955: 276) advocates for balanced growth in the sense that " the various sectors of the economy must grow in the right relationship to each other, or they cannot grow at all". Arguably, the process of economic development can become self-sustaining, self-reinforcing and cumulative only if this process is coordinated, integrated and balanced growth takes place in all the inter-related sectors of the economic system (Bhatt, 1960). Thus, both the financial and the real sector should grow at the same speed in order for the latter to positively impact on economic growth. In other words, to ensure such positive growth effect, lending must support the real economy so that credit and real GDP grow in tandem, with a non-accelerating share of domestic credit to real sector and to GDP. Here, the real sector would be able to finance profitable investment projects and attract and maintain efficient human resources. Thus, we hypothesize that financial development hampers growth if the growth in finance and real sector output is disproportionate. We argue that the threshold effect of financial development on growth depends on the relative speed of growth in finance and real sector.

Specifically, a fast-growing financial sector retards output and overall growth by damaging investment rates, magnifying macroeconomic instability as well as exacerbating economic fragility and resource misallocation. This paper aims to critically investigate this relationship in SSA given the region's renewed interest in enhancing growth by boosting financial sector development.

It makes significant contributions to existing finance-growth literature in so many ways: First, we are unaware of such study in the region and we present a first attempt to specifically focus on SSA in our investigation of

the overall growth effect of unbalanced sectoral growth. We thus present crucial findings on the effect of disproportionate sectoral growth rates from the lenses of developing economies. The second contribution is self-evident in the light of the robust techniques employed in the estimations. Needless to say, we proffer key policy implications based on the findings of the study. Our evidence provides further understanding to the seemingly conflicting and highly contested results in the finance-growth literature and provides crucial guidance for conducting effective monetary policy aimed at propelling growth.

The overall finding suggests that, while financial development supports economic growth, the extent to which finance helps growth depends crucially on the simultaneous growth of real and financial sectors. The elasticity of growth to changes in either size of the real sector or financial sector is higher under balanced sectoral growth. Further evidence reveals that rapid and unbridled credit growth comes at a huge cost to economic growth with consequences stemming from financing of risky and unsustainable investments coupled with superfluous consumption fueling inflation.

The scheme of this paper is as follows: the next section specifies the methodology while Section 3 discusses the findings. Section 4 analyzes the policy implementations while Section 5 concludes the study.

2 DATA AND METHODOLOGY

(a) *Data*

To test our hypothesis, we construct a panel dataset of 29 SSA countries for the period 1980-2014. The choice of these countries is based entirely on data availability for a sufficiently longer time period and a list of these countries is provided in the Appendix. Annual data for all the variables were gleaned from the World Development Indicators (WDI) of the World Bank. We used credit provided by financial sector to the private sector (% of GDP) to proxy financial development.

Indeed, SSA countries have comparative advantage in agriculture emanating from their abundant factor endowments, productivity and costs differences and from dynamic economies of scale (Collier and Venables, 2007; Eifert et al., 2005). It is therefore unsurprising that many agriculture-based countries have high agricultural shares in GDP and employment averaging 34 and 64% respectively (Hayami, 2005). Yet, agriculture creates special challenges for financial institutions due to its spatial and risk characteristics (Meyer, 2011). The seasonality of production creates big gaps between receipts and expenditures on the back of fixed and immobile land which in-

variably has a higher collateral value. These inherent characteristics create liquidity management problems for financial institutions because many borrowers borrow at the same time during planting period and repay at the same time at harvest. Given the long gestation period between the production and marketing of output, farmers are exposed to output price risks. Moreover, agricultural producers have to deal with risks associated with negative outcomes mainly driven by extreme weather shocks, like drought and floods. Pests, crop and livestock diseases are also highly recurrent experiences adversely affecting the region's agricultural production.

Meyer (2015) asserts that financial sector development programmes designed to reduce these problems produced disappointing results. Financial institutions are unwilling to lend to the agricultural sector largely on their probability of default. Mhlanga (2010) notes that, the overwhelming failure of financial institutions combined with scant penetration by risk-averse commercial financial institutions have led to a widespread dearth of agricultural credit[1]. However, industrial sector is seen as a sound destination for bank lending because they are often insulated from inherent challenges faced by the agriculture sector hence our choice to concentrate on the industrial sector. The real sector is proxied by growth in industrial sector value added which comprises of value additions in manufacturing, mining, construction, electricity, water and gas where the value added is the output of the sector when all outputs are summed up and intermediate inputs subtracted.

We define excess finance to refer to a situation where certain aspects of the financial system outstrip real sector activity. On hindsight, the idea of excess finance may suggest that SSA has reached its optimal level of finance which may be misleading given the underdeveloped nature of the financial systems. As a caveat, excess finance does not refer to access to finance over and above the optimal level. In line with standard literature, we used real GDP per capita to proxy economic growth. Both GDP per capita and growth rate of real sector output are in real terms based on 2005 US$ constant prices. Our control variables are based on the neoclassical growth theory and include inflation, investment, government expenditure, labour and trade openness. The inflation variable is the annual percentage change in the consumer price index and used to proxy macroeconomic (in)stability. We use gross fixed capital formation to proxy investment rates while government expenditure measures final government consumption expenditure. Both are expressed in GDP ratio. Labour is proxied by the percentage of economically active

[1]Mhlanga (2010) shows that except Malawi, Tanzania and Uganda and Botswana commercial banks in SSA lend less than 10% of their total credit to the agricultural sector. On average, commercial banks in invest the least share of their credit into the agricultural sector where credit advance to the sector has never exceeded 1.5% of total credit.

population aged 15-64 years. The descriptive statistics of the variables are presented in Table 1 below.

Average real GDP per capita over the sample is $1,241.27 reiterating the low income levels of the countries under consideration. Domestic credit to GDP ratio is averaged 25.6% relative to real output growth of 25.37%. Government expenditure is also averaged 14.88% and do not show much variability across the countries. We compute the coefficient of variation (CV) as the ratio of standard deviation to mean in order to measure the relative dispersion of the variables. Excess finance variables are the most volatile variable given their high CV. Real GDP per capita is also exceedingly volatile and labour is least volatile. However, among the conditioning variables, inflation is the most volatile with an average value of 56.23% which is fairly higher than the median value (52.93%). This evidence reflects that majority of our sampled countries experienced episodes of hyperinflation over the period under consideration[2]. All the variables are skewed to the right except the labour. While our sampled countries are gleaned from the same region, there still exist some variations in the macroeconomic indicators. We therefore present the values for the 25^{th}, 50 th and 75^{th} percentiles to allow for cross-country comparisons. The average difference between growth in real sector and that of the financial sector is around 0.23% which is significantly higher than the 50^{th} percentile (-1.06) suggesting that excess finance is highly skewed to the right. This is also collaborated by the sign of the skewness. Thus, for most of the countries, growth in financial sector significantly outstrips that of the real sector. Among others, the value of the skewness and kurtosis of economic growth, domestic credit and excess credit show non-normality and the distributions are leptokurtic. We present the correlation coefficient (CC) between excess finance and each variable in order to provide a cursory look at their relationships. Excess finance is positively correlated with labour and domestic credit. Excess finance is negatively and significantly related with economic growth, capital formation and inflation. We present a scatter plot of financial development and economic growth in Figure 1 below.

Figure 1 illustrates a plot of economic growth and financial development averaged 1980-2014 with one observation of growth and financial development for each country. While financial development is relatively homogenous for most of the countries, some outliers are noticeable. For instance, Botswana recorded the highest GDP growth rate on the back of a lower financial development. South Africa on the other hand has the highest financial development with a relatively lower growth rate. This notwithstanding, the

[2]Given the mean inflation rate, 15 countries experienced rates below 56% while the remaining 14 exceeded the average.

nexus between financial development and economic growth looks non-linear, largely positive for low and intermediate levels of financial development and negative for high levels. Given this understanding, it is instructive to note that the rather non-linear relationship and inverted U-shaped in particular may largely be driven by excess finance through the financial sector credit boom which interacts with real sector and economic growth more generally. In order to provide cursory evidence on the interrelationship between financial development, real sector and economic growth, we qualitatively identify patterns of credit expansion by the financial sector in order to examine the hypertrophy of finance.

(b) *Identifying episodes of credit boom*

SSA's credit expansion has not been unusually buoyant by international standards. This notwithstanding, most SSA countries have experienced a decade-long rapid increase in private credit. IMF (2015) note that real credit to private sector grew fivefold over the period 2003-2014 with an average annual progression of 16%. In this section, we determine episodes of credit boom albeit some caveats. Although the region's financial development is low compared to other emerging economies but in relation to its real growth, it is high for SSA's level of development.

Following Decressin and Terrones (2011), we express the credit growth in logarithmic form and conditions that, a country experiences a boom when the deviation in (log) credit from its long run trend exceeds the standard deviation of the cyclical component. We respectively denote the deviation from long run path in country i at time t and the corresponding standard deviation as d_{it} and $\sigma(d_i)$. We provide a more robust estimate of the credit trend by employing the Hodrick-Prescott filter which allows for the identification of credit boom incidence. The filter includes a parameter λ which determines the smoothness of private credit series and identifies the trend series μ_t that minimizes the sum for a given value of λ specified as:

$$\min_{\mu_t{}_{t=0}^{T}}[(\sum_{t=0}^{T}(y_t-\mu_t)^2+\lambda\sum_{t=1}^{T-1}((\mu_{t+1}-\mu_t)-(\mu_t-\mu_{t-1}))^2] \tag{1}$$

Typical of annual time series data, we set the smoothing parameter $\lambda = 100$ in line with Mendoza and Terrones (2012). By applying the boom threshold factor, we further define a credit boom as an episode where the country has at least one contiguous date that satisfies the credit boom condition $d_{it} \geq \Xi\sigma(d_i)$, where Ξ is the boom threshold factor. Following from Mendoza and Terrones (2008; 2012), we set the baseline value of Ξ at 1.65 because $\text{Prob}(d_{it}/\Xi\sigma(d_i) \geq 1.65$ satisfies the 5% tail of the standardized normal distribution (Mendoza and Terrones, 2008; 2012).

This paper identifies credit boom as deviations from the domestic credit trend that exceed the typical cyclical expansion by a threshold factor of 1.65. We set the date of the peak of the credit boom (t_d) at a point where the value of $d_{it} - \Xi\sigma(d_i)$ is highest among the set of contiguous dates that satisfy the credit boom condition. We present findings on the credit boom incidence in Figures 2 and 3 below.

Overall, seven countries do not record a credit boom over the period and such countries may perhaps have sound financial sector regulatory supervisions. For instance, although the country has seen rapid growth and development of its banking system over the past decade, Mozambique is not episodic largely because the Central Bank oversees an active interbank money market and open market operation. Bank supervision also imposes strict impairment recognition regulations and has rules for large credit exposures. Country-by-country analysis reveals that out of the 29 countries, more than two-thirds experienced at least one episode of credit boom (see Figure 2).

The Gambia alone recorded three episodes of credit boom. At the peak of its boom in 1985, the average expansion in private credit reached 11% above the domestic credit trend[3]. Credit growth rate was on the crescendo against the slow pace of financial sector growth and real sector need. In fact, the 1985 boom peak is unsurprising. Evidence provided by the Central Bank of the Gambia shows that the main aim of Gambia's Economic Recovery Programme (ERP) in August 1985 was to bring discipline and equilibrate the economy's financial sector. Specifically, the ERP was primarily directed at regaining control of liquidity and excessive credit expansion by the banking system[4].

Botswana and Cote d'Ivoire show homogeneity both in terms of incidence and time of peak. For instance, both countries experienced boom in 1992 and 1993 with peak period in 1992. Rwanda and Sierra Leone each experienced 1 boom over the period and both incidences occurred in 1994. Same can be observed for Togo and Democratic Republic of Congo. However, the recent episode in the sub-region occurred in Central African Republic in 2013 and this had a magnitude of 2% above the credit trend. South Africa has a relatively developed financial sector. In the early 1990s, the banking sector volatility created scope for consolidation through the mergers of several banks and the introduction of the Banks Act, 1990 (Act 94) led to an industry

[3]For countries with multiple episodes, we show only the peak incidence (t_d^*) from among the multiple contiguous dates that satisfy the credit boom condition. See Appendix for the rest of the boom periods. We do not report the magnitude of the boom but these ranges from 1 to 11% above the cyclical component of the domestic credit in each episodic country.

[4]See http://www.sesrtcic.org/files/article/30.pdf

growth spurt with a number of new banking licenses being issued paving way for new entrants into the domestic banking system (Matemilola et. al., 2015). Consequently, the banking sector became more competitive. It is therefore unsurprising that the country experienced a boom in 2001.

IMF (2015) identifies 24 countries that have experienced at least one credit boom episode. Our findings are consistent with IMF (2015) where among others countries like Central African Republic, Democratic Republic of Congo, Ghana, Lesotho, Malawi, Niger, Nigeria, Rwanda, Sierra Leone and Togo are episodic. IMF (2015) further shows that the Democratic Republic of the Congo, Ghana and Lesotho are among the seven countries where credit expansions have exceeded the region's average. The case of Ghana is interesting. Growth rate in gross loans and advances increased from 17.5% in September 2006 to 45.6% in September 2007. During the same period, real private sector growth and household credit respectively increased from 17.3 to 51.7% and 7.6 to 66.6% (BoG, 2015).

Our study results reveal 34 credit boom episodes over the entire period. The frequency of episodes increased from 18% in the 1980s to 53% in the 1990s (see Figure 3). Majority of the episodes in the 1990s occurred in the early and late 1990s and these periods also saw reductions in value additions of the real sector and economic growth (see Appendix A). The preponderance of the credit booms is synchronized regionally and centered on the reforms period that saw massive restructuring of the financial sectors in the 1980s and 1990s. Dell'Ariccia et al., (2012) reveal that the proportion of countries experiencing a credit boom at any given time has seen a rapid credit growth in response to the financial liberalization and deregulation of the 1980s[5]. While credit is essential for investment, innovation and economic growth, the current narrow financial and real sectors have highlighted the risks of lending booms-excessive indebtedness of firms and effect on economic growth in the sub-region. Taking Ghana as a case, private sector credit contributed 97.4% of the total banking sector's non-performing loans (NPLs) as at September 2015 compared with 93.1% in September 2014. In fact, a highly disproportionate level of NPLs associated with the private enterprises was driven mainly by indigenous enterprises. Although these enterprises received about 61% of credit to the private enterprises, they accounted for 79.1% of NPLs as at September 2015 (BoG, 2015). The likely effect is that the rising NPLs on banks' balance sheet can potential trigger banks' insolvency. Evidence from Ghana reveals a severe downturn of the financial sector due to the slump of real sector of the economy which stifled creativity and sustained finance

[5]There is evidence that financial reforms are predictors of credit boom (see Decressin and Terrones, 2011).

along the entire value chain. The end result is lower investment, cash flow and overall output. Markedly, the episodes of credit boom in the 1980s culminated in a reduction of growth rates from 1.91% in 1985-1989 to 0.64% in 1990-1994. Also, economic growth decreased from 4.89% (2000-2004) to 4.41% in 2010-2014 on the face of credit boom.

While a significant proportion of the boom episodes occurred before the 2008 Global Financial Crisis (GFC), among the incidence that happened in the 2000s, 60% occurred prior to the crisis thus providing some circumstantial evidence of boom-crisis-growth nexus. Our finding suggests that while domestic credit significantly increased in periods prior to the crisis, industrial sector output of the economy slowed from 6.7% in 2003 to 3.7% in 2006 with a concomitant reduction in growth rate (see Appendix A). This provides some qualitative evidence on the relationship between financial development, real sector output and economic growth. Anecdotally, this nexus suggests that the reduction in growth rates may be the resultant effect of the unbalanced growth in the financial sector development and that of the real sector. In the next section, we outline the empirical strategy in examining the unbalanced growth effects without explicitly modeling credit boom episodes as these are intrinsic to the financial sector.

(c) *Empirical strategy*

We examine the effect of financial development on growth by specifying a baseline model where economic growth depends on its one period lag, financial development and the set of controls estimated in Eqn. (2) below;

$$y_{it} = \beta_o y_{it-1} + \beta_1 FD_{it} + \alpha_2(g_{FDit} - g_{RSit}) + \beta_2 Q_{it} + \gamma_i + \mu_t + \epsilon_{it} \qquad (2)$$

where y_{it} is economic growth of country i at time t; y_{it-1} is the growth lag representing the initial condition; FD_{it} is financial development; g_{FDit} and g_{RSit} respectively denote the growth rate in finance and real sector output; Q_{it} is a vector of control variables; γ_i is country-specific fixed effects; μ_t is time effects while ϵ_{it} is idiosyncratic error term.

We estimate Eqn. (2) above by employing the system generalized method of moments (GMM) dynamic pooled estimator. Unlike the traditional cointegration and ordinary least squares techniques, this approach resolves the econometric problems inspired by endogeneity of the lagged dependent and the unobserved γ_i eminent in growth models. Our main parameter of interest is α_2 which measures the effect of excess finance on growth and forms the basis of our hypothesis. We investigate the channels through which excess finance affects economic growth by including a multiplicative interaction term of the difference between growth in finance and that of real sector output

and investment and inflation. From Eqn. (2), we specify our general system GMM framework as:

$$y_{it} = \sum_{k=1}^{p} \gamma_k y_{it-k} + \alpha_1 FD_{it} + \alpha_2(g_{FDit} - g_{FDit}) + \alpha_3(DIFF_{it} \times CHA_{it}) \quad (3)$$
$$+Q_{it}\beta + \varepsilon_{it}$$
$$t = p+1, \ldots\ldots\ldots, T; i = 1, 2, \ldots\ldots N$$
$$\varepsilon_{it} = \gamma_i + \mu_t + \epsilon_{it}$$

where β is the vector of parameters associated with each explanatory variable; p is the maximum lag in the model; $DIFF_{it}$ is excess finance while CHA_{it} is the vector of transmission channels. The other variables remain as previously defined.

By employing the dynamic pooled panel, we compute the linear GMM estimators of ψ with a general form equation specified as:

$$\psi = [(\sum_i V_i^{|} X_i) M_N (\sum_i X V_i^*)]^{-1} (\sum_i V_i^{|} X_i) M_N (\sum_i X_i^{|} y_i^*) \quad (4)$$
$$\text{where } M_N = (\sum_i X_i^{|} \Gamma_i X_i)^{-1}$$

V_i^* and y_i^* are transformations of V_i and y_i respectively; X_i is a matrix of instrumental variables while Γ_i is the country-specific weighting matrix.

Our panel estimator makes use of the pooled cross-country and time series properties while utilizing additional information provided by the variations in the level of economic growth and its intrinsic drivers. The equation above can be estimated using the first difference or system GMM. We choose the latter relative to the former approach because the former technique has poor finite properties both in terms of bias and precision especially when the explanatory variables are persistent overtime as their lagged values are weak instruments and predictors of endogenous changes (Blundell and Bond (1998). To permit the workings of the system GMM, Blundell and Bond (1998) propose the use of extra moment conditions that rely on stationarity property of the variables. It is also imperative to note that the additional condition imposed by the system GMM may require deviations from long run averages to be uncorrelated with the fixed effects. This condition particularly holds in this study since all the sample countries may not show much variation in economic conditions given their rather low income level. The additional moment conditions for the regression in levels are therefore given as:

$$E[y_{it-s} - y_{it-s-1}(\gamma_i + \epsilon_{it})] = 0 \quad for s = 1 \tag{5}$$

$$E[W_{it-s} - W_{it-s-1}(\gamma_i + \epsilon_{it})] = 0 \quad for s = 1 \tag{6}$$

Relying on the moment conditions in Eqns. (5) and (6) and invoking the GMM technique yield consistent and efficient estimates which are invariably contingent on the validity of the instruments. We address the validity of the instruments by using two formal tests: serial correlation and Sargan's tests for over-identifying restriction.

3 EMPIRICAL RESULTS

We regress economic growth on its lag and other controls selected in line with the standard growth theory and other indicators of financial development, excess finance and multiplicative interaction terms measuring transmission channels of excess finance effects on economic growth. We include time and country effect dummies to eliminate time-related shocks and country-level heterogeneity in growth trajectory. Table 2 presents findings on the relationship among financial development, real sector and economic growth.

Column 1 reports the drivers of economic growth in addition to the unique effect of financial development on long run growth. Lagged economic growth is included as an explanatory variable, as in the standard Barro growth model. Consistent with standard growth models, the coefficient of the initial growth variable is negative and significant suggesting that the countries eventually converge over time towards a common level of real per capita income. This is valid irrespective of the model specification. The coefficient of government expenditure is insignificant. This finding is plausible and may perhaps reflect that quality in government expenditure matters for economic growth relative to size. Trade openness, labour and capital formation positively and significantly affects growth. Consistent with Fischer (1993), inflation negatively affects growth. With regard to effect of financial development, the coefficient of domestic credit is robustly positive reflecting that the development of financial sector propels long run growth (Columns 1-5) as documented in Levine et al.'s (2000) and Masten et al. (2008).

We investigate threshold effects in the finance growth-growth nexus in Column 2 by including the square term of domestic credit. The differencing sign of the level of domestic credit and its square term reveals a non-linear relationship between financial development and economic growth. Specifically, the inverted U-shaped nexus suggest that too much is not healthy for

growth. Given the threshold effect, what is the optimal level of financial development consistent with long run growth? Our finding reveals that the effect of financial development on economic growth becomes negative when domestic credit (% of GDP) exceeds 29%[6]. Countries where this threshold was reached and in some cases exceeded over the period spanning 1980-2014 were Cote d'Ivoire, Ethiopia, Kenya, Mauritania, Mauritius, Senegal, Sierra Leone and South Africa. All the other variables maintain their signs and significance except for labour which turns insignificant (Column 2). This study hypothesizes that such non-linear relationship is the resultant effect of the relative speed in finance and real sector growth. To test this, we include the relative growth difference of domestic credit and real sector output - excess finance - in the model and result is presented in Column 3. The coefficient of domestic credit remains positive and significant at 5% while that of excess credit is negative and significant at 10%. In particular, a unit-percentage increase in excess finance decreases economic growth by 0.9%. Confirming our hypothesis, this finding suggests that excess finance negates the positive effect of other growth determinants. Further findings from our study suggest that when domestic credit growth outstrips real sector growth by 0.23%, an increase in credit from its 25^{th} percentile to the median, economic growth increases by 3.06%[7]. However, with a balanced sectoral growth, economic growth is expected to increase by 3.19% when domestic credit increases from the 25^{th} percentile value (12.04%) to the median value (19.57%)[8][9].Our evidence is also akin to Ductor and Grechyna (2011). By defining excess finance as the average difference between financial and real sector output growth under which aggregate output falls, the authors show that for a sustained economic development, simultaneous growth rates of real and financial sectors are required.

Up to this stage we do not include industrial share as a regressor. We contend that changes in growth emanating from excess finance may be due

[6]By taking the partial derivative of the growth equation with respect to domestic credit and setting the result to stationary.

[7]We obtain the expected growth rate first by calculating the percentage increase from the 25th percentile to the median value $\left[\frac{19.57-12.04}{12.04}\right] \times 100$ which is 62.54% and then multiplying the percentage increase by 0.051–0.009(0.23) where 0.23 is the average excess finance.

[8]The expected growth gain is estimated by calculating the percentage increase from the 25th percentile to the median value and multiplying the result by the coefficient of private credit. That is, $\left[\frac{19.57-12.04}{12.04}\right] \times 0.051 = 0.0319$.

[9]We obtain the expected growth rate first by calculating the percentage increase from the 25th percentile to the median value $\left[\frac{22.03-15.99}{15.99}\right] \times 100$ which is 37.77% and then multiplying the percentage increase by 0.029–0.009(0.23) where 0.23 and 0.029 is respectively the average excess finance and the coefficient of size of the real sector.

to some changes in industrial output following exogenous factors not attributable to financial sector dynamics. By controlling for industrial share in Column 4, the coefficients of domestic credit (excess finance) remain positive (negative) and significant at conventional levels although both coefficients are relatively lower than that of the baseline estimation (Column 3). Increases in the size of the industrial sector enhance economic growth given the positive coefficient of the industrial output. As noted by Manyika et al., (2012), higher industrial sector permits growth in other sectors of the economy by providing quality infrastructure and service growth opportunities necessary to propel growth.

In this specification, when the relative speed of growth in finance and real sector is proportionate, growth is expected to increase by 1.13% when credit growth increases from its 25^{th} percentile (12.04%) to the median value (19.57%). However, when domestic credit growth exceeds real sector output growth by 0.23%, economic growth is expected to rise by 1.03%. When domestic credit growth outstrips real sector growth by 0.23%, an increase in real sector size from the 25^{th} percentile (15.99%) to the median size of real sector (22.03%), economic growth increases by 1.02%. With a balanced sectoral growth, an increase in the size of real sector from the 25^{th} percentile (15.99%) to its median distribution (22.03%) increases economic growth by 1.10%[10]. In other words, the rapid of financial development thwarts the positive impact of financial development on economic growth when the growth in finance is unaccompanied by development of the real sector. Our evidence shows that although financial development promises an unequivocal positive effect on growth, such growth effects is contingent on the relative speed of growth in finance and real sector as an unbalanced sectoral growth does not promote long run economic growth. To the extent that disproportionate growth in finance and real sector negatively affects economic growth, a number of crucial policy insights are gleaned from these findings. How does excess finance impact on economic growth in SSA? Examining the channels through excess finance affects economic growth the coefficient of the interaction of excess finance and capital formation is negative and significant at 5% (Column 5). Consistent with our hypothesis, this evidence suggests that excess finance drags growth by damaging investment rates where a unit-percentage rise in excess finance significantly reduces growth by 2% via capital formation channel. The manifestation is that credit growth over and above the optimal level required by firms permits the financing of unproductive investments and as a

[10]We estimate the expected growth gain by calculating the percentage increase from the 25th percentile to the median value and multiplying the result by the coefficient of real sector size. That is, $\left[\frac{22.03-15.99}{15.99}\right] \times 0.029 = 0.0109$.

consequence shifting resources away from efficient use thus fueling undesired growth. Indeed, when the credit growth exceeds real sector demand, bad and risky investments get financed on the back of hypertrophic credit. This heightens both returns and growth volatility with the preeminent effect on overall economic growth. And as noted by Cecchetti and Kharroubi (2015), rapid credit growth disproportionately benefits low productivity investments by lowering total factor productivity. Beyond damaging capital formation, further results reveal that excess finance increases macroeconomic instability by magnifying inflation. The coefficient term of inflation and excess finance is -0.009 suggesting that a unit-percentage rise in excess finance decreases growth by 0.9% through its effect on inflation. Excess supply of credit permits higher private consumption expenditure (relative to investment) thereby increasing aggregate demand and general price levels.

Lesotho presents an interesting case worth considering. The country has experienced rapid private sector credit growth in recent years. However, available evidence reveals that Lesotho's economy is characterized by a higher share of credit to the household. In fact, more than half of private sector credits are used to support household consumption relative to investment. Available figures from the Central Bank of Lesotho show that lending to household has been persistently increasing since 2009. Lending for household consumption rose from 52.3% in 2010 to 56.2% in 2011 relative to investment credit of 47.7% and 43.8% in the same period (Central Bank of Lesotho, 2013). The rise in household consumption credit coincided with an increased inflation from 3.6 to 5.0%. It is therefore not surprising that annual GDP growth rate declined from 5.7% in 2010 to 4.2% in 2011.

Friedman (1977) has long argued that higher inflation rates reallocate scarce resources to unproductive activities thus reducing output growth. Apart from this, faster inflation spurs inflation uncertainty which distorts economic efficiency thus reducing total employment. However, the growth-damaging effect of excess finance is stronger via capital formation compared to inflation. To the extent that inflation in itself drags growth and further heightened by excess finance, the inverted U-shaped nexus between financial development and economic growth can best be explained by the disproportionate rate of growth in finance and real sector output.

With regard to models adequacy, our tests for over-identifying restriction support the validity of the instruments used for all the models given our failure to reject the null hypotheses for the Sagan's tests. The tests for first and second order-correlation reveal the absence of first-order serial correlation. However, given the rather high (low) p-values (z-values), we fail to reject the no serial correlation of order two at conventional levels. These findings provide coherent and consistent estimates on the back of valid instruments.

(a) Sensitivity analysis

We conduct sensitivity analysis to determine whether our results are robust to, first, the main financial development proxy and second the estimation approach. Here, we use private credit to proxy financial development. Unlike the private credit which includes all credit to various sectors on a gross basis except credit to the central government, domestic credit provided by the financial sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. With regard to the estimation approach, we use the fixed effect instrumental variable (FEIV) technique to examine the relationship between financial development and economic growth.

We use legal origins of the countries as candidates for the instrumental variables. This measure has been extensively used in the finance-growth literature (La Porta et al, 1998; Levine et al., 2000)[11]. Table 3 presents the results based the alternative indicator of financial development and using the FEIV approach. For brevity, we do not report results on the first stage regression but the findings largely show a positive (negative) relationship between financial development (excess finance) and economic growth.

Results from Tables 2 and 3 above are qualitatively similar both in terms of effects and significance but not in terms of magnitude of effects. From Table 3, the coefficients of the lagged dependent variable remain negative and significant. Government size is also negative and insignificant except in the model controlling for transmission channels. Trade openness is also a robust determinant of growth. Capital formation, inflation and labour do not show much variation in terms of direction of effect but not the level of significance. The coefficient of private credit and its quadratic term is respectively positive and highly significant (Column 2) suggesting that increases in private credit boost economic growth. While this holds, financial development does not always support growth. The coefficient of the level private credit and its quadratic term is respectively positive and negative revealing an inverted U-shaped relationship. Private credit enhances economic growth but too much is not healthy for growth with 27% being the point of inflection.

By relying on the difference between growth rate in private credit and real sector output to proxy excess finance, we find a robustly negative and significant effect of excess finance on economic growth albeit reduced magnitude relative to domestic credit proxy in Table 2. Here, a unit-percentage rise in

[11] Our sample countries fall under three legal origins: English, French and the Portuguese Common laws. Our reference legal origin is Portuguese. See Appendix 3 for countries' respective legal origin.

excess finance reduces growth by 1.1%. The difference in magnitude of effect is perhaps reflecting the broad definition of domestic credit as opposed to narrow-based private credit. Given the average difference between domestic credit growth and that of the real sector (0.14%), the proportion of growth loss due to excess finance is expected to reduce to about 0.62% when the 25^{th} percentile of the distribution of excess finance (-16.93%) decreases to its median value of -6.47%. However, with a balanced sectoral growth, economic growth is expected to increase by 1.93% when private credit increases from the 25^{th} percentile value (8.77%) to the median value (14.61%). Controlling for industrial share also reveal growth is maximum when the growth rate in finance and real sector output is proportionate. The key implication drawn here is statistically and economically not different from our earlier evidence which by far confirms our hypothesis: growth in financial development not accompanied with growth in real sector output does not propel economic growth. Controlling for industrial share to account for variations in real sector output not attributable to the financial sector does not significantly alter the results (Column 4). The coefficient of real sector size is positive and statistically significant where a unit-percentage point increases in industrial size increases growth by about 2%. Consistent with our earlier evidence, this finding is expected as growth in real sector size increases the economies' productively capacity thus propelling growth. Manifestation of excess finance on growth impact largely stems from the deleterious effect on capital formation and heightening of macroeconomic instability with their attendant ramifications for economic growth. Consistent with the system GMM estimates, the elasticity of capital formation to excess finance is higher than that of inflation as we reach the same conclusion: excess finance hurts growth by financing unproductive investments and undesired household consumption.

4 POLICY IMPLICATIONS

Based on the findings from our empirical analysis and given the overall objective of this study, we highlight the policy implications of our results. In an attempt to improve their growth performance through the financial sector, countries in SSA implemented some financial reform measures with view to eliminating financial repression and increasing financial deepening. But financial reforms can also be associated with credit boom where credit growth deviate from the normal cyclical trend. Our study revealed 34 credit boom episodes over the entire period with a rising frequency in the 1980s to 1990s.

Majority of the credit boom occurred during the financial reforms period that many SSA countries embarked on. It is unsurprising that intrinsically

similar economies in the region can experience divergent economic performance for purely endogenous reasons. Indeed, domestic factors as well as differences in Central Bank's monetary policy regimes matter. The differences in boom incidence across our sample suggest that local structural, institutional and domestic policy paths are crucial. Specifically, much of the booms occur in countries with soft or hard exchange rate pegs involving currency boards, loose monetary policies and lax supervision. For countries maintaining fixed exchange rate regimes, monetary policy is often directed at maintaining the peg at the expense of effectively responding to rapid credit growth. Beyond this, the independence of the Central Banks cannot be taken for granted. Making Central Banks independent by far helps insulate them from political pressures to pursue overly expansionary monetary and fiscal policies.

The level of financial sector supervision has a bearing on the enforcement of bank regulation and the effectiveness with which supervisory discretion is applied to deal with hypertrophic finance and early symptoms of credit boom. Central Banks are best placed to act as lenders of last resort and supplying adequate liquidity to the financial and real sectors of the economy. Countries can also consider developing a countercyclical capital buffer to guide credit growth. What is needed here is a good understanding of the optimal level of credit consistent with long run economic growth.

Although we do not foresee credit booms ending up in crises on account of the narrow and underdeveloped financial markets in SSA, what we observe is fragile economies resulting from risky and unsustainable investments coupled with superfluous consumption on the back of rapid and unbridled credit growth far outstripping the solvency needs of firms. The remnant of the rapid credit growth is an excess supply of financial resources relative to the needs of the real sector. Existence of an undisturbed equilibrated growth of real and financial sectors is a necessary condition for a smooth economic growth.

The elasticity of growth to changes in either the size of the real sector or domestic credit is higher under balanced sectoral growth. Our study shows that the process of financial development can involve substantial trade-offs, particularly when rapid financial development is not accompanied by real sector growth. As such, only growth-enhancing projects get funded. Our findings, however, suggest that the relatively abundant credit does not necessarily promote domestic investment. Excess finance may be used to finance unproductive investments and personal consumption thus exacerbating growth vagaries through higher inflation and bad investments. What is clear from the study is the pass-through excess finance-economic growth effect via investment exceedingly stronger than the growth responsiveness

of excess finance to changes in consumption. Thus, excess finance effect on growth via inflation is subdued.

However, the rather high rate of inflation in SSA should be a concern. Higher rates of inflation reduce savers' real rates of return and lower the real rates of interest that borrowers pay. This increases people's appetite for borrowing with fewer savers. And where the financial sector responds by increasing credit, such funds are used to finance private consumption exacerbating inflation. On the other hand, credits may be rationed and perhaps be politically driven and once inflation is exceedingly high, a potential consequence is that the financial system fails to provide the needed investment capital, resulting in a lower capital formation and levels of real sector growth. At the same time, high rate of inflation can potentially trigger an endogenous macroeconomic instability and theory predicts that this instability should as well be transmitted to real activity.

Boosting real sector growth also requires firms to develop a detailed understanding of specific emerging markets opportunities, as well as the needs of their clients. They also need agile approaches to the development of strategies using critical scenario planning and research. The challenge for the real sector and industry in particular however will be on how to advance their footprints in a more nuanced approach that go beyond rhetoric. A key priority of firms should be on skills and capacity of their workers and to develop a granular understanding of their operations, investment in R&D as well as expertise in product design for the complex supply and value chains.

Supporting industries requires a well-grounded policy based on comprehensive appreciation of the diverse industry fragments of the economy as well as the intrinsic factors affecting them. For instance, the inadequate supply of energy is a major challenge facing the industrial sectors of several SSA countries including Ghana, South Africa, Gambia and Malawi. Given that energy crisis is an important source of output fluctuations (Alagidede and Ibrahim, 2016), energy policies of Governments need to focus on ways of generating enough capacity that do not only meet the demand of the real sector but also provides reserve capacity to support other sectors of the economy. A formidable strand of innovation, information technology and optimal finance enhances real sector productivity and bringing a renewed dynamism to the sector. The proportionate growth in the real sector balances the supply and demand of financial resources thus improving the allocative efficiency.

5 CONCLUSION

In this study, we evaluate the economic growth effects when the growth in financial development and that of the real sector is unbalanced relying on data for 29 SSA countries over the period 1980-2014. We find that financial development positively affects growth albeit non-monotonically with inflection points ranging between 27 to 29%. Overall economic growth effect is contingent on the relative speed of growth in finance and that of real sector output. In particular, financial development damages economic growth when the improvement in the financial sector is not accompanied by higher real sector growth. Maximum growth is attained with a balanced sectoral growth. However, excess finance negates the positive effects of financial development by inflicting a huge cost on capital formation as bad investments get financed and at the same time exacerbating macroeconomic instability through increased aggregate demand. Financial booms are generally not growth-enhancing largely because it harms what is ought to spur growth while at the same time magnifies the effect of macroeconomic instability. Our findings remain robust to estimation techniques and are in synch with literature on the interdependence of real and financial sectors in the growth process. To ensure a sustained growth, we recommend strengthening of institutions to exercise proper oversight of the financial sector, enactment of laws and adopting countercyclical capital buffer to guide credit growth. Investment in R&D and policies that support industrial performance boost real sector growth to catch up with the fast-growing financial sector. Our evidence based on the findings of this study leads us to call for further research efforts in re-examining the finance-growth nexus in contemporary economic systems. The present study presents important implications for conducting macro-prudential policy and uncovers clear avenues for future research. First, it would be interesting to explicitly model credit boom in examining real and financial sector interdependence in finance-growth nexus. Second, it may be laudable to study how the real and financial sectors interact in the growth process disaggregating the analysis into pre- and post-GFC.

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Table 1. Summary statistics

Variables	Mean	Std. dev	CV	25th PCT	50th PCT	75th PCT	Skewness	Kurtosis	CC
Real GDP per capita	1,241.27	1,804.98	1.45	321.79	479.23	973.88	2.36	7.65	–0.54 [0.02]**
Government expenditure	14.88	6.31	0.42	10.64	13.79	17.52	1.57	7.15	–0.07** [0.03]
Inflation	56.23	36.63	0.65	27.56	52.93	84.06	0.30	2.60	–0.31 [0.04]**
Trade openness	71.15	36.48	0.51	44.86	61.09	89.22	1.10	3.83	–0.27*** [0.00]
Labour	52.83	4.65	0.09	50.55	52.04	53.89	–1.24	30.73	0.25*** [0.00]
Capital formation	19.69	9.65	0.49	13.56	18.61	23.64	1.59	8.25	–0.17*** [0.00]
Domestic credit	25.60	29.66	1.16	12.04	19.57	33.52	2.39	13.48	0.91*** [0.00]
Excess finance1	0.23	33.85	147.17	–12.82	–1.06	12.67	0.82	8.70	1.00
Private credit	19.52	21.72	1.11	8.77	14.61	22.72	3.78	19.68	0.59* [0.06]
Excess finance2	0.14	24.49	174.93	-16.93	-6.47	12.58	1.79	11.07	–0.42** [0.00]
Industrial share	25.37	13.83	0.55	15.99	22.03	32.03	0.94	4.29	–0.49*** [0.00]

Notes: *, ** and *** denote significance at 10, 5 and 1% respectively. CV and CC respectively denote coefficient of variation and correlation coefficient. Excess finance1 is the average difference between growth rate in domestic credit and that of real sector output while excess finance2 is the average difference between growth rate in private credit and that of real sector output. The correlation coefficient is between excess finance1 and the respective variable. However, the correlation coefficient of excess finance2 is its correlation with real GDP per capita. We do not report the how excess finance2 and private credit correlate with the remaining variables because of space but they do not significantly differ from that of excess finance1.

Table 2. Financial development, real sector and economic growth based on system GMM

Variables	1	2	3	4	5
Lagged GDP per capita	–1.016 (0.421)**	–0.991(0.171)**	–0.984(0.472)**	–1.098(0.482)**	–1.920(0.375)***
Government expenditure	–0.018(0.033)	–0.026(0.027)	–0.014(0.033)	–0.007(0.006)	–0.047(0.036)
Trade openness	0.044(0.014)***	0.039(0.021)*	0.041(0.016)**	0.081(0.030)**	0.088(0.026)**
Labour	0.048(0.023)**	0.013(0.064)	–0.034(0.011)***	–0.068(0.025)**	–0.035(0.020)*
Capital formation	0.048(0.017)**	0.053(0.023)**	0.028(0.013)**	0.035(0.016)**	0.045(0.023)**
Inflation	–0.001(0.005)	–0.003(0.025)	–0.007(0.003)**	–0.006(0.002)**	–0.005(0.002)**
Domestic credit	0.021(0.006)***	0.034(0.011)***	0.051(0.016)**	0.018(0.004)*	0.012(0.006)**
Domestic credit squared	–	–0.058(0.012)***	–	–	–
Excess finance	–	–	–0.009(0.002)***	–0.007(0.002)**	–0.006(0.003)**
Industrial output	–	–	–	0.029(0.018)*	–
Channels:					
Excess finance × Capital formation	–	–	–	–	–0.020(0.010)**
Excess finance × Inflation	–	–	–	–	0.009(0.002)*
Diagnostics:					
Observations	986	986	986	986	986
Country fixed effects	YES	YES	YES	YES	YES
Time effects	YES	YES	YES	YES	YES
Number of countries	29	29	29	29	29
AR(2) z–value [*p*–value]	–1.343 [0.179]	–1.544[0.123]	–1.367[0.172]	–1.508 [0.132]	–1.286 [0.198]
Threshold value		29%			
Sargan chi-square [p-value]	27.823[0.241]	26.923[0.261]	26.568[0.275]	25.977[0.228]	24.303[0.202]
Wald chi-square [p-value]	0.0000	0.0000	0.000	0.000	0.000

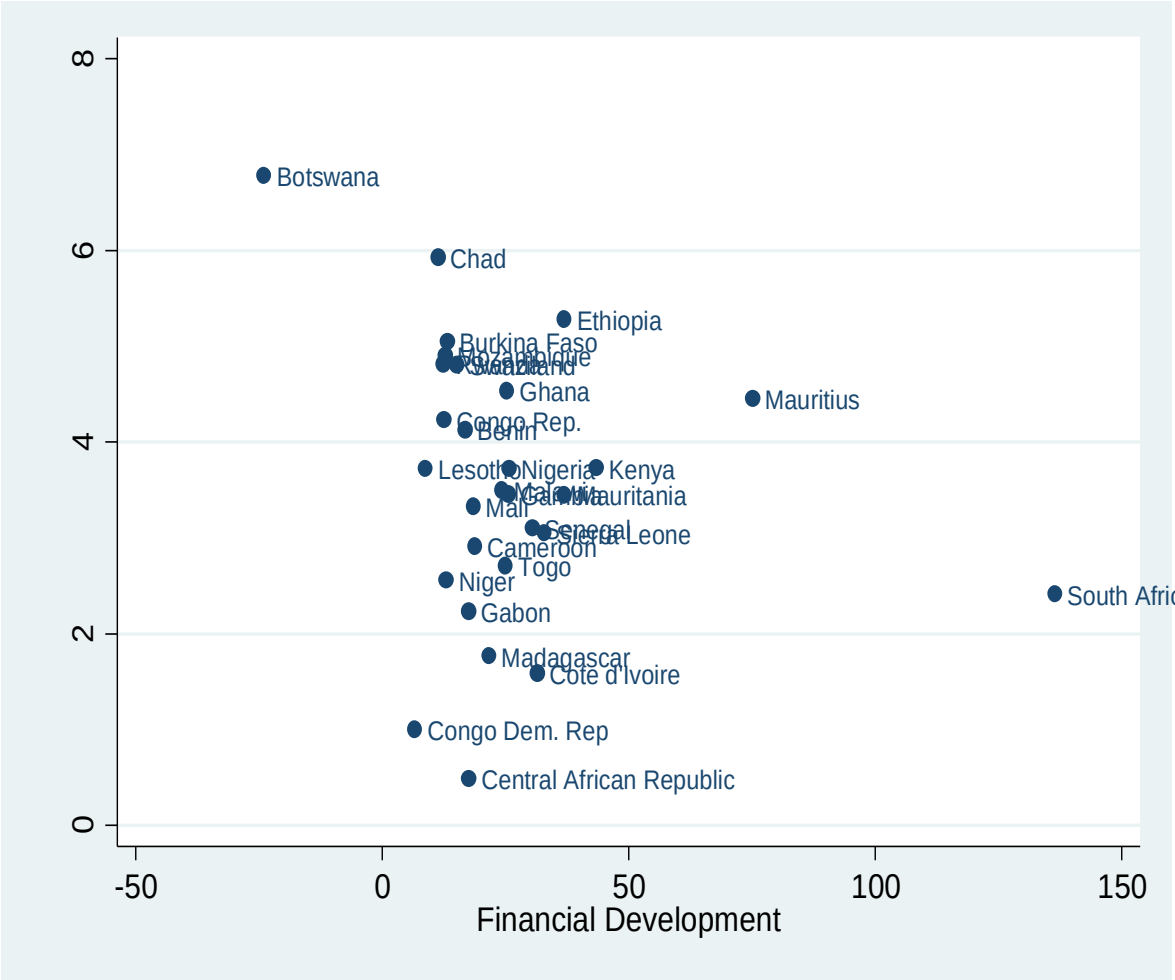
Notes: ***, ** and * denote significance at 1, 5 and 10% level. All variables are in logs. Excess finance here is the difference between growth rate in domestic credit and that of real sector output. The threshold value is the value after which financial development negatively affects economic growth.

Table 3. Financial development, real sector and economic growth based on FEIV

Variables	1	2	3	4	5
Lagged GDP per capita	–2.712 (0.501)*	–2.210(0.493)**	–2.471(0.521)*	–2.730(0.397)*	–2.114(0.281)*
Government expenditure	–0.032(0.029)	–0.041(0.031)	–0.018(0.041)	–0.004(0.006)	–0.060(0.071)
Trade openness	0.039(0.016)**	0.058(0.019)**	0.034(0.019)***	0.050(0.026)***	0.065(0.014)*
Labour	0.035(0.013)**	0.017(0.014)	–0.027(0.012)***	–0.053(0.013)*	–0.022(0.009)**
Capital formation	0.050(0.015)**	0.041(0.013)**	0.019(0.010)**	0.027(0.011)**	0.031(0.010)*
Inflation	–0.006(0.005)	–0.002(0.030)	–0.005(0.002)**	–0.009(0.003)**	–0.007(0.001)*
Private credit	0.015(0.006)***	0.022(0.011)***	0.018(0.009)**	0.011(0.004)*	0.009(0.006)**
Private credit squared	–	–0.074(0.012)***	–	–	–
Excess finance	–	–	–0.011(0.002)***	–0.008(0.002)**	–0.009(0.003)**
Industrial output	–	–	–	0.019(0.010)***	–
Channels:					
Excess finance × Capital formation	–	–	–	–	–0.031(0.008)*
Excess finance × Inflation	–	–	–	–	0.007(0.002)*
Diagnostics:					
Observations	986	986	986	986	986
R–squared	0.512	0.547	0.553	0.571	0.594
Number of countries	29	29	29	29	29
Threshold value		27%			
p-value of *F*–statistics	0.0000	0.0000	0.000	0.000	0.000

Notes: ***, ** and * denote significance at 1, 5 and 10% level. Standard errors are presented in parentheses. All variables are in logs. Excess finance here is the difference between growth rate in private credit and that of real sector output. The threshold value is the value after which financial development negatively affects economic growth.

Figure 1.Financial development and economic growth



Data source: Authors' construct using WDI.

Figure 2. *Country–by–country credit boom incidence*

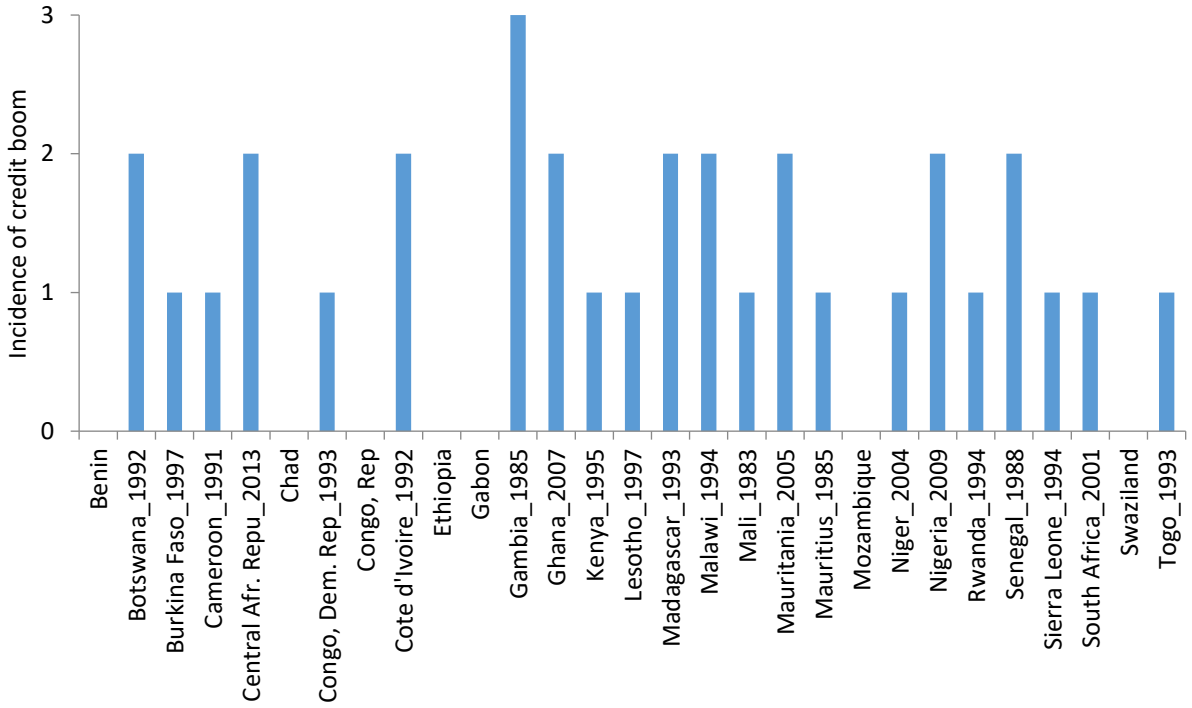
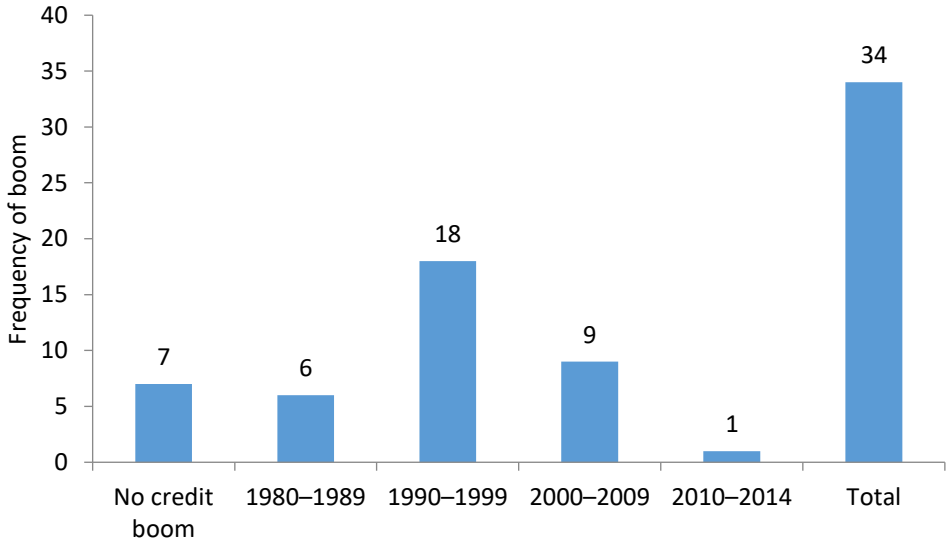


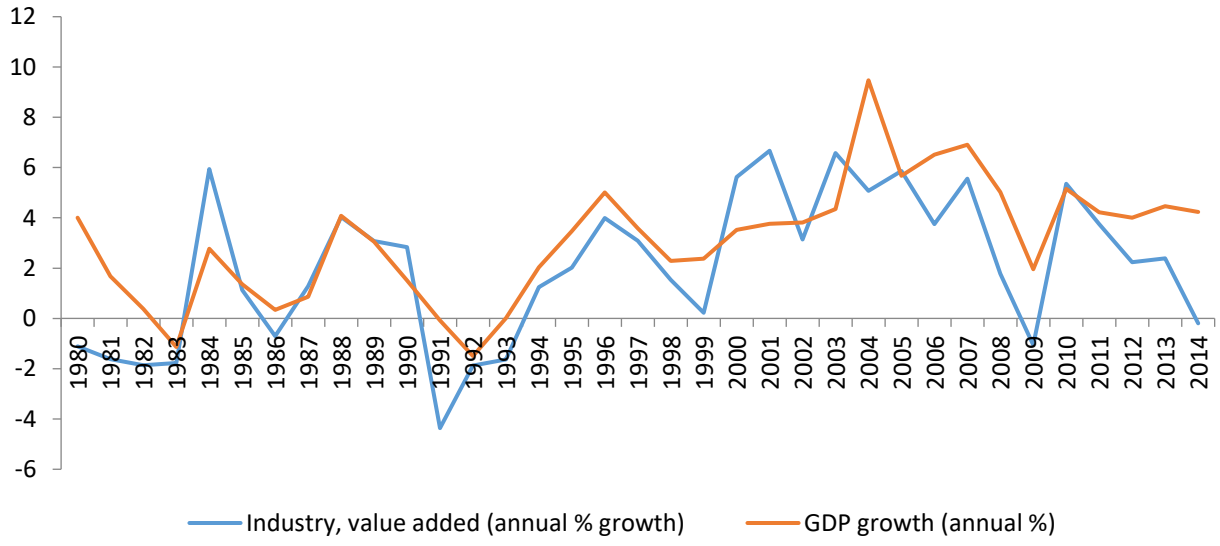
Figure 3. *Credit boom incidence*



Appendix A: Five–year averages of selected macroeconomic indicators

Year	GDP growth rate (%)	Real GDP per capita (in US$)	Domestic credit provided by financial sector (% of GDP)	Private credit to private sector (% of GDP)	Broad money (% of GDP)	Manufacturing, value added (annual % growth)	Industry, value added (annual % growth)	Inflation (annual %)
1980–1984	1.54	933.15	51.00	33.82	35.89	3.49	0.90	12.12
1985–1989	1.91	861.21	57.48	40.16	36.06	2.25	1.54	8.00
1990–1994	0.64	800.48	69.35	54.42	35.35	-2.31	-0.46	12.62
1995–1999	3.24	787.65	72.31	59.42	35.46	2.47	1.68	7.31
2000–2004	4.89	820.78	72.95	55.18	37.39	3.07	4.61	5.17
2005–2009	4.77	943.16	72.91	61.34	43.64	2.84	1.77	7.62
2010–2014	4.41	1,015.47	58.55	46.97	39.17	4.36	3.70	5.34

Source: Authors' computation using WDI.



GDP growth rate and industrial value added

Data source: Authors' construct using WDI.

Appendix B: List of countries, legal origin and boom incidence

List of Countries	Legal origin	Number of credit boom incidence	Year(s) of Incidence	Peak of credit boom
1. Benin	French	0	No credit boom	
2. Botswana	English	2	1992, 1993	1992
3. Burkina Faso	French	1	1997	
4. Cameroon	French	1	1991	
5. Central Afr. Rep.	French	2	1991, 2013	2013
6. Chad	French	0	No credit boom	
7. Congo, Dem. Rep.	French	1	1993	
8. Congo, Rep	French	0	No credit boom	
9. Cote d'Ivoire	French	2	1992, 1993	1992
10. Ethiopia	French	0	No credit boom	
11. Gabon	English	0	No credit boom	
12. Gambia	English	3	1984, 1985, 2003	1985
13. Ghana	English	2	1987, 2000	2000
14. Kenya	English	1	1995	
15. Lesotho	English	1	1997	
16. Madagascar	English	2	1993, 2003	1993
17. Malawi	English	2	1992, 1994	1994
18. Mali	French	1	1983	
19. Mauritania	French	2	2005, 2009	2005
20. Mauritius	English	1	1985	
21. Mozambique	Portuguese	0	No credit boom	
22. Niger	French	1	2004	
23. Nigeria	English	2	1994, 2009	2009
24. Rwanda	French	1	1994	
25. Senegal	French	2	1988, 1993	1988
26. Sierra Leone	English	1	1994	
27. South Africa	English	1	2001	
28. Swaziland	English	0	No credit boom	
29. Togo	French	1	1993	