Original Article

The Independence of Central Banks, Political Institutional Quality and Financial Sector Development in Africa

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Abstract

Central Bank Independence (CBI) as a mechanism for achieving lower inflation and effective regulation and supervision of the financial sector should promote financial sector development. Though there is not much difference in CBI legal provisions, it seems to be more effective in developed countries than in African countries. There are suggestions that this could be due to differences in political institutional quality. Using panel data from 1970 to 2012, we find that CBI does not promote financial development in Africa. The impact of CBI is dependent on the level of development of a country. CBI promotes financial development more in countries with strong political institutions.

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Central bank independence, financial development, institutional quality, Africa, emerging markets, developing countries

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1 Introduction

There exists a large body of literature on understanding the factors that determine the development of financial systems (Ang & McKibbin, 2007; Baltagi, Demetriades, & Law, 2009; Chinn & Ito, 2006). Key among these are institutional factors (Tayssir & Feryel, 2017). Poorly developed financial markets, such as those in Africa and some other developing countries, are characterised by high information and transaction costs, and institutions matter to the extent that they are the fundamental roots of these costs (Fernández & Tamayo, 2017; North, 1994).

While the role of political/legal institutions in promoting financial development has been broadly examined and established, that of economic institutions is nascent. At the end of the 1970s, economic theory began to recognise the importance of a key attribute of an economic institution; that is, central bank governance in determining macroeconomic performance, that is, during the New Classical Revolution, with the role of central bank design being confirmed in the New Keynesian analysis of monetary policy (Masciandaro & Romelli, 2015). Subsequently, there is evidence that monetary institutions affect financial development by being able to influence the level of inflation and expected inflation, government expenditure, government debt and interest rates (Agoba et al., 2017; Boyd, Levine, & Smith, 2001; Mbulawa, 2015; Piazzesi & Schneider, 2009; Raza, Shahzadi, & Akram, 2014). In this sense, the classic case for central bank independence (CBI) is argued by Rogoff (1985).

The regulation and supervision of the financial system has also been identified as an important determinant of its development. Though a plethora of studies have examined the impact of regulations such as capital requirements, restrictions on activities, deposit insurance and private monitoring on bank risk-taking and soundness (e.g., Agoraki et al., 2011; Battiston et al., 2016; Laeven & Levine, 2009), there exists a gap on the relationship between the architecture of the supervision system and financial development (Masciandaro & Romelli, 2015). Moreover, though CBI is believed to be beneficial not only for price stability but also financial stability, Berger and Kismer's (2013) theoretical model is contrary to this belief (Doumpos, Gaganis, & Pasiouras, 2015).

The main purpose of this article is therefore to add to this strand of the literature by investigating whether and how financial institutions risk-taking in terms of growth of finance to the private sector, through the banking, stock and bond markets is determined by CBI and how political institutions affect this relationship.

Though African governments like many other nations in the world have promulgated laws granting increasing independence to their central banks, Africa's financial system is characterised by a dominant banking sector and low activity level on the capital markets. Domestic bond markets are woefully small or non-existent, thereby limiting access to long-term capital. Financial instruments are basically short term and financial inclusion is still low. The cost of credit is very high, thereby excluding many from participating in the financial system (Bascom, 2016).

As indicated in Table 1, we see Africa performing poorly in terms of depositors per thousand, commercial bank branches per 100,000 adults; ATMs per 100,000 adults relative to other developing countries and world average. The lending deposit spread is also comparatively high compared to other developing countries and world average. This poses a significant challenge to access to finance and financial development in Africa.

In Figure 1, we see significant differences in financial sector development measured as broad money as a percentage of gross domestic product (GDP), among three African countries, namely, South Africa

Table 1. Financial Development in Africa, Other Developing and Developed Countries

	Financial Access and Outreach				Interest Rate Spread
	Depositors with Commercial Banks	Borrowers from Commercial Banks	Commercial Bank Branches	Automated Teller Machines	Lending Rate Minus Deposit Rate
	(per 1,000 adults)	(per 1,000 adults)	(per 100,000 adults)	(per 100,000 adults)	(percentage points)
	2016	2016	2016	2016	2016
Africa	292	35	5.3	5.82	7.3
Other Developing	657	22	9.6	9.64	4.2
Developed	1,967	..	17.3	62.17	..
World	1,141	..	12.5	47.55	5.7

Source: World Development Group (2017).

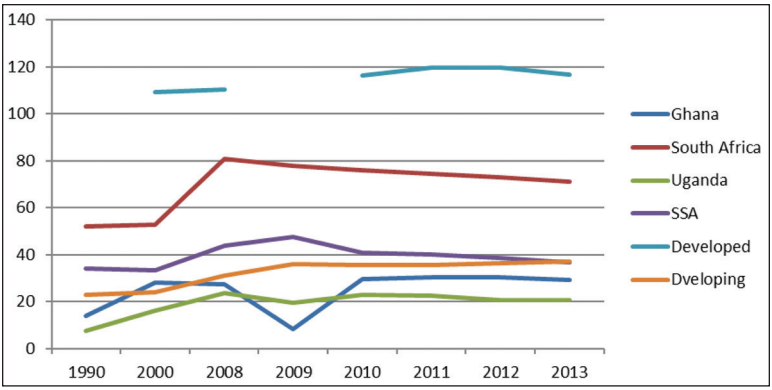

Figure 1. Broad Money (M2) as a Percentage of GDP

Source: The authors, World Development Indicators (2017).

(the biggest economy in Africa), Ghana (a small but fast-growing economy) and Uganda (a very small economy). We also see that aside South Africa, Ghana and Uganda have relatively less developed financial markets compared to other developing countries.

Given little difference in CBI provisions among Africa, other developing countries and developed countries (Figure 2), but a significant lag in the development of Africa's financial systems relative to other developing countries and developed economies, this study seeks to empirically

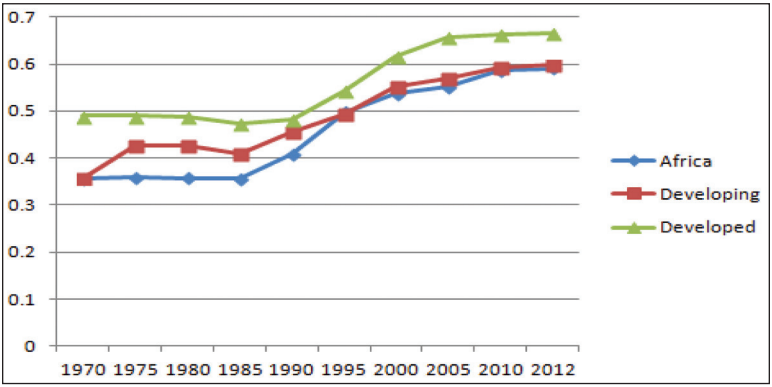

Figure 2. Average CBI in Africa, Other developing and Developed Countries 1970–2012

Source: Garriga (2016) (CBI Index).

examine the extent to which CBI has been an effective tool for financial development in Africa.

Second, according to Masciandaro and Romelli (2015), private agents trust the central banker only if effective rules on accountability and transparency hold. Lupusor (2012) also shows empirically how legal independence cannot be considered a sufficient condition for avoiding the political pressures on the monetary policy stance. The literature surveyed in this area indeed indicate that poor institutions that manifest, for example, in poor creditor protection in Africa and other developing countries (e.g., Latin America), have had effects on both the level and the variability of credit (Fernández & Tamayo, 2017). Subsequently, the study also examines the extent to which the level of development of political institutions, affects the extent to which CBI is effective in promoting financial development in Africa.

Compared to other developing countries, political/legal institutional quality on average is low in Africa, though there are differences among countries in the region in terms of rule of law, good governance and respect for civil liberties (see Figure 3). This situation can have serious implications for the impact CBI reforms will have on financial development on the continent.

Using panel data from 1970 to 2012, the study finds that in other developing countries and developed countries, CBI directly promotes financial development. However, in Africa, CBI does not significantly promote financial development. Further investigation reveals that this direct impact is dependent on the level of development of a country.

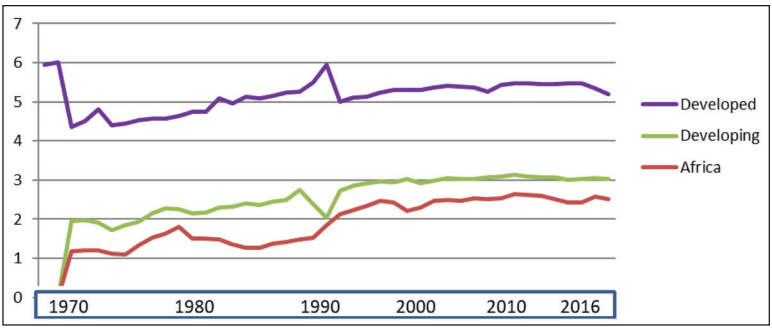

Figure 3. Political/Legal Institutional Quality (Civil liberties score 0 = minimum; 6 = maximum

Source: Freedom House (2017).

CBI promotes financial development more in countries with strong political institutions.

The rest of the article is organised as follows. We review literature in section 2 and outline the methodology for the study in section 3. Section 4 presents an analysis and discussion of results obtained. In section 5, we conclude the study.

2 Literature Review

2.1 CBI and Financial Development

According to Blancheton (2016), towards the end of the 1970s, there was a change in economic paradigm following the works of Friedman (1997), focussed on currency, and of Kydland and Prescott on the rules of economic policies. The advocacy by liberal economists towards advanced international financial integration and competitive deflationary policies, was to give impetus to greater long-term growth. In order to expand economic activity growth, there was a need for price stability to generate the best environment for economic activity to expand in the long term. Having an independent central bank was an additional institutional guarantee for keeping inflation under control. The CBI institutional setting gained momentum and the relationship between the policymaker—who designs the overall economic policy—and the central bank—who is responsible for the monetary policy—became crucial in avoiding the inflation bias (Masciandaro & Romelli, 2015).

During part of the Great Moderation between 1984 and 2003 Taylor (2013) considered changes in monetary policy to be a major reason for improved economic performance (measured by variability of output and inflation) in the United States. Agoba et al. (2017), however, finds no impact of CBI on inflation in Africa and other developing countries. The transparency in CBI monetary policy decision making, it is argued, has important economic benefits as it reduces inflationary expectations and makes the central bank accountable for its decisions (Eijffinger & van der Cruijsen, 2007; Papadamou, Spyromitros, & Tsintzos, 2017; Stiglitz, 1998;). Papadamou, Sidiropoulos, and Spyromitros (2014) find that a higher level of monetary policy credibility produces lower interest rates, higher effective exchange rates, and a positive effect on economic activity.

In modern literature, the role of the central bank in fostering price stability cannot be over emphasised. Price stability can have two positive

impacts for financial market participants, notably bond investors. The first effect is that lower inflation means lower short-term interest rates to boost credit demand. With lower short-term policy rates, intermediate and longer-term rates also tend to decline. Since bond prices and yields move in opposite directions, lower yields mean rising prices—and a higher principal value for fixed-income investors; thereby boosting bond market development (Kang & Pflueger, 2015). The second impact is on real returns on bonds. With price stability, the real returns on bonds are high compared to periods of high inflation where the real or inflation adjusted returns are much lower compared to the nominal returns. This can go a long way to affect the development of the bond market. A clear example is in Africa, where with high inflation rates among others, domestic bond markets are under-developed. Price stability which ensures proper evaluation of viable business projects presented to financial institutions (Huang, Wu, Yu, & Zhang, 2015).

In cases where the central bank is involved in prudential supervision, CBI could have a direct impact on the functioning of banks. Doumpos et al (2015) examined the impact of CBI on bank soundness and found that higher CBI improves the soundness of banks particularly in the case of smaller banks, which is enhanced during crisis. According to Barth, Nolle, Phumiwasana, and Yago (2003), independent regulators exercise professionalism and consistency in supervising the financial condition of banks. Furthermore, bank regulatory and supervisory independence is important in ensuring financial stability for reasons akin to why CBI matters for monetary stability (Quintyn & Taylor, 2003).

Quintyn and Taylor (2003) argue that, among other things, CBI is a mechanism that mitigates the economic costs that are associated with a time-inconsistency problem. Similarly, a greater level of CBI from outside pressures encourages central banks that are less politically constrained to act in preventing financial distress (Cihák, 2010). This is because a more dependent central bank may be influenced by political interests associated with weak and less compliant financial institutions, leading to a lax in the exercise of central bank discretion in the exercise of its powers to discipline such finial institutions. This can have implications for financial stability and confidence in the financial system. This is further highlighted by Hutchison and McDill (1999) who posit that ‘a dependent central bank that has close association with government, may have more tendencies towards providing monetary finance to problem financial institutions, thereby creating an additional channel for the moral hazard problem’ (p. 160).

2.2 The Impact of Political Institutions on the Effectiveness of Central Bank Independence

Posen (1995), noting that there are distributive consequences in the choices of monetary regimes, stated that there is no reason to assume that the adoption of CBI is self-enforcing; that choice requires political support. In addition, Chinn and Ito (2006) find that financial systems with a higher degree of legal/institutional development on average benefit more from financial liberalisation than those with a lower one. This provides further impetus for our investigation into the role of institutions in enhancing the impact of CBI on financial development.

High-quality political institutions might generally be associated with greater trust in governmental decisions and legal arrangements. As a result, the quality of political institutions might be a positive determinant of the reputation effects of CBI (Hielscher & Markwardt, 2012). Aisen and Veiga (2008) argue that politically unstable countries are more often susceptible to political shocks leading to discontinuous monetary and fiscal policies and higher inflation volatility. Their study showed that greater political instability, lower economic freedom and higher degrees of polarisation and political fragmentation lead to higher inflation volatility.

In addition, when political institutions such as the judiciary do not ensure the proper enforcements of contracts, this can impact the extent to which investors and creditors take advantage of the stable macroeconomic environment pursued by the independent central bank. The cost of contract enforcement, if high, can negate the benefits of low inflation and reduce the number and value of financial contracts in the economy. On the other hand, better enforcement of financial contracts can enhance the willingness of creditors and investors to engage in financial transactions and improve access to finance (Besley, 2015). Chinn and Ito (2006) argue that capital liberalisation significantly improves financial development with a given level of institutional and legal development.

We argue that strong political institutions ensure that central bank provisions are respected since such systems will hold government accountable for breaching such provisions. This should enable central banks to effectively work towards achieving their objectives of price stability which financial markets need. In high political institutional environments, the credibility of central banks is high as little/no interference from government is expected. This enables the market to adequately rely on central banks' pronouncements and execute financial contracts with some

degree of certainty. This enables projects to be properly evaluated and considered given the stable macroeconomic environment. Subsequently, more projects are financed as banks can give more loans to projects deemed as profitable.

In addition, investors are better able to take advantage of stable macroeconomic environment when there is political stability and a protection for them and their investment by the legal system. Information asymmetry is reduced, thereby reducing the cost that high information asymmetry generates, aside inflation which feeds into determining the cost of credit.

3 Methodology

3.1 Data and Sample

To investigate the effect of CBI on financial development, and the impact of political/legal institutional quality on this relationship, we utilise panel data from 1970 to 2012 on 48 African countries and 90 other developing countries, 40 developed countries and 35 Organisation for Economic Co-operation and Development (OECD) countries. In addition to the CBI index from Garriga (2016) who computes the Cukierman, Webb and Neyapti (CWN) index for the period 1970–2014, and civil liberties variable as a proxy for the political/legal institutional quality measure from Freedom House, the control variables come from the models of Tayssir and Feryel (2017) and Chinn and Ito (2006). We include an indicator of trade openness, log of GDP per capita, the real GDP annual growth rate, public debt, and, inflation targeting dummy, population size and the exchange rate regime dummies.

3.2 Model and Estimation Technique

3.2.1 Model

Our preferred model based on Tayssir and Feryel (2017), Bodea, Garriga, and Higashijima (2017), Lucotte (2009), Acemoglu, Johnson, Querubin, and Robinson (2008) and Romer (1993) and can be summarised as follows:

$$FINDEV_{it} = \beta_1 FINDEV_{it-1} + \beta_2 CBI_{it} + \beta_3 PolInst_{it} + \beta_4 X_{it} + \varepsilon_{it} \quad (1)$$

To capture possible unobserved heterogeneity, and to analyse the impact of political/legal institutional quality on the CBI-financial development nexus, we specify the following interaction model:

$$FINDEV_{it} = \beta_1 FINDEV_{it-1} + \beta_2 CBI_{it} + \beta_3 PolInst_{it} + \beta_4 (CBI * PolInst)_{it} + \beta_5 X_{it} + \varepsilon_{it} \quad (2)$$

where,
i denotes the country and t denotes the time,
ε_{it} is the error term,
$FINDEV_{it}$ is the financial development indicator,
CBI_{it} is central bank independence measured by the CWN index,
$PolInst_{it}$ is the measure of political/legal institutional quality proxied by the political rights and civil liberty scores and
X_{it} is a set of control variables, namely:
$GDPR_{it}$ is the real GDP annual growth rate,
$POPUL_{it}$ is the population size,
$LGDPC_{it}$ is the log of real GDP per capita,
$DEBTG_{it}$ is the debt-to-GDP ratio,
LDS_{it} is the lending deposit spread measured as the difference between lending rate and deposit rate,
$CBASSETS_{it}$ is the ratio of central bank assets to GDP,
$TRD.OPEN_{it}$ is the trade openness measured as the sum of exports and imports as a percentage of GDP and
$FINOPEN_{it}$ is the financial openness measured as the Chinn–Ito index.

3.3 Definition of Variables

3.3.1 Dependent Variables

The dependent variable in this study is financial development ($FINDEV_{it}$) which is measured by three (3) indicators. The first indicator is private credit to GDP ratio ($PRIV.CRE_{it}$) which measures the extent of financial intermediation in a country and a gauge of the extent to which the banking sector is developed.

The study uses private credit, which captures the value of all credit issued by financial intermediaries to the private sector as a share of GDP. It excludes credit given to public corporations and other agencies of government which may not be allocated based on expected return. According to Levine, Loayza, and Beck (2000), higher levels of private

credit indicate 'higher levels of financial services and therefore greater financial intermediary development.'

The second measure is a widely used measure in literature; stock market capitalisation (*STOCK*. $MKCAP_{it}$) which is the ratio of the value of all stock on the domestic markets to GDP and is an indicator of the size of the economy's stock market. The stock market provides alternative sources of finance and thus acts as a substitute of or complement to bank credit (Büttner & Hayo, 2011; Yao et al., 2014).

The third measure of financial development is public sector bond as a percentage of GDP ($PUBLICBOND_{it}$) to capture the impact of CBI and political institutions on bond market development. We use the public bond to GDP variable first due to the absence of adequate data on private bond to GDP. Secondly it is argued that well developed public sector bond markets are precursors or pointers to well-developed corporate bond markets (McCauley & Remolona, 2000).

3.3.2 Explanatory Variables

On the basis of literature reviewed, the explanatory variables include a set of financial, demographical, institutional and macroeconomic variables.

CBI_{it}, which is our principal explanatory variable, is measured as the annual legal central bank independence measure of country *i* in period *t*. It represents the degree of CBI measured by the *de jure* indicator. We settle on de jure measures of CBI, since the focus of the study is on policy reforms. Many researchers have attempted to capture and measure CBI. This study uses a CBI index as given by Garriga (2016), who compute an updated CWN index for a large set of countries using the International Monetary Fund's Central Bank Law Database. The index varies between 0 and 1, with larger values indicating independence. A central bank is legally more independent when the governor's term in office is longer; the appointment and dismissal procedures are more insulated from the government; the mandate is more focussed on price stability; the formulation of monetary policy lies squarely with the central bank; and the provisions on direct central bank lending are restrictive.

Because the CBI measure is an index, the possibility of it being an endogenous variable is addressed by the choice of estimation technique. Because financial development may affect the level of independence granted to the central banks, there are potential endogeneity effects which we account for by using System Generalised Method of Moments (SGMM) estimation technique.

In this study, as a measure of political/legal institutional quality ($PolInst_{it}$), we use the civil liberties score variable obtained from Freedom

House database. The score for the variable ranges from 7 to 1, with 7 representing the least rating and 1 the highest. Following Bodea et al. (2017), we rescale the original score to range from 0 to 6, so that lower scores now correspond to lower civil liberties rating and higher scores correspond to higher civil liberties rating. In order to do this, we use the formula – 1*(CLS-7), where CLS is the civil liberties score as given by Freedom House. We expect the coefficient of political/legal institutional quality to be positive. We also expect the interactive term between CBI and institutional quality to be positive.

We include a the log of GDP per capita ($LGDPC_{it}$) to capture the level of economic development. It is expected that more developed economies will have better developed financial systems. This is due to the availability of higher incomes for investments, technological advancements and better developed systems that address issues of information asymmetry. The expected sign is therefore positive.

We include the size of the population ($POPUL_{it}$) to capture the availability of huge number of potential investors and borrowers which means higher savings, investments and demand for credit.

We also introduce the real annual GDP growth rate ($GDPR_{it}$). The inclusion of this variable is stimulated by work such as Greenwood and Smith (1997) on the impact of economic growth on the development of financial markets. Economists hold different perspectives on the theoretical link between financial development and economic growth. Schumpeter (1911) contends that the services provided by financial intermediaries are essential drivers for innovation and growth. A well-developed financial system channels financial resources to the most productive use. The alternative explanation initiated by Robinson (1952) argues that finance does not exert a causal impact on growth. Instead, financial development follows economic growth as a result of higher demand for financial services. When an economy grows, more financial institutions, financial products and services emerge in the markets in response to higher demand of financial services.

We also include real annual GDP growth rate ($GDPR_{it}$) in the regression to proxy for economic activity as a result of the fact that demand for and supply of credit is sensitive to fluctuations in the economy. We measure trade openness ($OPEN_{it}$), as the ratio of the sum of exports and imports of goods and services to GDP. The importance of this variable is to assess the extent of integration of a country in global trade. Openness offers a larger market for domestic producers, allowing them, on one hand, to operate at minimum required scale and on the other hand, to reap benefits from increasing returns to scale. With this growth in economic activity, demand for financial services is high.

We include a dummy for inflation targeting regime (IT_{it}). We assign a value of *1* for inflation targeting countries and periods and *0* otherwise. The empirical evidence suggests that most IT experiences have been successful in reducing inflation as high rates of inflation negatively affect developments in the financial system, exacerbate credit market frictions and ultimately, make financial institutions inefficient in allocating resources for growth (Agbeja, 2008; Boyd & De Nicolo, 2005; Huybens & Smith, 1999; Stone, 2003). The expected sign is therefore positive.

The exchange rate dummy variable ($FEXRT_{it}$), is captured as *1* for fixed exchange rate regimes and 0 otherwise. We capture the existence of a fixed exchange rate regime based on the *de facto* exchange rate regime classification by Reinhart and Rogoff (2004, 2009). This dichotomous variable equals 1 when there is no separate legal tender, when there is a pre-announced peg or currency board arrangement, when there is a pre-announced horizontal band that is narrower than or equal to +/–2 per cent, or when there is a de facto peg, and zero otherwise. We expect that fixed exchange rate regimes will reduce foreign exchange rate risks which result in more stable macro-economic environments for the growth of the banking sector and capital markets (Calvo & Reinhart, 2002; Tayssir & Feryel, 2017).

Public debt ($DEBTG_{it}$) is measured by the ratio of public debt to GDP, which is determined by adding two ratio which is the accumulated debt-to-GDP ratio for the previous year, discounting it by the interest rate and the ratio of budget deficit to GDP for the current year. The negative impact of public debt on financial development through the crowding out effect is empirically ambiguous (Kutivadze, 2011).

Central Bank assets ($CBASSETS_{it}$) is measured as the ratio of central bank total assets held to GDP of a country. Central bank assets are claims on domestic real nonfinancial sector by the Central Bank. The more assets held by a central bank, the more finance it can provide to support the financial system when it needs funds.

The lending to deposit spread (LDS_{it}) variable, is a measure of the efficiency of the financial system. It is the difference between lending rate and deposit rate. Lending rate is the rate charged by banks on loans to the private sector and deposit interest rate is the rate offered by commercial banks on three-month deposits. More efficient financial systems can offer credit at lower rates which promotes increased access to credit and expansion of the financial system (Odhiambo, 2005).

Finally, we also include time period and country dummies to capture year and country specific effects correlated with the variables of analysis

in particular political stability that may affect all economies in a particular region or economic group.

3.3.3 Estimation Technique

The study assumes that past values of financial development affect its current values. We therefore require the use of the lag of financial development as an explanatory variable. If not done, then the precision of point estimates would be low as a result of the variance being higher when the lag is omitted – due to a specification error (Mizon, 1995). We adopt the use of the generalised methods of moments (GMM) dynamic panel data estimation as the standard solution to avoid Nickell bias (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). This approach addresses the issues of joint endogeneity of all explanatory variables in a dynamic formulation, and mitigates potential biases induced by fixed effects. There is a danger however that the instrument count can easily grow large relative to the sample size (Roodman, 2006). This is termed instrument proliferation. This can result in an over-fitting of endogenous variables, thus failing to expunge their endogenous components and biasing coefficient estimates. This study uses the two-step SGMM estimator, with Windmeijer (2005) corrected standard errors since this is asymptotically more efficient than the one step-estimator.

In order to deal with the issue of instrument proliferation, we collapse the instrument matrix as suggested by Rodman (2009) and Bontempi and Mammi (2015). Doing this we observe, gives us higher point estimates and lower number of instruments. We also have a higher reliability of the Hansen test, consistently characterised by a lower *p*-value. Though the sign and significance of some of the control variables change (compared to earlier estimations where collapse of instruments matrix was not applied), the sign and significance of the main variables of interest (CBI, PolInst; and their interactions) do not. According to Bontempi and Mammi (2015), this shift in the sign of some of the control variables, is not directly driven by the reduction in the number of instruments rather, it is due to the restrictions imposed on the instrument matrix. The autocorrelation test and the robust estimates of the coefficient standard errors assumes no correlation across individuals in the idiosyncratic disturbances.

The study reports two standard specification tests: The Hansen test of over-identifying restrictions, tests the overall validity of the instruments and failure to reject the null hypothesis gives support for the model, including our choice of endogenous variables. The Arellano–Bond test for AR (2) in first differences tests whether the residuals from the regression in differences is second order serially correlated and failure to reject the null hypothesis supports the model specification. The study

also reports the number of instruments as suggested by Bazzi and Clemens (2013).

4 Analysis and Discussion of Findings

4.1 Main Results

We first present descriptive statistics of a our variables on interest as well a correlation matrix of the variables in Appendices 1–2. We separately consider Equations (1) and (2) for each group of countries (Africa, other developing countries and developed countries). In estimating the regressions separately for African other developing and developed countries, there is no selection bias as a check of the variables indicate that, there exist significant variations in the variables except for institutional quality measure in which the variations are not wide. This is a result of the fact it is a score from 0-6 and most African countries have scores around the average. The results of the test of autocorrelation of errors (significant AR (1) and insignificant AR (2)) mean we accept the null hypothesis indicating that there is no correlation between the errors in the second order.

4.1.1 CBI, Political/Legal Institutional Quality and Financial Development

In Table 2, we see the results of regressions for the African sample and other developing countries sample; seeking to examine the impact of CBI and political/legal institutional quality on financial development. Table 2 also presents the results for developed and OECD countries. The tables also present results on the impact of political/legal institutional quality on the ability of CBI to impact financial development in Africa.

In models (1) and (2), central bank independence (CBI_{it}) in Africa, does not have any significant impact on financial development measured as the ratio of private credit to GDP ($PRIV.CRT_{it}$), neither does it have any impact of financial development measured as the ratio of stock market capitalisation to GDP ($STOCK.MKCAP_{it}$) in models (3) and (4). For other developing countries and developed countries however, all across the four models, central bank independence (CBI_{it}) has a significant positive impact on both financial development variables; namely, the ratio of private credit to GDP ($PRIV.CRE_{it}$) and the ratio of stock market capitalisation to GDP ($STOCK.MKCAP_{it}$). This mostly emanates from the insignificant relationship between CBI and inflation in Africa as detailed in Agoba et al. (2017). When CBI has no impact on price stability, it is more likely not to have any impact on financial development as price stability is a major channel through which CBI impacts financial development in literature.

Table 2. Effect of CBI and Political/Legal Institutional Quality on Financial Development

	Africa				Developing			
	PRIV.CRT		STOCK.MKCAP		PRIV.CRT		STOCK.MKCAP	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Priv.Crt_{t-1}$	0.187***	0.107***			0.168***	0.181***		
	(0.005)	(0.005)			(0.003)	(0.003)		
$Stock.MkCap_{t-1}$			0.201***	0.118***			0.155***	0.162***
			(0.005)	(0.005)			(0.004)	(0.002)
CBI	0.231	0.185	0.238	0.232	0.185***	0.127***	0.165***	0.046***
	(0.24)	(0.35)	(0.27)	(0.34)	(0.008)	(0.011)	(0.018)	(0.002)
PolInst	0.183**	0.145**	0.079	0.061**	0.135*	0.128**	0.113*	0.210**
	(0.045)	(0.064)	(0.174)	(0.011)	(0.083)	(0.095)	(0.067)	(0.069)
CBI*PolInst		0.065*		0.071*		0.024***		0.035**
		(0.021)		(0.028)		(0.012)		(0.017)
DEBTG	−0.005	−0.004	−0.004	0.019	−0.033	−0.041	−0.025	−0.024
	(0.006)	(0.005)	(0.012)	(0.012)	(0.035)	(0.016)	(0.031)	(0.021)
POPUL	0.005	0.009	0.181***	0.098**	0.262**	0.254*	0.187**	0.176**
	(0.014)	(0.018)	(0.012)	(0.053)	(0.089)	(0.132)	(0.083)	(0.063)
GDPR	0.012**	0.018*	0.172*	0.088*	0.321**	0.345**	0.215*	0.219**
	(0.00)	(0.00)	(0.074)	(0.051)	(0.121)	(0.065)	(0.122)	(0.078)
TRD.OPEN	0.081*	0.029	0.144*	0.025*	0.15*	0.122*	0.158*	0.255*
	(0.051)	(0.11)	(0.068)	(0.01)	(0.08)	(0.087)	(0.075)	(0.112)
LGDPC	−0.05	0.041	1.704	−1.124	0.639*	0.244*	1.620**	0.568**
	(0.22)	(0.21)	(0.75)	(0.84)	(0.332)	(0.154)	(0.35)	(0.213)

FEXRT	0.412	0.619**	0.242	1.435**	1.042*	1.414*	1.481*	1.876**
	(0.35)	(0.29)	(0.185)	(0.57)	(0.51)	(0.62)	(0.54)	(0.25)
IT	0.115**	0.355	0.323*	0.236	0.401**	0.535**	0.451*	0.227**
	(0.042)	(0.71)	(0.18)	(0.61)	(0.022)	(0.19)	(0.221)	(0.45)
LDS	−0.043*	−0.016	−0.033*	−0.023**	−0.13**	−0.119**	−0.022*	−0.055*
	(0.03)	(0.181)	(0.021)	(0.00)	(0.031)	(0.072)	(0.011)	(0.041)
CBASSETS	0.056	0.027	0.293	0.231	0.305**	0.225**	0.118*	0.133**
	(0.25)	(0.22)	(0.71)	(0.851)	(0.116)	(0.125)	(0.092)	(0.011)
FINOPEN	0.42	0.119**	0.245	0.258*	0.145	0.114**	0.175	0.187*
	(0.33)	(0.025)	(0.73)	(0.154)	(0.46)	(0.055)	(0.56)	(0.118)
Total CBI effect		0.25*		0.303*		0.151***		0.076**
$(\beta_2 + \beta_4)$		(0.015)		(0.111)		(0.021)		(0.025)
Observations	951	951	468	471	1,660	1,669	1207	1207
No. of countries	48	48	18	18	90	90	63	63
No. of instruments	28	27	11	11	35	35	31	31
AR (1)	0.003	0.003	0.004	0.004	0.001	0.003	0.001	0.002
AR (2)	0.201	0.201	0.202	0.202	0.209	0.199	0.202	0.209
Hansen test	0.110	0.110	0.111	0.119	0.221	0.221	0.205	0.204

Source: The authors.

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

$PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is log of real GDP per capita, $InstQUal_{it}$ is the rescaled political rights score, from 0–6 where 0 denotes least respect for political rights and 6 highest respect for political rights, and $TRD.OPEN_{it}$ is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as 1 for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* inflation targeting regime and is a dummy measured as 1 for inflation targeting regimes and 0 otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is Chinn–Ito binary index for capital openness. All regressions include both country-specific effects and time-period effects.

In developed countries (Table 3), central bank independence (CBI_{it}) has a significantly positive impact on all three measures of financial development; namely, the ratio of private credit to GDP ($PRIV.CRE_{it}$), the ratio of stock market capitalisation to GDP ($STOCK.MKCAP_{it}$) and ratio of public bonds to GDP ($PUBLICBOND_{it}$). This shows that in other developing countries and developed countries, CBI has a direct positive impact on financial development. This is explained by the impact of CBI on price stability as well as effective regulation and supervision by a central bank independent of political control which focusses on achieving price stability and effectively dealing with weak financial institutions, thereby engendering confidence in the financial system as argued by Laeven and Levine (2009) and Agoraki et al. (2011). In developed countries and other developing countries, independent central bankers are allowed to operate per the charter and this has the impact of improving access to credit and capital as price stability enables market participants to enter into financial contracts within a stable macro-economic environment. The bond markets also grow as price stability guarantees better real returns to investors and no principal losses (Kang & Pflueger, 2015).

In Africa (models [1], [2] and [4]) and other developing countries (models [5]–[8]), political/legal institutional quality (*PolInst*.) has a significant and positive impact on financial development measured as the ratio of private credit to GDP ($PRIV.CRE_{it}$) only. This is, in line, with the studies of Law and Azman-Saini (2008) and Gazdar (2011), which indicate that while strong institutions matter for the development of the banking sector, it has no effect on stock market development. In developed countries, it has a significant and positive effect on both banking sector and stock market development including the bond market (models [9]–[14]). This implies that strong political/legal institutions advance the development of the financial sector (specifically the banking sector) in Africa and confirms the findings by Huang. With strong political/legal institutions, there is good governance, protection of property rights, political stability and freedom of expressions which ensures that the rights of investors and market participants are protected. This promotes price stability, reduces risks of political hunting which can cause capital flight, and enables financial institutions and businesses to operate in sound environments guaranteeing the security of credits given and investment made. This finding confirms that of other authors who found that institutions encourage financial development (Miletkov & Wintoki, 2008; Tayssir & Feryel, 2017).

The difference in the impact of political institutional quality on stock market development in Africa and other developing countries, on the one

Table 3. CBI, Political Institutional Quality and Financial Development in Developed and OECD Countries

	Developed						OECD					
	PRIV.CRT		STOCK.MKCAP		PUBLICBOND		PRIV.CRT		STOCK.MKCAP		PUBLICBOND	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
$Priv.Crt_{t-1}$	0.710***	0.785***					0.381***	0.354**				
	(0.002)	(0.002)					(0.005)	(0.005)				
$Stock.MkCap_{t-1}$			0.955***	0.921***					0.141***	0.823***		
			(0.001)	(0.001)					(0.003)	(0.002)		
$PublicBond_{t-1}$					0.121***	0.129***					0.113***	0.162**
					(0.032)	(0.041)					(0.008)	(0.091)
CBI	0.58*	0.53*	0.188**	0.108**	0.115***	0.098*	0.163**	0.081*	0.122***	0.151***	0.196	0.118**
	(0.071)	(0.152)	(0.021)	(0.006)	(0.011)	(0.052)	(0.071)	(0.032)	(0.005)	(0.005)	(0.212)	(0.076)
PolInst	0.212***	0.148***	0.133**	0.154**	0.451**	0.102*	0.415*	0.048	0.152	−0.141	0.156*	0.612*
	(0.006)	(0.002)	(0.082)	(0.083)	(0.162)	(0.042)	(0.136)	(0.076)	(0.112)	(0.086)	(0.043)	(0.328)
CBI*PolInst		0.075*		0.015**		0.035*		0.092*		0.089*		0.077**
		(0.021)		(0.007)		(0.022)		(0.051)		(0.051)		(0.045)
DEBTG	0.021	0.015	0.071	0.012	0.085	0.072	−0.044	−0.131	0.022	0.069	0.181	−0.645
	(0.035)	(0.021)	(0.052)	(0.075)	(0.073)	(0.063)	(0.22)	(0.36)	(0.15)	(0.073)	(0.193)	(0.66)
POPUL	0.092**	0.075	0.183***	0.312**	0.045**	0.056***	2.893*	0.866	0.153	0.219*	0.035	0.336*
	(0.043)	(0.092)	(0.056)	(0.124)	(0.025)	(0.016)	(1.525)	(1.564)	(0.213)	(0.124)	(0.037)	(0.178)
GDPR	0.115*	0.245***	0.376***	0.341***	0.462***	0.481***	0.658**	0.379	0.269	0.421***	0.336***	0.431***
	(0.071)	(0.011)	(0.011)	(0.019)	(0.011)	(0.012)	(0.124)	(0.211)	(0.215)	(0.014)	(0.013)	(0.051)
TRD.OPEN	−0.081	−0.063	−0.121	−0.084	−0.035	−0.047*	−0.016	−0.075	−0.091	−0.025	−0.031	−0.022
	(0.08)	(0.057)	(0.088)	(0.081)	(0.041)	(0.014)	(0.042)	(0.11)	(0.13)	(0.12)	(0.045)	(0.03)
LGDPC	0.031**	0.005	0.003	0.011*	0.187	0.133**	0.382*	0.387	0.383	0.079*	0.031*	0.072
	(0.001)	(0.012)	(0.011)	(0.005)	(0.33)	(0.077)	(0.181)	(0.44)	(0.211)	(0.033)	(0.011)	(0.14)
FEXRT	0.197**	0.735**	0.377	0.612	0.021**	0.642	0.511	0.754	−0.493	0.451	−0.022	0.731*
	(0.051)	(0.182)	(0.35)	(0.78)	(0.013)	(0.311)	(0.413)	(0.811)	(0.323)	(0.371)	(0.015)	(0.118)
IT	−0.087	−0.188	0.049***	0.068	0.325***	0.329***	−0.291	−0.292	−0.413	0.433**	−0.351	0.509
	(0.19)	(0.15)	(0.005)	(0.19)	(0.013)	(0.005)	(0.21)	(0.26)	(0.42)	(0.071)	(0.310)	(0.431)

(Table 3 continued)

(Table 3 continued)

	Developed						OECD					
	PRIV.CRT		STOCK.MKCAP		PUBLICBOND		PRIV.CRT		STOCK.MKCAP		PUBLICBOND	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
LDS	−0.016**	−0.109	−0.143	−0.131	−0.165*	−0.119*	−0.162*	−0.107	−0.159	−0.157	−0.029*	−0.029
	(0.008)	(0.091)	(0.095)	(0.088)	(0.092)	(0.071)	(0.071)	(0.11)	(0.22)	(0.22)	(0.011)	(0.112)
CBASSETS	0.091***	0.065***	0.277	0.032	0.032**	0.641	0.471	0.741	0.491	0.452	0.015	0.133*
	(0.005)	(0.003)	(0.224)	(0.061)	(0.013)	(0.51)	(0.211)	(0.315)	(0.224)	(0.151)	(0.017)	(0.087)
FINOPEN	0.088***	0.144**	0.142	0.128	0.241	0.196	0.058*	0.045	0.058	0.018	0.142*	0.197*
	(0.002)	(0.022)	(0.174)	(0.194)	(0.261)	(0.185)	(0.024)	(0.066)	(0.042)	(0.091)	(0.065)	(0.082)
Total CBI Effect		0.605*		0.123*		0.133*		0173*		0.24**		0.198**
$(\beta_2 + \beta_4)$		(0.121)		(0.082)		(0.084)		(0.088)		(0.011)		(0.084)
Observations	961	961	961	961	778	778	859	852	704	704	693	693
No. of Countries	40	40	40	40	34	34	35	35	32	32	26	26
No. of Instruments	25	25	25	25	19	19	23	23	23	23	15	15
AR (1)	0.028	0.028	0.028	0.028	0.028	0.029	0.021	0.024	0.011	0.012	0.052	0.051
AR (2)	0.115	0.127	0.201	0.208	0.209	0.202	0.187	0.291	0.215	0.211	0.232	0.214
Hansen test	0.101	0.117	0.101	0.117	0.103	0.101	0.291	0.312	0.118	0.158	0.101	0.101

Source: The authors.

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

$PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is log of real GDP per capita, $PolInstI_{it}$ is the rescaled political rights score, from 0–6 where 0 denotes least respect for political rights and 6 highest respect for political rights, and *TRD.OPEN* is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as 1 for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* inflation targeting regime and is a dummy measured as 1 for inflation targeting regimes and 0 otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is Chinn–Ito index for capital openness. All regressions include both country-specific effects and time-period effects.

hand, and developed countries, on the other hand, could be due to the low levels of institutional quality which do not promote the commitment of capital for long-term projects or investments. Political instability in most African countries does not encourage the long-term commitment of funds (Ayadi, Arbak, Naceur, & De Groen, 2015).

4.1.2 Is the Impact of CBI on Financial Development Dependent on the Level of Development of a Country?

From Tables 2 and 3 in African countries, CBI has no direct impact on financial development, while in other developing and developed countries, CBI has a direct impact on financial development, With the knowledge also from the results that per capita GDP is a significant determinant of financial development in other developing and developed countries while it is not a significant determinant of financial development in African countries, we seek to investigate whether the direct impact of CBI on financial development is driven by the level of development of a country. It could be that the significant impact of CBI on financial development in developing countries is driven by the upper middle income and high-income countries in the sample who share similar characteristics with developed countries in terms of income levels and institutional quality.

In order to examine this, following Issahaku et al. (2018), we split our developing countries sample into two, based on the World Bank's 2014 classification of countries based on gross national income (GNI) per capita computed from the Atlas method. The income divisions are: low-income countries (GNI per capita of less than or equal to $1,045 in 2013), lower-middle-income countries (GNI per capita greater than $1,045 but less than $4,125), upper-middle-income countries (GNI per capita greater than $4,125 but less than $12,746) and high-income countries (GNI per capita of $12,746 or greater). For the sake of our analysis, and to gain an adequate sample size, we truncate the sample at $4,125; those countries below this amount form one sample (low-income and lower-middle-income countries), whereas those above (upper-middle-income and high-income countries) form another sample.

This classification is based on the presumption that the CBI characteristics of low-income countries will be similar to those in lower-middle-income countries, and the CBI features of upper-middle-income countries will be similar to those in high-income countries. This categorisation will also afford us more observations to avoid over fitting the models. We then run separate regressions for low-income and lower-middle-income countries (LLMIC), on the one hand, and upper-middle-income and high-income countries (UMHIC), on the other hand.

From the results in Table 4, we clearly see that while CBI has no direct impact on financial development in LLMIC (models [21]–[24]), it has a positive and significant impact on financial development in upper middle and high-income countries (models [25]–[28]). Low-income countries are associated with low levels of institutional quality which deters effective functioning of independent central banks. The interactive term between CBI and institutional quality ($CBI * PolInst_{it}$) in Table 3 is however significant and positive in both LLMIC and upper middle and high-income countries (models [26] and [28]). This means that the impact of CBI on financial development is conditional on the level of development of the economy. In high-income countries, where per capital income is high, people are able to take advantage of investment opportunities and the willingness of financial institutions to advance credit as their capacity to pay back is high. In low-income countries, even when there is price stability, not everyone can take advantage of credit facilities provided by financial institutions, for example, as they may not have the minimum income to guarantee repayment of their loans. In addition, well-developed economies generate economic opportunities where profitable investments can be made therefore encouraging demand for finance in a stable economic environment. Developed countries are also associated with high-quality institutional environments where the rule of law is high, and therefore, independent central banks can function effectively in achieving price stability and properly regulating and supervising financial markets.

The study also ran regressions for OECD countries, which is made up of some developed countries. This is shown in Table 2 models (15)–(20). In thee regressions, CBI has a significantly positive impact on all the three measures of financial development across all models. Institutional quality had a significant and positive impact on financial development in models (15), (19) and (20). This is shown by the significantly positive coefficient of the interactive variable $CBI * InsQual_{it}$ in models (16), (18) and (20). This means that overall, in economies that are well developed, CBI promotes financial development and its impact on financial development is enhanced in strong institutional environments. We also run regressions for global sample presented in Appendix 3. This largely confirms the role strong institutions play in enhancing the impact of central bank independence of financial development.

Table 4. CBI, Institutional Quality and Financial Development in LLMIC and UMHIC

	Low and Lower Middle Income				Upper Middle and High Income			
	PRIV.CRT		STOCK.MKCAP		PRIV.CRT		STOCK.MKCAP	
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
$PRIV.CRT_{t-1}$	0.021***	0.019***			0.017***	0.083***		
	(0.001)	(0.001)			(0.001)	(0.003)		
$STOCK.MKCAP_{t-1}$			0.101***	0.087***			0.042***	0.097***
			(0.006)	(0.002)			(0.005)	(0.001)
CBI	0.054	0.071	0.042	0.022	0.009***	0.014***	0.037***	0.091***
	(0.031)	(0.031)	(0.012)	(0.012)	(0.002)	(0.001)	(0.002)	(0.002)
PolInst	0.362*	0.381*	0.215**	0.262	0.185**	0.148**	0.301*	0.222*
	(0.035)	(0.044)	(0.011)	(0.031)	(0.011)	(0.011)	(0.052)	(0.104)
CBI*PolInst		0.083**		0.081*		0.165***		0.068**
		(0.03)		(0.03)		(0.008)		(0.008)
GDPR	0.017**	0.022***	−0.295	0.08	0.309*	0.361**	0.214**	0.226***
	(0.001)	(0.001)	(0.23)	(0.041)	(0.111)	(0.091)	(0.111)	(0.006)
DEBTG	0.011	0.022	0.041	0.009	0.012*	0.015	−0.022*	0.112*
	(0.035)	(0.021)	(0.052)	(0.075)	(0.004)	(0.023)	(0.012)	(0.051)
POPUL	0.045**	0.042	0.065**	0.034**	0.025*	0.037**	0.058*	0.013
	(0.013)	(0.071)	(0.016)	(0.011)	(0.015)	(0.017)	(0.025)	(0.011)
TRD.OPEN	0.062	0.042	0.123***	0.423	0.381	0.365***	0.233	0.164**
	(0.064)	(0.064)	(0.005)	(0.081)	(0.081)	(0.052)	(0.03)	(0.072)
FEXRT	0.274*	−0.031	−0.291	−0.266	0.019	0.087	0.078*	−0.781
	(0.14)	(0.072)	(0.88)	(0.187)	(1.86)	(1.820)	(1.142)	(1.224)
IT	0.182***	−0.018	0.238	0.242*	0.291**	0.215	0.092	0.064
	(0.008)	(0.031)	(0.061)	(0.043)	(0.043)	(0.01)	(0.072)	(0.051)

(Table 4 continued)

(Table 4 continued)

	Low and Lower Middle Income				Upper Middle and High Income			
	PRIV.CRT		STOCK.MKCAP		PRIV.CRT		STOCK.MKCAP	
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
LGDPC	0.033*	0.015	0.023	0.012**	0.103	0.099*	0.114*	0.112*
	(0.011)	(0.017)	(0.021)	(0.005)	(0.083)	(0.037)	(0.064)	(0.055)
LDS	−0.032	−0.039**	−0.024***	−0.021**	0.027***	−0.021	−0.261	0.121
	(0.04)	(0.02)	(0.001)	(0.002)	(0.003)	(0.032)	(0.341)	(0.154)
CBASSETS	0.025**	0.018***	−0.044	0.064	0.205*	0.207**	0.114**	0.119***
	(0.011)	(0.002)	(0.12)	(0.16)	(0.13)	(0.091)	(0.055)	(0.004)
FINOPEN	0.055	0.039	0.123***	0.055	0.079	0.089*	0.028	0.034**
	(0.06)	(0.06)	(0.003)	(0.08)	(0.08)	(0.05)	(0.03)	(0.01)
Observations	1717	1717	1263	1271	1568	1571	1349	1339
No of Countries	76	76	66	66	63	63	60	60
No. of Instruments	40	40	35	35	32	32	30	30
AR (1)	0.011	0.012	0.062	0.053	0.025	0.014	0.014	0.039
AR (2)	0.247	0.223	0.335	0.325	0.337	0.319	0.582	0.164
Hansen test	0.109	0.110	0.108	0.112	0.204	0.204	0.205	0.199

Source: The authors.

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.

$PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is the log of real GDP per capita, $PolInstI_{it}$ is the rescaled political rights score, from 0 to 6 where 0 denotes the least respect for political rights and six highest respect for political rights, and *TRD.OPEN* is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as 1 for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* the inflation targeting regime and is a dummy measured as 1 for inflation targeting regimes and 0 otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is the Chinn–Ito index for capital openness. All regressions include both country-specific effects and time-period effects.

5 Conclusion

The article sought to examine the impact of CBI on financial development in Africa, and compare to that in other developing countries and developed economies. Borrowing from the political economy of reforms, the study further examined the impact of institutional quality on the CBI financial development nexus in Africa and compares these results to that in other developing countries and developed countries. The study found that, CBI has no direct impact on financial development in Africa. However, in other developing and developed countries, it does. In Africa however, CBI had no significant impact. The study also found that CBI promotes financial development the more in countries with strong political/legal institutions.

Robustness checks reveal that CBI directly impacts financial development in upper-middle and high-income countries and not in LLMIC such as many African countries. This shows that the level of development of a country, does determine the extent to which CBI impacts financial development. In that case, with many African countries, being poorly developed, the impact of CBI may be insignificant. The policy implications are that CBI laws in Africa should be implemented together with other institutional reforms that strengthen the central bank's ability to be independent of political authorities. At the same time, strong economic reforms should be implemented to increase economic growth, so that the impact of CBI on financial development is not eroded away by poor economic policies in Africa.

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Appendix 1. Descriptive Statistics

Variables		Mean	Median	Max.	Min.	SD.	Obs.
PRIV.CRT	Africa	19.892	14.736	160.125	0.491	19.347	1769
	Other developing	29.219	20.193	115.783	0.491	80.527	2028
	Developed	68.671	58.178	312.154	0.059	44.925	1654
Stock.MkCap	Africa	36.043	13.785	96.939	0.009	76.587	335
	Other developing	32.410	15.922	75.380	0.009	60.713	1150
	Developed	57.091	43.308	265.128	1.389	47.434	1114
BondMktDev	Africa	–	–	–	–	–	–
	Other developing	1.47e+08	25.447	38.915	0.428	5.64e+08	360
	Developed	35.741	30.157	190.772	0.005	26.612	691
CBI	Africa	0.501	0.501	0.866	0.137	0.197	1593
	Other developing	0.491	0.482	0.899	0.134	0.198	2769
	Developed	0.483	0.450	0.894	0.097	0.222	1872
PolInst.	Africa	2.178	2	6	0	1.451	1986
	Other developing	2.757	3	6	0	1.604	2396
	Developed	4.854	6	6	0	1.598	1842
FEXRT	Africa	0.311	0.302	1	0	0.454	1259
	Other developing	0.632	0.752	1	0	0.524	3485
	Developed	0.412	0.486	1	0	0.525	1483
GDPR	Africa	4.084	14.736	149.73	−62.08	7.682	1908
	Other developing	29.219	20.193	115.783	0.491	80.527	2028
	Developed	68.671	58.178	312.154	0.059	44.925	1654
Per Capita GDP	Africa	1362.7	1568.5	14749.2	113.7	2129.5	1429
	Other developing	2045.7	2254.3	15912.5	111.7	2179.6	4127
	Developed	23951	32154	87772.7	589.1	14956	1703

POPUL (log)	Africa	5.241	7.736	26.73	2.118	3.37	2013
	Other developing	12.31	13.254	35.83	3.215	3.427	2018
	Developed	13.27	13.178	33.154	4.591	3.525	1554
TRD.OPEN	Africa	43.58	45.2	92.9	22.5	16.5	1569
	Other developing	33.82	54.23	85.27	21.6	36.7	2480
	Developed	91.9	89.52	217.4	21.38	19.42	1912
IT	Africa	0.019	0.018	1	0	0.0967	1588
	Other developing	0.072	0.065	1	0	0.0987	2579
	Developed	0.115	0.095	1	0	0.124	1937
FINOPEN	Africa	−0.25	−.0.15	2.37	−1.90	1.45	1986
	Other developing	−0.23	−1.19	2.37	−1.90	1.44	2376
	Developed	1.30	2.37	2.37	−1.90	1.36	1842
LDS	Africa	9.28	10.25	15.23	6.87	5.63	1543
	Other developing	7.75	9.78	12.54	3.48	5.26	2769
	Developed	8.26	8.32	5.53	1.61	1.23	1872
CBASSETS	Africa	2.21	2.35	3.56	1.25	1.451	1986
	Other developing	5.21	5.36	4.52	1.75	1.604	2396
	Developed	6.54	6.87	8.53	4.56	2.58	1842

Source: The authors.

$PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is log of real GDP per capita, $InstQUal_{it}$ is the rescaled political rights score, from 0–6 where 0 denotes least respect for political rights and 6 highest respect for political rights, and $TRD.OPEN_{it}$ is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as *1* for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* inflation targeting regime and is a dummy measured as *1* for inflation targeting regimes and *0* otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is Chinn–Ito binary index for capital openness.

Appendix 2. Correlation Matrix

Variable	PRIV. CRT	Stock. MkCap	Bond MktDev	CBI	PolInst.	FEXRT	GDPR	Per Capita GDP	POPUL (log)	TRD. OPEN	IT	FINOPEN	LDS	CBASSETS
PRIV.CRT	1.00													
Stock.MkCap	0.421	1.00												
BondMktDev	0.322	0.212	1.00											
CBI	0.458	0.421	0.421	1.00										
PolInst.	0.564	0.554	0.311	0.421	1.00									
FEXRT	0.468	0.321	0.119	0.112	0.012	1.00								
GDPR	0.521	0.553	0.325	0.213	0.214	0.218	1.00							
Per Capita GDP	0.755	0.628	0.412	0.211	0.315	0.365	0.321	1.00						
POPUL (log)	0.655	0.521	0.215	0.111	0.115	0.116	0.258	−0.112	1.00					
TRD.OPEN	0.521	0.422	0.223	0.145	0.235	0.174	0.421	0.358	0.365	1.00				
IT	0.524	0.325	0.214	0.198	0.114	0.163	0.416	0.269	0.125	0.362	1.00			
FINOPEN	0.636	0.352	0.325	0.124	0.254	−0.124	0.325	0.456	0.365	0.432	0.101	1.00		
LDS	−0.535	−0.425	0.113	−0.114	−0.128	0.139	−0.216	−0.256	0.113	−0.124	0.115	−0.215	1.00	
CBASSETS	0.433	0.321	0.215	0.118	0.128	0.248	0.421	0.214	0.025	0.421	0.356	0.487	−0.268	1.00

Source: The authors.

Note: $PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is log of real GDP per capita, $InstQUal_{it}$ is the rescaled political rights score, from 0 to 6 where 0 denotes least respect for political rights and 6 highest respect for political rights, and $TRD.OPEN_{it}$ is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as 1 for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* inflation targeting regime and is a dummy measured as 1 for inflation targeting regimes and *0* otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is Chinn–Ito binary index for capital openness.

Appendix 3. Global Sample

	PRIV.CRT		STOCK.MKCAP	
	(30)	(31)	(32)	(33)
$PRIV.CRT_{t-1}$	0.054***	0.079***		
	(0.001)	(0.001)		
$STOCK.MKCAP_{t-1}$			0.113***	0.094***
			(0.005)	(0.003)
CBI	0.021**	0.032**	0.019*	0.018*
	(0.011)	(0.012)	(0.008)	(0.07)
PolInst	0.114**	0.115**	0.201**	0.205**
	(0.037)	(0.034)	(0.051)	(0.043)
CBI*PolInst		0.075**		0.065*
		(0.23)		(0.21)
GDPR	0.012***	0.015***	−0.023*	0.052*
	(0.001)	(0.001)	(0.014)	(0.011)
DEBTG	0.015*	0.017	0.008*	0.011
	(0.008)	(0.021)	(0.002)	(0.075)
POPUL	0.006**	0.007*	0.014**	0.017**
	(0.002)	(0.002)	(0.016)	(0.008)
TRD.OPEN	0.032**	0.022	0.043**	0.051
	(0.014)	(0.064)	(0.015)	(0.081)
FEXRT	0.024**	−0.033*	−0.048*	−0.052*
	(0.14)	(0.012)	(0.028)	(0.027)
IT	0.104***	−0.025	0.108*	0.119
	(0.018)	(0.031)	(0.071)	(0.143)
LGDPC	0.054**	0.036**	0.041**	0.052**
	(0.019)	(0.017)	(0.018)	(0.015)
LDS	−0.023*	−0.037**	−0.034***	−0.031**
	(0.014)	(0.018)	(0.002)	(0.009)
CBASSETS	0.031***	0.021***	−0.065	0.054
	(0.005)	(0.003)	(0.16)	(0.18)
FINOPEN	0.071	0.052**	0.063***	0.072*
	(0126)	(0.16)	(0.003)	(0.028)
Observations	3255	3255	2831	2831
No of Countries	142	142	142	142
No. of Instruments	68	68	57	57

(Table A3 continued)

(Table A3 continued)

	PRIV.CRT		STOCK.MKCAP	
	(30)	(31)	(32)	(33)
AR (1)	0.014	0.014	0.015	0.015
AR (2)	0.103	0.115	0.121	0.122
Hansen test	0.107	0.109	0.117	0.118

Source: The authors.

Note: Standard errors are in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
$PRIV.CRT_{it}$ denotes the ratio of domestic private credit to GDP. $STOCK.MKCAP_{it}$ denotes the ratio of stock market capitalisation to GDP. $PUBLICBONDS_{it}$ denotes the ratio of public bonds to GDP. CBI_{it} is the central bank independence measured by the CWN index, $GDPR_{it}$ is the real GDP annual growth rate, $LGDPC_{it}$ is the log of real GDP per capita, $InstQUal_{it}$ is the rescaled political rights score, from 0 to 6 where 0 denotes least respect for political rights and 6 highest respect for political rights, and $TRD.OPEN_{it}$ is the trade openness measured as the ratio of sum of exports and imports to GDP. $FEXRT_{it}$ is a dummy variable for the exchange rate regime measured as 1 for fixed exchange rate regimes and 0 otherwise. IT_{it} *denotes* the inflation targeting regime and is a dummy measured as 1 for inflation targeting regimes and 0 otherwise. $POPUL_{it}$ is the size of the population and $DEBTG_{it}$ is the debt to GDP ratio. LDS_{it} is the difference between lending rate and deposit rate; $CBASSETS_{it}$ is the ratio of central bank assets to GDP and $FINOPEN_{it}$ is the Chinn–Ito binary index for capital openness.

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