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The Influence of Financial Market Development on Economic Growth in BRICS Countries

Abstract

The debate about the influence of financial market development on economic growth has been ongoing for more than a century. Since Schumpeter [1912] wrote about the happenings on Lombard Street there has been growing interest in the way financial market development affects economic activity and growth. As development issues have deepened, inquiry into the finance-growth nexus has also grown, with recent research focusing on various aspects of financial crisis and developments in the BRICS economies. This study investigates the influence of financial market development on the higher growth of BRICS as compared to non-BRICS counterparts. The research utilizes the Generalised Method of Moments and an extended endogenous growth model to estimate the influence of a set of financial market indicators. We find that higher private sector levels of credit and financial depth in the BRICS economies contributed to the economic growth of those economies.

Keywords: Financial Market Development, economic growth, BRICS
JEL: O43

Introduction

The role of financial market development in economic growth has been studied since Schumpeter's findings about Lombard Street [1912]. Clearly, the development of financial market affects economic activity and growth. It has also emerged as a policy lever that central banks and governments use to target economic growth.

Financial market development is defined by Demirgüç-Kunt et al. [2009] as improvements of the size, activity, efficiency and stability of the financial system. Levine [2005] describes an effective financial system as one that embodies five functions: (i) production of ex-ante information about possible investments, (ii) monitoring of investments and implementation of corporate governance, (iii) trading, diversification, and management of risk, (iv) mobilisation and pooling of savings, and (v) exchange of goods and services. In this study we investigate the possible improvement of these functions and their potential impact on higher economic growth in BRICS countries.

Chittedi [2009] noted that BRICs nations reformed their financial regulations and policies to attract foreign portfolio flows and accelerate their stock market and banking sector development. Thus, they experienced a fundamental change in financial structures and capital flows from developed nations. Gries [2008] concluded that these countries fostered their financial development by reducing governmental intervention in national financial sectors, privatising banks and enhancing market capitalisation. These policies promoted growth through, *inter alia*, a higher mobilisation of savings or a rise in domestic and foreign investments.

In developing financial markets BRICS have been more emphatic than their other counterparts, leading to higher growth rates. The next section illustrates how financial market development interacts with economic growth mechanisms.

Literature Review

Schools of Economics

The history of economic theory inspires and influences financial market development and economic growth. The Classics, Neo-Classics and Monetarists believed in funds mobilising financial markets and the allocation of these funds into productive activities via the banking system. Central bank control of liquidity and its coordination are

evident features of the role of banks in private sector lending [King, Levine, 1993b]. The Keynesians separated investment from savings and attributed the origin of its levels and nature to "animal spirits". In addition to Monetarist Theory, the Classical school laid the economic foundations of financial market mechanisms affecting savings and investment.

Literature on the role of financial market in promoting economic growth, the stakeholders involved in financial markets, and their impact on the mobilization of savings and allocating capital is incorporated into the analysis presented below.

The Role of Financial Intermediaries in Financial Markets

In an open economy with free markets, financial intermediaries connect lender savers to borrower spenders [Gurley, Shaw, 1955]. Howells [2007] argued that a financial intermediary's role is "to creates assets for savers and liabilities for borrowers which are more attractive to each than would be the case if the parties had to deal with each other directly." The financial intermediaries' function is to channel funds from lender savers who have managed to save part of their income to borrower spenders who wish to spend more than their income can allow. To do so efficiently, a financial system requires many different types of institutions: banks, insurance companies, mutual funds, stock and bond markets [Mishkin, 2005].

Information Asymmetry and Funds Mobilisation

This structural and functional complexity of financial markets relates mainly to effects mitigation of transaction costs and information asymmetries that inhibit the allocation of mobilised funds in an economy. Direct means of financing are often connected with high costs and less transparency. Therefore indirect means are more favourable.

State contingent contracts are one way to provide entrepreneurs with direct funding. Given information asymmetry in the lending process, it is crucial that financial intermediaries reduce a lack of trust between borrowers and lenders, to open up fund flows and spur economic growth. Functional financial intermediaries enable funds mobilisation through reduced transaction costs and ameliorated information asymmetry leading to greater volumes of capital being allocated in comparison to the direct process. It is therefore necessary to understand how financial intermediaries influence economic growth.

Financial Sector Reforms and Financial Market Development in BRICS Countries

Financial market development involves size, activity, allocative efficiency and stability of the financial system improvements King and Levine [1993a; 1993b] demonstrated

that financial-sector reforms in five developing countries were strongly associated with financial development. Lynch [1996] noted that "As initial liberalisation leads to positive real interest rates, only projects with positive real returns are undertaken. Positive real interest rates stimulate greater financial saving, significantly increasing monetisation of the economy, and financial intermediation."

The following indicators of financial development were borrowed from King and Levine [1993a, 1993b]. The first indicator is *DEPTH*, which is a proxy for the overall size of the formal financial intermediary sector measured as the ratio of liquid liabilities of the financial sector to GDP. The second indicator is *BANK*, the ratio of deposit-money bank domestic assets to deposit-money bank assets plus central-bank domestic assets. The researchers introduced this variable to emphasise the risk-sharing and information services that their theory states banks are most likely to provide. The third variable is PRIVY – the ratio of claims on the nonfinancial private sector to GDP, which indicates the share of credit funnelled through the financial system to the private sector.

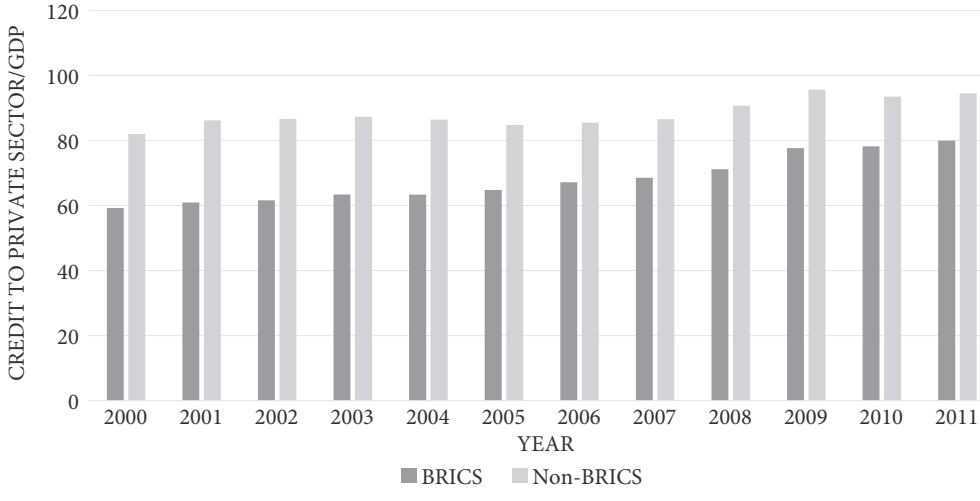
Development of bank lending to firms has generally preceded stock and bond markets, which were then followed by credit and insurance markets [Pagano, 1993]. This justifies our focus on bank lending as it is a fundamental form of financial intermediation. Stock and bond markets play a lesser role in our countries of interest. We focus on identifying trends in financial market development indicators and analysing how they affect economic growth. The diagrams that show the trends and their correlation with the growth of financial markets in emerging economies and BRICS are illustrated below.

Figure 1 compares the averages for the credit to private sector value as a percentage of GDP for BRICS versus non-BRICS emerging economies. Seventeen emerging market economies were, included. During the 2000–2010 period, we see an increasing rate of private sector credit to GDP in BRICS economies (although non-BRICS economies generally have higher averages of credit to private sector than the BRICS economies). The non-BRICS ratios, however, remain constant over the examined period. Increasing ratios imply increased bank lending to the private sector, implying an increase in the size of the intermediaries sector in an economy. In this paper this indicator is denoted as PRIVY.

Figure 2 indicates financial depth as a measure of the size of the financial system relative to the economy. In this paper this is denoted by the DEPTH indicator. The BRICS economies experienced increasing depth between the years 2000–2011, though the non-BRICS emerging economies increased the amount of M2 to GDP as the decade progressed. The greater depth of the BRICS economies is associated with the long gestation periods of projects that spur economic growth.

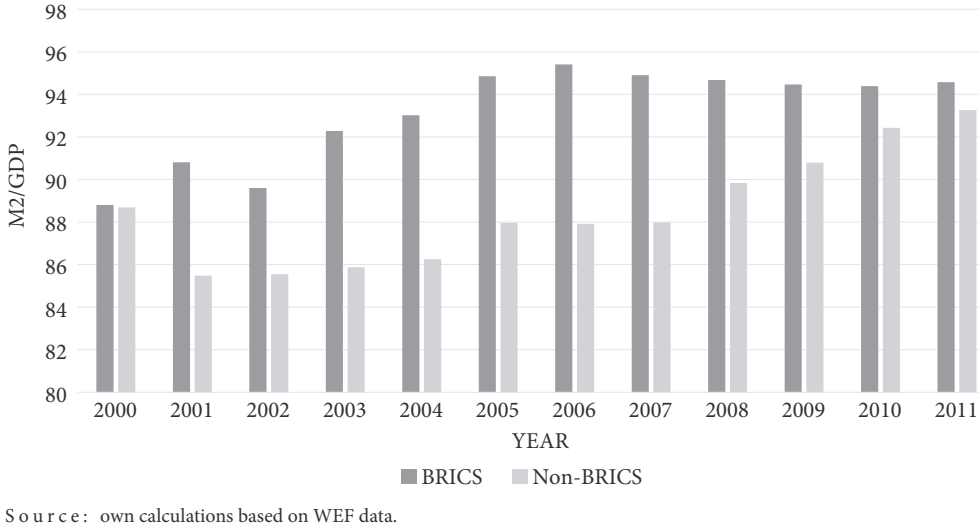
Figure 3 indicates that BRICS economies had more bank assets in the economy compared to non-BRICS countries. The could be interpreted as indicating that BRICS economies have more bank intermediation than non-BRICS economies and are also funnelling more funds to productive private sector projects than other financial market intermediaries (including central banks).

FIGURE 1. BRICS vs. non-BRICS: Credit to private sector as a percentage of GDP



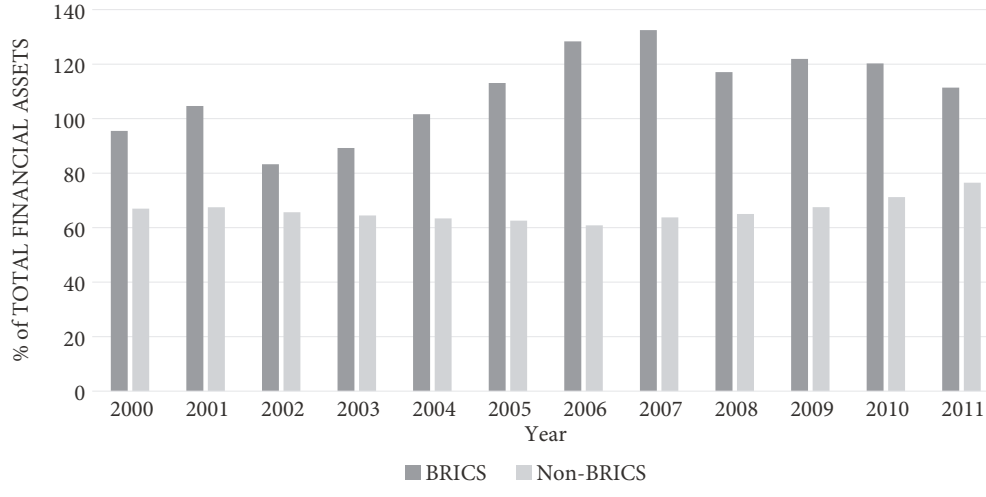
S o u r c e : own calculations based on WEF data.

FIGURE 2. BRICS vs. non-BRICS: Money supply as a percentage of GDP



S o u r c e : own calculations based on WEF data.

FIGURE 3. BRICS vs. non-BRICS: Bank assets as a percentage of total financial assets



S o u r c e : own calculations based on WEF data.

Methodology

Econometric Methodology

The following analysis involves regressing several financial sector development indicators against real GDP growth, capital accumulation and productivity enhancements. The methods used include three stage least squares, Vector Error Correction models and Vector Auto Regressive models. The underlying theory of the endogenous growth models, tested on the countries around the world, resulted in a wide variety of findings. Until now the most robust econometric methodologies applied to panel data analyses were the generalised method of moments which could account for the endogeneity of physical capital accumulation in economic growth as Spiegel et al. [2001], Lopez and Spiegel [2002] have demonstrated, creating a precedent for further investigation for the growth finance nexus along the same line of thought.

The econometric tool applied in this study is panel data analysis through the generalised method of moments, as described by Loayza et al. [2000], Spiegel and Benhabib [2000] and Levine [1997]. The intuition in this method is to circumvent the simultaneity bias that is induced by the co-determination of physical capital accumulation and income in time series. If this aspect is not treated for estimation with OLS, it will produce estimates that are biased between income and physical capital accumulation. Besides simultaneity bias GMM enables full information to be distilled from the data.

The GMM system entails estimating level equations, preferably in logarithms, which enables obtaining elasticity coefficients. Differenced lags of the dependent variable and the weak exogenous variables are then utilised to estimate the equation in a two-stage mode. Usually labour and capital are defined as weakly exogenous or endogenous in the generalised method of moments estimations of production functions [Benhabib, Spiegel, 2000].

Jose Lopez uses DEPTH, BANK and PIVYY differently, identifying a problem with indicators that arises in growth regressions concerning their tendency to be endogenous with current income levels and investment rates, as discussed by Greenwood in Jovanovich [1990]. To address the endogeneity issue he uses the beginning of period values as indicators of financial development. He also notes that the extent of financial markets development in anticipation for future investment and growth, may cause simultaneously bias in the analysis.

To address this possibility, the GMM system methodology of Blundell and Bond [1998] is used. This methodology builds upon the differenced GMM estimation method of Holtz-Eakin et al. [1988] and Arellano and Bond [1991] that was used in several panel studies, such as Benhabib and Spiegel [2000] or in another instance the GMM system method of Blundell and Bond [1998] as in Levine et al. [2000], where both studies found a positive relationship between growth and financial economic development.

Following Spiegel and Benhabib [2000], the procedure adopted for estimation involved regressing one indicator of financial development at a time and then combining all of the indicators on one equation in order to see if they remain significant as ancillary variables that can affect GDP. A BRICS dummy variable was utilised to check if there is any financial development initiative occurring in the BRICS.

GMM as an Estimation Technique[4]

GMM was popularised by Hansen [1982] as a method to estimate moment based estimators that could not developed mathematically. The foundational intuition of the method of moments is the starting point of GMM estimation, where this method is based on the idea of estimating a population moment by utilising a corresponding sample moment. A moment is a statistical attribute of a population or sample data generating process. Typical moments are the mean, variance, peakedness and kurtosis of a given data generation process.

The vector L of moment conditions that the true parameters of β should satisfy may be written as follows:

$$E[m(y_t, \beta)] \tag{1.1}$$

Where y_t, a vector of variables is observed at time t and β is the unique value of a set of parameters that makes the expectation equals zero. Equation (1.1) should usually satisfy

orthogonality conditions between a set of instrumental variables Z_t and the residuals of the equation, $u_t(\beta) = u(y_t, X_t, \beta)$ as follows:

$$E[Z_t \mu_t(\beta)] \tag{1.2}$$

Where: X_t refers to a set of explanatory variables observed at time *t*. By replacing the moment conditions in equation (1.1) by its sample analogue, the following traditional MOM estimator – equation (1.3) is obtained:

$$\frac{1}{T} Z' u_t(\beta) = 0 m_t(\beta) = \frac{1}{T} \sum_{t=1}^{T} Z_t u_t(\beta) \tag{1.3}$$

Where: T is the sample size. The MOM can only yield an exact solution to this equation if the number of *L* of moment conditions is equal to *K* number of parameter estimates.

The general case includes more moment conditions than the number of unknown parameters; (*L*>*K*). Under such conditions, the alternative approach to the over-identified system is the GMM. The GMM procedure is an extension of the traditional MOM approach, which permit us to deal with such case [Mittlehammer et al., 2000]. Although generally there is no exact solution of an over-identified system, GMM is deemed to reformulate the problem by choosing a β that makes the sample moment as close to zero as possible.

To compute beta value, the following quadratic function is utilised:

$$J\left(\beta, \hat{W}_T\right) = T m_t(\beta)' \hat{W}_T^{-1} m_t(\beta) \tag{1.4}$$

$$= \frac{I}{T} u(\beta)' Z \widehat{W_T^{-1}} Z' u(\beta) \tag{1.5}$$

Where: W_T is an (m x m) weighting matrix which minimises the weighted distance between the theoretical and actual values. It is worth mentioning that GMM produces consistent estimates with a positive weighting matrix. For instance, Mittlehammer et al. [2000] stated that the GMM approach defines an entire family of consistent and asymptotically normally distributed estimators as a function of the weighting matrix. Another benefit arises in the presence of hetero-scedastic errors in which GMM is asymptotically more efficient than its special cases for instance Two-Stage Least Squares.

Moment conditions that will be minimised in the analysis will be as following:

$$\Sigma(LogY_{it} - LogA_{it} - \alpha LogK_{it} - \beta LogL_{it} - \gamma LogH_{it} - \varphi_1 LogTC_{it} - \varphi_2 OP_{it} - \varphi_3 RD_{it} -$$

$$- \varphi_4 GE_{it} - \varphi_5 DEBT_{it} - \theta_2 X_{it} - \delta DBRICS_{it} - \tau(DBRICS_{it} * X_{it}) Z_{t-1}) = 0 \tag{1.6}$$

Up to

$$\Sigma(LogY_{it} - LogA_{it} - \alpha LogK_{it} - \beta LogL_{it} - \gamma LogH_{it} - \varphi_1 LogTC_{it} - \varphi_2 OP_{it} - \varphi_3 RD_{it} -$$

$$- \varphi_4 GE_{it} - \varphi_5 DEBT_{it} - \theta_2 X_{it} - \delta DBRICS_{it} - \tau(DBRICS_{it} * X_{it}))Z_{t-n} = 0 \qquad (1.7)$$

All these are orthogonal conditions that can be simplified to yield approximations of the parameter estimates that will minimise the difference from zero for the given moments. Z_{t-n} is a matrix of instruments that has lags running from time *t* up to time *n*.

The estimation of growth regressions was done using the generalised method of moments (GMM) to account for the endogeneity of physical-capital accumulation. This accounts for the fact that economic growth influences past values of growth concurrently, as well as being influenced by past values. To untangle the dual causality an estimator is applied, which accommodates the bi-causality between economic growth and physical-capital accumulation by weighting the error terms of the equation with instruments that alternatively explain the phenomenon in question.

This methodology has been used in several panel growth regressions, including Caselli et al. [1996] and Easterly et al. [1997], applying advanced techniques by Holtz-Eakin et al. [1988] and Arellano and Bond [1991]. Essentially, consistency of estimators under GMM requires the assumption that all factors except for physical-capital accumulation are strictly exogenous, while physical-capital is only weakly exogenous. For example, for equation (1.2) we require $E(\Delta k_{it} e_{is}) = 0$ for all $s > t$ *w*hich is the moment condition that the estimation of this production function is built upon. The instruments (the weighting matrix) are by exception defined by the aforementioned moment condition.

Specification Tests for GMM

The validity of instruments used in the regressions was tested using second-order serial correlation, after which we conducted the Sargan test of the over-identifying restrictions suggested by Arellano and Bond [1991]. The logic of the test is that under the null hypothesis the over-identifying restrictions are valid, the Sargan statistic is distributed as a $\chi^2(p - k)$, where k is the number of estimated coefficients and p is the instrument rank. To ensure that there is no serial correlation in the model the residual is run and tested for second-order auto-correlation, and first-order correlation.

Conclusion

Spiegel [2001] also found that the Arellano-Bond methodology played a positive role in enhancing economic growth. In addition, Spiegel found that the growth experiences of

a sub-sample of APEC countries were more sensitive to financial development than the overall world sample of countries. This additional sensitivity appeared in both enhancing the rates of physical capital accumulation and total factor productivity growth. The analysis theoretically examines the relationship between financial development and economic growth for BRICS countries by extending the work of Benhabib and Spiegel [2000] to utilising a Blundell-Bond system GMM method.

Regression Results

A summarised description of data and sources are presented below in Table 1:

TABLE 1. Data description and sources

Variable	Symbol	Source	Measure
GDP	Y	Penn World tables 8.0	Gross domestic product at consumption levels
Capital Stock	K	Penn World tables 8.0	Stock of machinery and infrastructure utilised in the production of goods and services
Labour	L	Penn World tables 8.0	Number of people employed in a given country in a given year
Educational Achievement	H	Penn World tables 8.0	Average number of years of educational attainment
Technological Advancement	TC	World Bank Database 2014	Number of cell phone connections per 1000
Debt	DEBT	World Economic Forum database	Gross national debt to GDP ratio
Openness	OP	World Economic Forum database	Exports+Imports/GDP
Government Expenditure	GE	World Economic Forum database	Government expenditure/GDP
Research and Development	RD	World Bank Database 2014	Research and development expenditure/GDP
Bank	BANK	World Bank Database 2014	Bank assets/ (Central Bank Assets + Bank Assets)
Privy	PRIVY	World Bank Database 2014	Credit to private sector/GDP
Depth	DEPTH	World Bank Database 2014	M2/GDP

Variable	Symbol	Source	Measure
Gross Fixed Capital Formation	GFCF	World Bank Database 2014	Sum of all improvement in infrastructure, capital equipment and machinery to do business in a given year
DBRICS	DBRICS	Dummy variable	1 if BRICS,0 if otherwise

Source: own elaboration compiled from sources in the third column.

Data Transformations

Variables representing GDP, Capital Stock, Labour, Educational attainment and technological change have been transformed to logs so that they can be used in a Cobb-Douglas type of production function. The rest of the variables are either in ratio or percentage form, which makes them stationary and easier to interpret.

Data Description

The descriptions of the various variables utilised in the regressions are presented in Table 2, which. is created by using Eviews 7. These are time series descriptions that have been used in the analysis.

TABLE 2. Time series analysis

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Y	1.19E+12	4.58E+11	1.04E+13	1.28E+11	1.82E+12	3.091414	13.04894	1113.668	0
K	3.77E+12	1.57E+12	4.53E+13	3.29E+11	6.57E+12	3.962363	20.45491	2939.802	0
L	1.04E+08	26689635	7.84E+08	2020546	1.98E+08	2.514369	8.031244	404.813	0
H	2.554339	2.597946	3.244556	1.747066	0.387872	–0.040309	2.275251	4.254079	0.11919
TC	66.47597	64.02441	215.5038	0.343205	46.13253	0.516925	2.643288	9.568701	0.00836
DEBT	53.86581	47.1875	137.512	2.956	26.47551	0.161376	2.708184	1.514601	0.468931
OP	107.9844	59.10387	447.0576	18.03959	110.6156	1.859565	5.176013	148.5356	0
GE	27.56079	26.542	51.806	11.953	8.883436	0.520409	2.572989	10.12511	0.006329
RD	0.950384	0.72282	4.52323	0.04756	1.002768	2.236967	7.747189	340.4151	0
BANK	68.80701	49.40162	202.12	10.49303	47.24929	0.520054	1.997685	16.69169	0.000237
PRIVY	81.95126	59.5006	313.6654	17.36075	60.6066	1.820288	6.669629	213.7598	0
DEPTH	89.95446	95.02998	101.6567	62.70788	10.23788	–0.944551	2.494363	30.59501	0
GFCF	1.45E+11	5.12E+10	1.90E+12	1.33E+10	2.75E+11	4.182369	22.19756	3508.12	0

S o u r c e : own elaboration.

Presentation of Results

The table below shows regression results illustrating the role of financial market development in economic growth.

TABLE 3. Results of regressions
Dependent variable log (GDP)

Variable	Coefficient BASE MODEL	Coefficient BANK MODEL	Coefficient PRIVY MODEL	Coefficient DEPTH MODEL
C	7.101996*** (2.273098)	5.224699*** (2.922997)	7.389367** (3.366359)	3.610824 (2.392399)
LOG(K)	0.573272*** (0.116606)	0.302576** (0.143438)	0.261767*** (0.067327)	0.35564*** (0.107517)
LOG(L)	0.272981* (0.139231)	0.676102*** (0.152503)	0.643097*** (0.139865)	0.753227*** (0.075645)
LOG(H)	–0.025912 (1.399919)	3.31463** (1.409784)	3.028132** (1.205095)	1.82155* (1.031487)
DEBT	–0.059138*** (0.044398)	–0.005131*** (0.00089)	–0.005739*** (0.000967)	–0.0036664*** (0.000751)
LOG(TC)	–0.004488 (0.000899)	–0.147932*** (0.052337)	–0.143097*** (0.045327)	–0.059058 (0.044112)
OP	–0.00132** (0.000601)	0.000145 (0.000436)	–0.000301 (0.000396)	0.000222 (0.000447)
GE	0.001316 (0.088003)	0.001163 (0.003453)	–0.003491 (0.002779)	–0.000846 (0.003465)
RD	–0.006048 (0.000745)	0.040636 (0.096294)	–0.04338 (0.10837)	0.073867 (0.094697)
BANK	0.002182*** (0.000606)	–0.002435 (0.001863)		
PRIVY	0.000347 (0.001274)		–0.00105* (0.000598)	
DEPTH	–0.000915 (0.001274)			–0.003728*** (0.001288)
DBRICS	–0.948691* (0.471778)	–1.955935*** (0.322799)	–2.085742*** (0.48616)	–6.424299*** (1.080993)
BANK *DBRICS		0.010547*** (0.003827)		
PRIVY *DBRICS			0.014336*** (0.000893)	

Variable	Coefficient BASE MODEL	Coefficient BANK MODEL	Coefficient PRIVY MODEL	Coefficient DEPTH MODEL
DEPTH *DBRICS				0.053234*** (0.010922)
Sargan Statistic	35.89366	17.37720**	17.56097**	22.27493***
AR(1)	0.0000	0.0000	0.0000	0.0000
AR(2)	0.54563	0.2703	0.4311	0.1144

Note: *** significance at 1%, ** significance at 5%, * significance at 1% and Figures in parenthesis are p- values. All regressions were regressed using Δy_{it}, Δk_{it} and Δl_{it} as instruments.

Source: own elaboration.

Interpretation of Results

Base Model

Although it is common practice to regress economic growth using potential determinants as shown in Table 1 the usefulness of this approach has increasingly been questioned by a number of studies [Sala-i-Martin, 1997; Levine, Renelt, 1992]. Bosworth and Collins [2003] stated that it is necessary to focus only on a core set of variables of interest and evaluate the importance of other variables conditionally including the core set. As such, analyses in this section focused mainly on the link between financial market development and economic growth. The basic model involved is an extended Cobb-Douglas function with ancillary variables and financial market development indicators. The coefficients for K, L and H are therefore flexible regarding capital, labour and educational attainment respectively. The flexibility for capital is 0.57, implying that a one-unit increase in the log of the capital stock will yield a 0.57 increase in the log of GDP. This elasticity for labour is 0.27 and has the same interpretation. Human capital with a coefficient of –0.002 implies that a one-year increase in the average educational attainment of the population will yield a negative 0.002 percentage shift in GDP. All these variables are significant at the 5 percent level.

The results from the econometric analysis of the determinants of economic output show that domestic capital, stocks, labour and bank assets relative to total financial assets have a positive and statistically significant impact on economic output, while government consumption and openness have a significantly negative impact on growth. The negative coefficient of changes in government consumption suggests that government was pursuing a counter-cyclical fiscal policy by increasing consumption in response to lower growth and reducing it in response to higher growth. The coefficient for the debt-to-GDP ratio shows that for every percentage point increase in the debt-to-GDP ratio the growth rate of per capita income falls by 0.06%. In a log model, coefficients for variables in ratio or

percentage forms translate into percentage increases in the logged dependent variable. The results are also consistent with Barro's [1999, p. 3] findings that growth is inversely related to government consumption.

Openness to trade has a coefficient of –0.0002 implying that a percentage increase in openness to trade reduces GDP by 0.0002 log units or 0.04%. A percentage increase in gross national debt will decrease GDP by 0.06 log units or 0.14%. The results for BANK are significant at 0.002 log units or 0.05%, PRIVY AND DEPTH are insignificant at 0.0003 and 0.0009, respectively, implying that movements in BANK assets are crucial in explaining movements in GDP, in the dataset, a 1% increase in the BANK ratio increases GDP by 0.46%. The BRICS coefficient –0.94, is significant and implies that BRICS countries as a block have lower intercept coefficients than non-BRICS countries. BRICS economies started approximtely one log unit of GDP behind non-BRICS economies at the starting point of the analysis. The data suggest that BRICS economies overtook non-BRICS economies in terms of growth in the time period of our analysis due to more liberalised financial markets [2000–2011].

Indicator Specific Models

The indicator specific models utilise a simple but intuitive extension of the Least Squares Dummy Variable (LSDV) models. Their interpretation is explained in Gujarati [2004, p. 645]. The two crucial coefficients are the financial development indicator and the BRICS coefficient. Both coefficients would have to be significant and their interpretation will be the same as in the base model. The particular interactive variable determines the slope coefficient in respect to the BRICS dummy variable and if it is positive and significant, it shows a higher growth trajectory for BRICS countries.

Bank Model

The BANK model focuses on the activities of banks in emerging markets; being mainly the composition of their assets within total financial assets in the economy. This measure of financial development has to do with the extent of banks' involvement in economic activities. The assumption is that the more assets banks bring to financial markets, the more involved they are in screening, intermediation and surveillance activities as a percentage of all banking activity in the country, the more they are likely to funnel funds that will spur economic growth in the country. The model shows significant capital and labour elasticities as well as positive elasticity for education. Gross national debt has a negative and significant impact on GDP, as does technology.

The BANK coefficient equals –0.002 and is insignificant. The BRICS dummy has a negative and significant coefficient. The BRICS BANK interactive variable has a significant but positive coefficient of 0.01, which implies a percentage increase in bank activities that allows GDP growth 2.32% faster in BRICS economies compared to non-BRICS economies. However, since the BANK coefficient is insignificant, the BANK variable does not affect

economic activity in this selected data. Overall, the emerging market economies portray conformity to Neo-Classical principles in their behaviour. The level of bank involvement as a percentage of total financial intermediation in the BRICS economies has led to faster economic growth.

Privy Model

The PRIVY model focuses on funds channelled from financial markets to private sector firms. The assumption underlying the involvement of private sector credit flows in this analysis is that when more funds are channelled to the private sector, financial markets are perceived to be larger. Capital, labour and educational attainment have positive and significant elasticities. Gross national debt and technology have a negative and significant coefficient. The PRIVY indicator for private sector credit flows has a negative and significant coefficient, as does the BRICS dummy. The interactive dummy is positive and significant at a 0.01 level, implying that BRICS economies grow 2.32% faster than non-BRICS economies due to credit volumes that flow to the private sector. These results are consistent with findings in the literature about cross-country growth analyses that found a positive effect of credit to private sector on growth [Levine et al., 2000].

Depth Model

The DEPTH model is connected with the amount of liquidity in an economy. The rationale for the inclusion of depth is that the deeper the financial markets are the more people will invest in long-term gestation projects, since change of ownership is not difficult or does not entail getting a haircut on one's investment. The model has significant elasticities for capital, labour and education. Gross national debt has a negative and significant coefficient. DEPTH and BRICS independently have negative and significant coefficients but the interactive term of BRICSDEPTH has a coefficient of 0.05 implying that the depth in BRICS countries makes them grow about 13% faster than non-BRICS economies.

Robustness Checks

All the models have significant J-statistics, which imply that the instruments that have been utilised correctly over-identify the equation by creating a covariance matrix that minimises the betas or coefficients that are being estimated. The residuals of all the models portray second-order correlation, which is consistent with GMM models estimated with time series that are not in levels (logarithms and percentages in this model) [Spiegel, Benhabib, 2001]. The second stage of the regression involved the impact estimation of external capital flows on investment volatility. Findings from the estimation results are presented in Table 3. The diagnostic tests for the GMM–IV specification indicate that the model is well-specified. The new residuals for the GMM–IV specification are, at times,

auto-correlated of order 1, but not auto-correlated of order 2. The Sargan test results also confirm the validity of the over-identifying restrictions and the use of the instruments.

Conclusion

Based on the literature survey it was expected that a positive relationship between financial market development indicators and economic growth would be obtained. The econometric analysis found that a 1% increase in financial market depth causes BRICS economies to grow 13% faster than non-BRICS economies. Additionally, a 1% increase in credit extended to the private sector causes BRICS economies to grow 2.32% faster than their non- BRICS counterparts. More open financial markets can accelerate growth for developing or emerging economies; an increase in bank assets compared to total financial sector assets (including the central bank) does not cause BRICS economies to grow faster than non-BRICS economies.

Notes

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[4] Though widely known GMM has rarely been applied in empirical exercises despite its advantages. See: [Speigel 2000], Benhabib and Speigel [2001].

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