



FINANCIAL SYSTEM AND ECONOMIC DEVELOPMENT: A STUDY FOR EMERGING COUNTRIES THROUGH A SYSTEM OF SIMULTANEOUS EQUATIONS

Thomas Cristofaro Warrener^{1*} , Fernanda Faria Silva¹ , Luanna di Guimarães² 

¹Universidade Federal de Ouro Preto – Mariana (MG), Brazil.

²Universidade Federal de Ouro Preto – Ouro Preto (MG), Brazil.

ARTICLE DETAILS

Article history:

Received on January 17, 2023

Accepted on May 16, 2023

Available online on July 17, 2023

Double Blind Review System

Editor in Chief:

Fernanda Cahen

Keywords:

Financial system

Economic development

Emerging countries

Latin America

Asian countries

ABSTRACT

Objective: The objective of this paper was to analyze the bidirectional relationship between financial development and economic growth for a dataset of Latin American and Asian developing countries between 2001 and 2019. **Method:** This research employed an empirical approach to analyze the statistical relationship between financial development and economic growth, by presenting an estimation of a system of simultaneous equations for a panel of Asian and Latin American countries using 3SLS. **Main Results:** The results presented in this research provided evidence that financial development does not appear to have a significant impact on economic growth, although growth appears to have a significant and positive influence on financial development. Moreover, the results also suggested that regulatory quality and domestic credit directed to the private sector have a positive effect on economic growth, while urbanization and education showed a negative influence on growth. The estimated model also indicated that urbanization has a positive influence on financial development while foreign direct investment presented a negative effect on the development of the financial sector. **Relevance / Originality:** Most of the research agenda on the topic of finance and growth has focused on identifying correlation or causality between these variables, with little attention given to the simultaneous relationship between them. This is still a clear gap in economic literature. Following this premise, the objective of this paper was to analyze the bidirectional relationship between financial development and growth by estimating a system of simultaneous equations using the Zellner and Theil's (1962) 3SLS methodology. In this sense, the main contribution will be given empirically, based on data and analysis from emerging countries in Latin America and Asia. The fact that financial development has an influence on growth and growth plays a role on the development of the financial sector indicates a simultaneous relationship between these variables. Another relevant contribution is to update the debate on financial systems and economic development for emerging countries, highlighting institutional aspects and financial cycles. **Theoretical / Methodological Contributions:** The main contribution of this study is in the empirical strategy, whose results dialogue with part of the literature on the financial system and development presented along the text. That is, this research explored the statistical relationship between economic development and financial development for a sample composed by twenty-two Asian and Latin American emerging countries, using a simultaneous equations model.

*Corresponding author: thomaswarrener@hotmail.com

<https://doi.org/10.18568/internext.v18i3.741>

INTRODUCTION

The debate regarding financial systems and economic development began to have prominence in economic literature from the 1960's onward with seminal works such as Goldsmith (1969), Gurley and Shaw (1967), McKinnon (1973) and Shaw (1973), among others. Since then, this debate has spread among academics and policy makers. Goldsmith (1969) was the first researcher to present empirical evidence of a correlation between financial sector development and economic growth for a cross-section of countries (Eschenbach, 2004). McKinnon (1973) and Shaw (1973) advocated in favor of financial liberalization as a mechanism to increase savings, capital accumulation and, therefore, generating long-term economic growth.

Based on these seminal theoretical ideas a wide range of studies have investigated the channels in which financial development influences economic activity (Berthélemy & Varoudakis, 1996; Greenwood & Jovanovic, 1990; King & Levine, 1993). The empirical research about the relationship between financial development and economic growth has been investigated basically through multiple regressions using cross-country data. These papers presented evidence that the financial sector is an important inducer of economic growth (Beck, Demircuc-Kunt & Levine, 2009; King & Levine, 1993; Levine, 1997).

Some authors highlighted that results provided by cross-country regressions should be treated with caution due to the heterogeneous characteristic of the samples, which could generate misleading evidence (Arestis & Demetriades, 1997; Beck et al., 2009; Levine & Zervos, 1998). Most studies have obtained contradictory results regarding the influence and the direction of causality between the variables, without being able to present a consensus on the influence and direction of causality of finance in economic growth (Arestis, Demetriades & Luintel, 2001; Demetriades & Hussein, 1996; Liu & Hsu, 2006; Wang, 1999).

Some researchers have focused on the influence of financial development on economic growth in Asian countries (Liu & Hsu, 2006; Sinha & Macri, 2001; Estrada, Park & Ramayandi, 2015). Musamali, Nyanmango and Moyi (2014) focused on the importance of finance in growth in Africa; Guru and Yadav (2019) in the BRICS countries; Bittencourt (2012)

and García (2012) explored the Latin American case. These papers have investigated the relationship between financial development and economic growth, obtaining very different results for these regions, but without identifying simultaneous relationships.

Most of the research agenda on the topic of finance and growth has focused on identifying correlation or causality between these variables, with little attention given to the simultaneous relationship between them. This is still a clear gap in economic literature. Following this premise, the objective of this paper was to analyze the bidirectional relationship between financial development and growth by estimating a system of simultaneous equations using Zellner and Theil's (1962) three-stage least squares (3SLS) methodology.

In this sense, this work's main contribution will be given empirically, based on data and analyses from emerging countries. The fact that financial development has an influence on growth and that growth plays a role on the development of the financial sector indicates a simultaneous relationship between these variables. Another relevant contribution is to update the debate on financial systems and economic development for emerging countries, highlighting institutional aspects and financial cycles.

To accomplish this task, panel data from the main Asian and Latin American developing countries were used, covering the period between 2001 and 2019. Furthermore, the results presented in the estimated models provide evidence for future research regarding the topic of the relationship between finance and growth.

The first section of this article presents the introduction, while the rest of the paper is organized as follows. Section 2 gives a broad overview of the debate about the financial system and development, especially for less developed countries (LDCs). Section 3 recovers some features of the financial systems and economic cycles of the emerging countries studied in a context of greater economic and financial liberalization. Section 4 presents the empirical approach and the results presented by the estimated models. The fifth and final section concludes this paper by discussing the challenges ahead for financial sector development and growth in emerging countries, along with some policy implications and suggestions for future research on this topic.

1. FINANCIAL SYSTEM AND ECONOMIC DEVELOPMENT: AN UPDATE OF THE DEBATE

The research about the role of the financial sector in the process of economic development has been investigated over the years by several economists. Gerschenkron (1962), Goldsmith (1969) and Patrick (1966) emphasized the propulsive role that the financial sector can represent in the process of economic development of a country. Gerschenkron (1962) claimed that a country's degree of economic development at the beginning of the industrialization process determined the role of its banking sector. In the 1970's McKinnon (1973) and Shaw (1973) developed a theoretical framework that helped to explain the growth-inducing effects of financial liberalization as opposed to financial repression.

The majority of studies come to the conclusion that finance induces growth in the early stages of economic development and vice versa in more advanced stages (Eschenbach, 2004). Studies of large samples of countries support the idea that financial development facilitates the entry of newcomers (Rajan & Zingales, 2003). As stated by these authors, the growth in the number of new financial institutions is significantly higher in industries dependent on external funding when the economy is financially developed. While foreign markets bring opportunities, openness also brings foreign competitors to domestic markets.

The development of the financial system is an essential aspect of the industrialization process (Gerschenkron, 1962; Zysman, 1983). There are two main types of financial systems, bank-based and market-based, which are related to the weight of each sector in a country's financing structure¹. The considerable differences between the structures of the financial systems of different countries can be related to the timing of their industrialization process (Gerschenkron, 1962; Zysman, 1983).

In countries where industrialization started early, firms were able to finance new investments gradually with internally generated funds from security issues in relatively developed financial markets. Firms in countries where industrialization started later faced a double disadvantage relative to their

industrialized competitors (Vitols, 2001). As stated by these authors, first because the financing generated internally was inadequate in relation to the large sums needed for investments, especially for infrastructure and technological demands. Second, market financing was difficult to increase because securities markets were underdeveloped and investors were more inclined to invest in safer assets, such as government bonds. Thus, these features and constraints related to financial underdevelopment conditioned the degree of State participation in the industrialization processes of developing countries. Once established, bank-based systems have strong survivability. This interpretation of history provides support for the recommendation that developing countries follow the model of bank-based development (Aoki & Patrick, 1994).

The development of the financial system is pivotal for economic and financial stability, in order to stimulate internal sources of financing that can contribute to increasing economic activity. For this reason, the study of these determinants has been part of the research agenda of many scholars. There is more evidence regarding growth causing financial development than for bidirectional causality, as presented by Demetriades and Hussein (1996) and Levine & Zervos (1998), for example. The latter found empirical evidence that liquidity, size, volatility, and stock market integration are strongly correlated with current and future rates of economic growth, capital accumulation, productivity improvements, and savings rates. Also, it was verified that the channels for growth (capital stock, social capital, and productivity), the liquidity of the stock market, and banking development are positive and strongly correlated.

The development of the financial system is directly affected by structural and institutional changes which reach the countries. The 1990's were important for emerging countries, both in terms of economic and financial development. The World Development Report (1999-2000), published by the World Bank (1999), summarized the set of characteristics that marked this period: advances in information and communication technology (especially in the financial system); dissemination of financial innovations;

¹ For this discussion, see Beck et al. (2009) and Vitols (2001).

opening of domestic economic and financial markets; liberalization of capital account transactions; and increase in capital mobility.

This set of transformations attracted the attention of academics who sought to understand their positive and harmful effects, especially for LDCs countries. Studies such as Singh and Weisse (1998) and Stiglitz (2000), for example, analyzed the relationship between the financial system and economic development, incorporating the specificities of developing countries in terms of the potential benefits of financial liberalization. According to these studies, market liberalization can be beneficial for developed countries which have a consolidated financial structure but could be harmful to underdeveloped economies that often have little decision-making power to regulate their financial systems. On the one hand, liberalization can have benefits, on the other hand, efficient regulation and supervision is important to reduce financial weaknesses, potential systemic risk, and support economic growth.

Incorporating other elements into this discussion, Barth et al. (2013) emphasized that the greater interconnection of international financial markets increases the propensity for systemic banking crises, which can generate adverse effects for economies. Therefore, these authors highlighted the importance of regulation and supervision of the banking sector, since banks when operating efficiently are an important driving force for economic growth, especially for LDCs.

Beck et al. (2009) presented trends and indicators of financial institutions for a group of countries in the immediate aftermath of the 2007 financial crisis. According to these authors, despite middle- and low-income countries having made economic progress, this progress has been uneven, specifically in terms of financial deepening. Also, regarding the differences between market and bank-based systems, Beck et al. (2009) stated that while both market and bank funding has deepened over recent years, the deepening has been stronger for markets than for banks, especially for developed economies.

Many studies have found a positive relationship between financial and economic development (Levine, 1997; Narayan & Narayan, 2013). Although studies on the role of the financial system in economic development evolved, new nuances began to be ex-

plored, such as the relationship between finance and inequality; financial sector liberalization (and regulatory supervision capacity); the influence of internal and external macroeconomic factors in the current account deficits, capital flows, and twin crises; globalization, growth, and volatility in developing countries; the impacts of financial innovations in this market, among others (Aizenman, Jinjark & Park, 2015; Bordo & Meissner, 2015; Cihák et al., 2012; Demirgüç-Kunt & Levine, 2009; Desbordes & Wei, 2017; Prasad, Rogoff, Wei & Kose, 2007; World Bank, 1999).

Another highlighted aspect of this debate has been the relationship between the financial system and its potential to affect crises resulting from different shocks (Cihák et al., 2012; Kregel, 2009; Lane & Gian-Maria, 2017; Singh & Weisse, 1998; Wooldridge, 2020 World Bank, 2020). These elements from previous researches described in this section will be important to consider in analyzing the empirical results of this research.

2. THE FINANCIAL SYSTEM IN LATIN AMERICA AND ASIAN COUNTRIES

Latin America and Asia are composed of very heterogeneous countries in terms of stages of economic and, especially, financial development. However, these countries have some similarities. For instance, they started their intensive industrialization process relatively late; their financial system is predominantly bank-based and they accelerated their financial opening process in the 1990s which was followed by financial globalization and crises (Bordo & Meissner, 2015; World Bank, 1999, 2020).

About forty years ago, Latin America started liberalization policies; most of its countries liberated their capital account and strongly engaged in the process of financial globalization. On the one hand, globalization is justified by bringing new opportunities for expanded markets and the spread of technology and management expertise, as it raises productivity and living standards. On the other hand, globalization is feared and condemned because of its instability (World Bank, 1999, p. 4). Compared to developed countries, Latin America stands out for its imperfect markets, particularly, with asymmetric information, high transaction costs, and institutional framework without a correct incentive structure. Thereby, finan-

cial globalization can produce crises, instability, and losses, reflected in abrupt adjustments in exchange rates, damages to the economic structure and to the prices of the economy (García, 2012; Prasad et al., 2007; World Bank, 1999, 2020).

The 1980s has been called “the lost decade” for many emerging economies, especially in Latin America. These countries were marked by high inflation and indebtedness, high unemployment and low economic growth. Cross-border capital flows to emerging economies have facilitated investment and helped to foster economic development. However, they also meant that countries were more susceptible to external shocks and crises, such as Mexico (1994), Asia (1997), Russia (1998), Brazil (1999), Argentina (2001), and the financial crisis in 2007-2008 (García, 2012).

The rapid contagion of the last financial crisis has launched an alert on the dangers of globalization. Although Bekaert, Harvey, and Lundblad (2005), Eichengreen and Leblang (2003) and Stiglitz (2000) argue that the impact of financial globalization on economic development will be positive if countries have a developed and well-regulated financial system, there is still no consensus on the type of measures and intensity of regulation that would be required for each type of country².

On the Asian side, China, India, and the first rapidly industrializing economies in Northeast Asia are relatively poor in natural resources, present high levels of inequality, and are densely populated. According to Anderson and Strutt (2016), the evolution of global economy has had significant implications for regions rich in natural resources. As stated by these authors, rapid economic growth, especially in Asia, is shifting the global economic and industrial center of gravity away from the north Atlantic, and globalization is causing trade to grow much faster than output. Together, these forces are raising the importance of Asian economies in World output, consumption and trade, and are increasing the demand for exports from resource-rich economies³.

Internal and external factors have contributed to explain economic cycles of emerging countries. The main internal factors, considering different types, degrees of measures and impacts, are the commercial and financial opening processes; economic crises due to the high levels of external and internal indebtedness (in the most part of these countries), and exchange rate crises (Kregel, 2009; Lane & Gian-Maria, 2017; Prasad et al., 2007; World Bank, 1999, 2020). In addition to the internal determinants of economic cycles, external factors, such as global shocks also explain the performance of these countries, as highlighted by Fernández, Schmitt-Grohé and Uribe (2016).

In respect to their financial systems, Latin America and East Asia are at similar income levels, but one key difference is the relative abundance of savings in the latter (Aizenman et al., 2015). Still, both regions were resilient to the last financial crisis; also, some countries (such as China and Brazil) have large national banks (development, regional, and commercial banks). Some of these institutions are state-owned banks that support credit to state-owned firms and the private sector (Aizenman et al., 2015; Estrada et al., 2015; Kriekhaus, 2002). East Asian countries generally have large financial sectors relative to their income levels.

Another relevant feature of the “emerging financial system” is that corporate firms have increasingly turned their focus to bond markets. According to Wooldridge (2020), the amount of outstanding corporate debt securities almost quadrupled over the 2000–2017 period. As stated by this author, between 2009 and 2017, non-financial corporations in Eastern Europe and Latin America issued bonds predominantly in foreign currencies, whereas bonds issued by corporate firms in Asia were denominated mostly in local currencies. In terms of the equities market, although it has been developed in both regions, it is still quite heterogeneous in terms of scale and performance. Asian financial systems have experienced a rapid de-

² According to Estrada et al. (2015), the financial systems of these regions have not been so affected by the turmoil in global financial markets such as developed countries. This is because of the low exposure to toxic assets and the low level of sophistication of financial products in some countries, also due to regulatory arrangements.

³ As stated by Anderson and Strutt (2016), it is a continuation of a process that began in Japan in the 1950s and was followed by Hong Kong, South Korea, Singapore, and Taiwan from the late 1960s, then by other South-East Asian countries, but more recently by the much more populous China and India.

velopment of their equity markets and, to a lesser extent, bond markets (Estrada et al., 2015).

In short, Asian and Latin American countries have great heterogeneity in terms of economic and financial development, especially within their territories. Also, they differ on the degree of external financial openness and integration into the international market, in addition to institutional and regulatory aspects. Recently, they have gone through a significant period of economic expansion followed by crises. Although many of these countries have achieved a greater degree of productive and financial sophistication, many of them still remain dependent on external trade relations and commodity cycles.

3. EMPIRICAL STRATEGY

3.1. Sample

In order to investigate the statistical relationship between financial development and growth in developing countries this paper uses a sample of twenty-two emerging nations⁴ from Asia and Latin America between 2001 and 2019. These countries were selected based upon data availability and compose a strongly balanced panel data set of 22 countries spread along 19 years.

As described in the previous section, the countries under analysis represent a particularly heterogeneous set of nations that have experienced very different historical, political, and economic trajectories. One thing these emerging countries have in common is the fact that they have undergone a process of financial liberalization along the 1980s and 90s. An increasingly liberal financial sector combined with a globalized economy has been accompanied by an inflow of capital into developing economies, and when channeled efficiently to the productive sector is an important source of growth. Although in some cases the process of financial liberalization and the inflow of capital can lead to excessive speculation in the financial sector, generating systemic crisis and ultimately economic recession (Arestis & Demetriades, 1997).

The sample period under analysis covers a time after the process of financial liberalization under-

gone in developing countries along the 1990s, when emerging economies experienced intense macroeconomic fluctuations. The time span under analysis also covers the period before and after the 2008 financial crisis that affected economies worldwide. Therefore, the data used in this paper covers a long period of intense economic and financial change in a wide range of emerging countries, thus providing information about the relationship between financial development and growth.

To conduct the empirical research on the statistical relationship between financial development and economic growth in developing countries, the following variables were selected: *per capita* gross domestic product (GDP) growth, Financial Development Index, Average Years of Education, Regulatory Quality, Government Expenditure, Urban Population, Inflation, Access to Sanitation, Trade, Foreign Direct Investment, and Credit to the Private Sector. The abbreviation and description of these variables are depicted in table A.1 (Appendix) along with the source from which the data were collected.

3.2. Methodology and variables

Most of the literature has focused on the influence of financial development on growth; although according to Arestis and Demetriades (1997), economic growth very possibly mutually influences financial development. This hypothesis was empirically verified by Nguyen, Thai-Thuong Le, Ho, Nguyen and Vo (2021) and Pradhan, Arvin, Nair, Bennett and Hall (2018), who found evidence of bidirectional causality between financial development and growth for a sample of Financial Action Task Force (FATF) and emerging countries, respectively.

This issue of reverse causality between these variables indicates a simultaneous relationship between them. According to Wooldridge (2012), variables that are simultaneous can cause bias and inconsistency in the ordinary least squares (OLS) estimation because the explanatory variables are generally correlated with the error term of the regression.

The most common way to correct this type of error in a regression is by using instrumental variables

⁴ Bolivia, Brazil, Chile, China, Colombia, Ecuador, Hong Kong, India, South Korea, Malaysia, Mexico, Myanmar, Pakistan, Panama, Paraguay, Peru, Philippines, Singapore, Sri Lanka, Timor-Leste, Uruguay, Vietnam.

to correct the simultaneous bias (Wooldridge, 2012). This particular type of endogeneity has been empirically addressed by Guru and Yadav (2019) and Liu and Hsu (2006), who applied the generalized method of moments (GMM) to estimate the influence of finance on economic growth in Asian and BRICS countries, respectively. Bittencourt (2012) addressed the simultaneity bias between finance and growth by estimating a Fixed Effect regression model with instrumental variables to analyze the impact of financial development on economic growth in Latin American countries. Musamali et al. (2014) used two-stage least squares (2SLS) to estimate the relationship between finance and growth in Africa. According to these authors, this methodology corrects the bias generated by the simultaneity between the variables.

These papers analyzed the relationship between finance and growth by estimating one single equation with growth as the dependent variable. But as suggested by Arestis and Demetriades (1997) and empirically demonstrated by Musamali et al. (2014), Nguyen et al. (2021) and Pradhan et al. (2018), financial development and growth have a bidirectional relationship with one variable simultaneously influencing the other.

Some papers have analyzed the bidirectional relationship between finance and growth by estimating a system of simultaneous equations using 3SLS (Adamu, 2013; Gründler & Weitzel, 2013; Oseni, Akpa & Aberu, 2018). The empirical methodology conducted in this research has been largely inspired by the econometric techniques used in these papers.

Therefore, to analyze the relationship between financial development and economic growth, this research presents an estimation of a system of simultaneous equations for a panel of Asian and Latin American countries using 3SLS. One equation will present as the dependent variable economic growth (GWTH), and the other, financial development (FD) (considering banks, equity and bond markets). The variable GWTH is measured by the annual variation of the country's *per capita* GDP, and FD is a relative ranking regarding the country's depth, access, and efficiency in financial markets and institutions.

The equations will be estimated using the 3SLS estimation for simultaneous equation modeling developed by Zellner and Theil (1962) that combines instrumental variables, random effects, and generalized

least squares (Greene, 2003). This methodology was selected due to its efficiency in correcting the simultaneity bias by estimating the parameters of the system of simultaneous equations using the variance and covariance matrix of the disturbances of the regression. Thus, providing results that can be compared to other studies on the relationship between finance and growth that applied regression techniques and also addressing the bias generated by simultaneity. This strategy will provide empirical evidence about the influence of Financial Development on Economic Growth, as well as the effect of Growth on the development of the financial sector. The equations estimated in this paper are mathematically represented by Equations 1 and 2, depicted below.

$$GWTH = \alpha + \beta_1 FD + \beta_2 EDUC_{it} + \beta_3 REG_{it} + \beta_4 GOV_{it} + \beta_5 URB_{it} + \beta_6 INFL_{it} + \beta_7 TRD_{it} + \beta_8 CRDT_{it} + \varepsilon_{it} \quad (1)$$

$$FD = \sigma + \gamma_1 GWTH + \gamma_2 REG_{it} + \gamma_3 INFL_{it} + \gamma_4 URB_{it} + \gamma_5 TRD_{it} + \gamma_6 FDI_{it} + \pi_{it} \quad (2)$$

The variables GWTH and FD are paramount for this study and have been analyzed along the text. In Equation 1 a positive sign is expected for the FD coefficient, as it has been largely mentioned in literature that financial development has a positive influence on growth (Arestis & Demetriades, 1997; Bittencourt, 2012; Cihák et al., 2012; Estrada et al., 2015). For the other explanatory variables in Equation 1, a positive sign is expected for the coefficients of EDUC, REG, GOV, URB, TRD, and CRDT, as these variables are usually considered in the literature to have a positive influence on growth (Beck et al. 2009; Lee et al., 2017; Vianna & Mollick, 2018; World Bank, 1999). For details on the variables and data sources considered, please check Supplementary Table 1. According to Adamu (2013) and Estrada et al. (2015), a negative sign for the coefficient of inflation (INFL) would be expected, as inflation is usually considered to be harmful to economic growth.

Regarding Equation 2 a positive influence of GWTH on FD is expected, as Musamali et al. (2014) and Nguyen et al. (2021) found evidence of a causal influence of economic growth on financial development. The World Bank (2020) highlighted the importance of regulation on the development of the financial sector, especially after the 2008 financial crisis. Therefore, the explanatory variable REG was included

Table 1. Descriptive statistics of the variables.

Variables	Observations	Average	Standard Deviation	Minimum	Maximum
GWTH (annual %)	418	3.46	3.42	-8.87	16.41
FD	396	0.38	0.21	0.00	0.85
EDUC (years)	418	8.07	2.21	2.80	12.30
REG	396	0.07	0.93	-2.34	2.26
GOV (% of GDP)	408	15.59	16.81	5.47	147.73
URB (% of total population)	418	62.22	24.92	18.20	100.00
INFL (annual %)	415	5.07	5.40	-2.98	57.07
SANIT (% of total population)	375	76.51	19.24	18.78	100.00
TRD (% of GDP)	417	96.71	95.20	0.17	442.62
FDI (% of GDP)	415	5.05	7.25	-2.50	58.52
CRDT (% of GDP)	417	60.14	46.79	1.36	235.72

to the model with the aim to investigate the influence of regulation on financial development. The influence of inflation, trade, and foreign direct investment on financial variables has been empirically investigated by Oseni et al. (2018) and Zainudin and Nordin (2017), who came to different conclusions. By including INFL, TRD and foreign direct investment (FDI) to the model depicted in Equation 2 this research aimed to analyze the influence of these variables on FD. According to Shahbaz, Bhattacharya and Mahalik (2017), the urbanization process enhances financial development in developing countries. Therefore, the variable URB was also included in the model and is expected to exert a positive influence on FD in Equation 2. Lee et al. (2017) highlighted the contributions of urbanization, physical and human capital as being positive for economic growth. However, for emerging countries, the distributions of the benefits of these determinants are highly unequal within and across countries. From empirical exercise, these authors detected that these factors contributed to increase the income inequality in the provinces of China.

Based on the data described along the text and in Supplementary Table 1, it was possible to elaborate the descriptive statistics of the variables used in this paper, which are presented in Table 1. The number

of observations varied according to data availability. The statistics shown in Table 1 demonstrate a very heterogeneous sample, with the range between maximum and minimum being generally very large. The number of observations also varies significantly due to some missing data, but for the period and countries analyzed, this data set was considered the best available to conduct this research.

Some statistics in Table 1 demonstrate the developing aspect of the countries analyzed. Firstly, the average growth rate in the sample under analysis is 3.46% a year, thus indicating a set of growing economies. Secondly, the average urbanization calculated in the sample is 62.55% and, therefore, indicates a set of countries that are still undergoing the process of urbanization. These two characteristics demonstrate particular aspects of developing economies that are experiencing economic growth and a recent urbanization process (Bittencourt, 2012; Lee et al., 2019; World Bank, 1999)⁵.

4. RESULTS

To analyze the simultaneous relationship between economic growth and financial development two equations were estimated following the mathemati-

⁵ According to the World Bank (1999), agglomeration increases the productivity of a wide array of economic activities in urban areas. Added to productivity, Lee et al. (2017, p. 128) stated that when an economy begins to develop, the movement of labor from the rural sector to the urban-based industrial and service sectors spurs income growth, the urban sector expands, the agglomeration of people and industries would further accelerate economic growth.

cal representation of Equations 1 and 2. Both equations were estimated using a 3SLS regression model for panel data; this methodology was used because it estimates the parameters of a system of equations correcting the simultaneous bias between the variables economic growth and financial development. The results of the models are depicted in Table 2.

Some of the empirical research that investigated the determinants of growth used lagged exogenous variables as instruments to correct the simultaneity issue (Gründler & Weitzel, 2013; Levine & Zervos,

1998). But according to Guru and Yadav (2019), the use of lagged variables as instruments generates loss of information and the use of proper exogenous variables produces a more efficient and robust model. Although the authors acknowledge that this is not always possible and the use of lagged explanatory variables in most cases is sufficient to correct endogeneity. Bittencourt (2012) used the variable inflation as an instrument to investigate the relationship between financial development and economic growth, and found that this variable presented an exogenous variation to the estimated model. Therefore, the variables sanitary conditions (SANIT) and the third lag of INFL were selected as instruments in this research, as they combine a proper exogenous variable with a lagged exogenous variable. The Hansen Sargan test presented in Table 2 confirms that the instruments used are exogenous. The χ^2 statistics shown in Table 2 presented statistical significance, therefore indicating that both equations are significant at acceptable levels. The estimated model passed the rank condition test presented by Baum (2007); indicating that the system of equations is identified and therefore it is possible to obtain unique values for the estimated parameters. The tests described validate the empirical approach used in this paper, by reaffirming the consistency of the estimation of the simultaneous equation model using 3SLS.

The results from the first equation estimated, presented in Table 2, indicate that FD does not have a statistically significant influence on GWTH, therefore contradicting the evidence presented by Bittencourt (2012) and Estrada et al. (2015). In equation 2, GWTH showed a positive and significant impact on FD, thus indicating that economic growth has a positive effect on the development of the financial sector. Moreover, REG showed a significant and positive influence on GWTH in Equation 1 converging with the results of Vianna and Mollick (2018), although in Equation 2 REG did not show a statistically significant coefficient.

In agreement with Lee et al. (2017) and World Bank (1999), the variable URB was a significant parameter in both equations. As shown in Equation 1 URB presented a negative influence on GWTH and in Equation 2 a positive effect on FD. These results suggest that less urbanized developing countries present larger growth rates, while more urbanized emerging countries present a more developed financial sector.

Table 2. Results of the estimated models.

Variables	Estimated Equations	
	(1)	(2)
	GWTH	FD
Constant	9.02*** (1.78)	-1.26* (0.69)
FD	-6.40 (4.24)	
GWTH		0.24** (0.09)
REG	1.09* (0.64)	-0.093 (0.087)
URB	-0.04*** (0.01)	0.01** (0.005)
INFL	-0.03 (0.05)	0.01 (0.013)
TRD	-0.003 (0.003)	0.0009 (0.0007)
EDUC	-0.20** (0.09)	
CRDT	0.03** (0.01)	
FDI		-0.023** (0.01)
R ²	0.10	-9.74
Chi squared	44.06**	23.28***
Instruments	SANIT and third lag of INFL	
Hansen Sargan	1.182	

*p < 0.1; **p < 0.05; ***p < 0.01; ¹standard errors in parentheses; ²the Hansen Sargan test could not reject the null hypothesis that the instruments used in the regression are exogenous.

These results need to be further investigated, but may be related to the costs of disorderly agglomeration. Typically, large cities in emerging countries have been characterized by high income inequality, high cost of living, and peripheral conditions in these large centers, which have affected economic growth. In addition, a significant part of the population of these countries still lives in rural areas, considered to be of lower productivity (World Bank, 1999).

However, the positive influence of URB on FD is expected, as previously stated by Shahbaz et al. (2017). The growth of the manufacturing, services and financial sector are usually concentrated in big cities, where they benefit from agglomeration economies and ample markets for inputs, outputs, labor, and knowledge (World Bank, 1999, p. 126). The variables INFL and TRD did not present any statistical significance in any of the estimated equations, therefore inhibiting the interpretation of the coefficients of these variables.

In Equation 1 the variable EDUC presented a significant and negative impact on GWTH. This result converges with the evidence presented for a sample of African countries by Adamu (2013), even though it contradicts most of the theoretical literature regarding human capital and growth. According to Adamu (2013) the negative effect of human capital on growth can be explained by the characteristics of the variable mean years of education used. The author suggests the use of a variable that measures high-quality human capital, although this kind of data is not available for a long time period and neither for a wide number of countries.

As expected by the related literature, the variable CRDT presented a positive and significant coefficient in Equation 1, indicating that this variable has a positive influence on GWTH. This result is in consonance with the findings of Gründler and Weitzel (2013), who stated that the channeling of credit from banks to productive activities is the main form in which finance affects growth.

Finally, the variable FDI presented a negative and significant effect on FD, indicating that developing countries with higher foreign direct investment present a lower development of the financial sector. This result converges with the findings of Oseni et al. (2018), and indicates that financial openness to foreign capital can have adverse effects on the development of the financial sector in emerging countries.

This evidence contradicts the advocates of financial liberalization; after all the results indicated that in some developing countries the inflow of foreign capital can have negative effects on financial development. This does not mean that developing countries should close themselves to foreign investment, but the inflow of this type of capital should be treated with caution and with the necessary regulatory procedures.

5. DISCUSSION AND IMPLICATIONS

The main contribution of this study is in the empirical strategy, whose results dialogue with part of the literature on the financial system and development presented in parts 3 and 4. That is, this research explored the statistical relationship between economic development and financial structure for a sample composed by twenty-two Asian and Latin American emerging countries, using a simultaneous equations model.

The estimated model provided evidence that financial development does not appear to have a significant impact on economic growth, although growth appears to have a significant and positive influence on financial development. Moreover, the results also suggested that regulatory quality and domestic credit directed to the private sector have a positive effect on economic growth, while urbanization and education showed a negative influence on growth. The estimated model also indicated that urbanization has a positive influence on financial development while foreign direct investment presented a negative effect on the development of the financial sector.

The results described in this paper present evidence regarding the statistical relationship between financial development and economic growth in emerging countries. The data set used was considered to conduct this research, although the heterogeneous set of countries has to be highlighted. Despite this point, some important policy implications of this study's findings are that the development of financial markets and their institutions in emerging countries needs to be better studied because it does not necessarily work as an inducer of economic activity.

The development of the financial sector may benefit the real sector, but it depends on the ability to allocate resources to the most productive uses. It is emphasized that the role played by financial systems

is important to mitigate interregional, sectoral, and productive inequalities, important to be considered as part of broader development agenda for Latin American and Asian countries. Otherwise, the expansion of the financial sector, the fast growth of financial services, the integration into international markets, the greater vulnerability, and the dependence of these countries on international financial flows can be magnified, which allows us to point toward possible policy and regulatory framework.

By the sample under analysis, it was verified that the channeling of credit to the private sector seems to be more effective to promote economic growth than the actual development of the financial sector. This paper also suggests that the openness of the financial sector can have negative effects on financial development. This means that some emerging countries should reconsider liberal financial policies that permit the free inflow of foreign capital, as this could be harmful to financial development.

The evidence presented in this research is by no means completely conclusive, and should be treated with caution, as it analyzed a very heterogeneous sample set. Future research would benefit greatly from better details on the degree of financial development (focusing on the dynamics of equities, bonds, and credit markets), as well as on the role of different kinds of financial institutions, banking market segmentation, regulatory arrangements and the advancement of information technology. The emergence of new financial products, services and institutions (such as digital banks and currencies), also need to be considered in future studies especially on the implications of these transformations in the economic system as a whole.

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SISTEMA FINANCEIRO E DESENVOLVIMENTO ECONÔMICO: UM ESTUDO PARA PAÍSES EMERGENTES A PARTIR DE UM SISTEMA DE EQUAÇÕES SIMULTÂNEAS

Thomas Cristofaro Warrener^{1*}, Fernanda Faria Silva¹, Luanna di Guimarães²

¹Universidade Federal de Ouro Preto – Mariana (MG), Brazil.

²Universidade Federal de Ouro Preto – Ouro Preto (MG), Brazil.

DETALHES DO ARTIGO

Histórico do artigo:

Recebido em 17 de janeiro de 2023

Aceito em 16 de maio de 2023

Disponível online em 17 de julho de 2023

Sistema de revisão “Double blind review”

Editores-chefe:

Fernanda Cahen

Palavras-chave

Sistema financeiro

Desenvolvimento econômico

Países emergentes

América Latina

Países asiáticos

RESUMO

Objetivo: O objetivo deste artigo é analisar a relação bidirecional entre desenvolvimento financeiro e crescimento econômico para um conjunto de dados de países em desenvolvimento da América Latina e da Ásia entre 2001 e 2019. **Método:** Esta pesquisa empregou uma abordagem empírica para analisar a relação estatística entre desenvolvimento financeiro e crescimento econômico, apresentando uma estimativa de um sistema de equações simultâneas para dados em painel de países asiáticos e latino-americanos usando MQ3E. **Principais Resultados:** Os resultados apresentados nesta pesquisa forneceram evidências de que o desenvolvimento financeiro não parece ter impacto significativo no crescimento econômico, embora este apresente influência significativa e positiva no desenvolvimento financeiro. Além disso, os resultados também sugeriram que a qualidade regulatória e o crédito doméstico direcionado ao setor privado têm efeito positivo sobre o crescimento econômico, enquanto a urbanização e a educação apresentaram influência negativa sobre o crescimento. O modelo estimado também indicou que a urbanização apresentou influência positiva sobre o desenvolvimento financeiro enquanto o investimento estrangeiro direto apresentou efeito negativo no desenvolvimento do setor financeiro. **Relevância / Originalidade:** A maior parte das pesquisas sobre sistema financeiro e crescimento econômico tem se concentrado em identificar correlação ou causalidade entre essas variáveis, com pouca atenção dada à relação simultânea entre elas. Esta ainda é uma lacuna na literatura econômica. Seguindo essa premissa, o objetivo deste artigo é analisar a relação bidirecional entre desenvolvimento financeiro e crescimento por meio da estimação de um sistema de equações simultâneas usando a metodologia de MQ3E, de Zellner e Theil (1962). Nesse sentido, a principal contribuição será dada empiricamente, com base em dados e análises de países emergentes da América Latina e Ásia. O fato de o desenvolvimento financeiro influenciar o crescimento e o crescimento influenciar o desenvolvimento do setor financeiro indica uma relação simultânea entre essas variáveis. Outra contribuição relevante é atualizar o debate sobre sistema financeiro e desenvolvimento econômico para países emergentes, destacando aspectos institucionais e ciclos financeiros. **Contribuições teóricas / Metodológicas:** A principal contribuição deste estudo está na estratégia empírica, cujos resultados dialogam com parte da literatura sobre sistema financeiro e desenvolvimento econômico apresentada ao longo do texto. Neste sentido, esta pesquisa explorou a relação estatística entre crescimento econômico e desenvolvimento financeiro para uma amostra composta de 22 países emergentes asiáticos e latino-americanos, utilizando um modelo de equações simultâneas.

How to cite this article:

Warrener, T. C., Silva, F. F., & Guimarães L. (2023). Financial system and economic development: a study for emerging countries through a system of simultaneous equations. *Internext*, 18(3), 235-249. <https://doi.org/10.18568/internext.v18i3.741>