Financial Development and Economic Growth: A Dynamic Panel Data Analysis

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Abstract This paper re-examines the empirical relationship between financial development and economic growth. The data cover the regressions according to the maximum of 110 countries and at least 10. It includes developing and developed countries. The study period extends from 1973 to 2012. Imports results obtained using the Generalized Method of Moments dynamic panel show that the variable that influence a significant and positive economic growth, whatever the sample is the variable that reflects the level of availability of the banking system. Contrary to that extent the credits granted by the financial system to the private sector, even if significant, has a negative influence on growth. Finally, the measure that reflects the financial deepening of the economy seems to depend positively on economic growth for developing countries and negatively for developed country.

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1. Introduction

The marked differences in terms of income per capita in the world, and the differences in per capita growth rates have attracted much research in recent years on the economic growth process. Traditionally, there are three factors that may contribute to the supply side, value added growth: an increase in the volume of work, an increase in capital stock and an increase in the productivity of factors of production. The theoretical and empirical works on the most recent economic growth have emphasized the potential importance of financial development as a factor in improving the amount of capital and therefore economic growth. This relationship finance and growth has received much attention throughout the history economic. Its roots are found in the work of Schumpeter (1912) who insisted the importance of banks in the functioning of the economic system and their beneficial contribution to growth, through the financing of innovation. Despite this, traditional models of growth, including the neoclassical model, have long ignored the role of financial development. Growth in the Solow model **(Solow, 1956)** is mainly determined by technical progress which has the distinction of being exogenous. He did not therefore need to be funded, which makes it independent of changes in savings and the financial system. This is not the case in the context of endogenous growth models, which always give a vital role in technical progress, but it becomes endogenous and needs to be funded.

In light of these data, the integration of the financial system in the growth analysis appeared possible. The question that arises at this level, then, is what role the financial system in the economic system and to determine its impact on growth. This idea is developed and extended in studies of Goldsmith (1969), McKinnon (1973) and Shaw (1973). These studies refer to the new endogenous growth literature.

In this context, the aim of this paper is to empirically reinvestigate links between financial development and economic growth, using a more advanced econometric technique, which is named generalized method-of-moments (GMM) dynamic panel estimators. This econometric technique has been recently used in the growth literature as an alternative to cross-sectional estimators. The advantage of this GMM methodology is that it takes care of the econometric problems caused by unobserved country-specific effects and endogeneity of the independent variables in lagged-dependent-variable models such as economic growth regressions. The inclusion of both cross-country and time-series data introduces additional information about the over-time change in growth and its determinants, and, thus, helps us get more precise results.

The remainder of this paper is organized as follows. Section 2 provides a brief view on theoretical approaches. Section 3 reviews empirical contributions on this topic. The empirical methodology is described in Section 4 and

the results are presented in Section 5. Finally, Sections 6 states the main conclusions and policy implications.

2. Theoretical Approaches

The relationship between financial development and economic growth has attracted attention throughout the decades. Indeed, economists disagree about the role of the financial sector in economic growth. Some economists do not believe in the importance of the financial system in the process of growth. Meier and Seers (1984) and Lucas (1988), are economists who have the Nobel Prize in economics, eliminate financial development as a determinant of growth. Robinson (1952) believes, in particular, that the financial system following the economic growth. These economists have studied the financial intermediation in terms of its effects on the allocation of credit and monetary expansion. Nevertheless, the influence of the intermediation process of savings mobilization appeared in the writings of Schumpeter (1912), Gurley and Show (1955), Goldsmith (1969) and McKinnon (1973). Consequently, the possibility of a causal relationship between financial development (broadly defined as an increase in the volume of financial services of banks and other financial intermediaries, as well as, financial transactions on financial markets) and economic growth did sell a lot of ink for a long time.

Generally, economic theory postulates three awards on the effects of financial activity on the overall economic performance. First, payment methods are the least expensive services offered by the financial system (**Kindleberger, 1993**). Secondly, a volume effect, where the financial activity increases savings and thus resources can be a source of investment financing. Schematically, we have:

Financial development → Capital accumulation→ Economic growth

Thirdly, an allocation effect, that financial development improves the allocation of resources for investment.

Schematically, we:

Capital accumulation → Economic growth
↑
Financial development

Recently, many theoretical and empirical findings on the relation between financial development and growth have shown that financial intermediation is likely to have positive effects on growth. This work identifies three Key issues:

- Effect of liberalization versus financial repression on economic growth (**McKinnon 1973; Shaw, 1973; Ang and McKibbin, 2007**)
- Impact of financial structure on economic performance (**Gerschenkron, 1962 ; Mayer, 1987; Levine, 2002**)
- Effect of capital account liberalization on economic growth (**Edwards, 2001; Edison et al., 2002; Kose et al., 2006**).

3. Empirical Studies

This theoretical literature has resulted in abundant studies and empirical works are current to support the correlation tests and in particular, improve the measurement of financial development. There is currently a substantial body of empirical work on finance-growth relationship assesses the impact of the operation of the financial system on economic growth, if the impact is economically important, and if some components of the financial system, for instance, banks and stock markets play a particularly important role in stimulating growth at certain stages of economic development. The organization of the empirical evidence announces weakness in the literature of financial development and economic growth: there is frequently an insufficiently precise link between theory and measurement of financial development. The theory focuses on particular functions provided by the financial sector: producing information, exercising corporate governance, facilitating risk management, collecting and aggregating savings and settling transactions. Consequently, how they can influence decisions of resource allocation to economic growth?

The great majority of empirical studies are organized around studies that measure each of the functions of the financial system, or on measures to the size of banks or financial markets. Petersen and Rajan (1997), Demirguc-Kunt and Maksimovic (2001) and Fisman and Love (2003) conclude that firms frequently act as financial intermediaries in providing trade credit. This source of financial intermediation may be very important, especially in countries with restrictions on financial intermediaries and standardization in countries with less developed legal systems, which do not effectively support the formal financial development.

The first work on the relationship finance and growth, led by R. Goldsmith (1969) motivated his breaking study of finance and growth as follows: One of the most important problems in the field of finance, if not the single most important one,... is the effect that financial structure and development have on economic growth. (p. 390)[1]

Therefore, Goldsmith seeks to assess whether financial development exerts a causal influence on growth and if markets and intermediaries, which operate in an economy, have an influence on economic growth. Towards this end, Goldsmith shows, during the period from 1860 to 1963, for a sample of 35 countries, the value of the financial intermediation assets to GDP has a positive influence on economic performance. He found that the size of the financial intermediary sector is directly correlated with the quality of financial functions provided by the financial system.

Goldsmith was able to provide confident answers to this problem. Having proven that financial intermediary size relative to the economy raises size as countries develop, Goldsmith graphically showed the positive correlation between financial development and the economic activity level.

This study was particularly remarkable for its time by the amount of data that Goldsmith had collected and analyzed, but this work has several weaknesses:

1. The investigation involves limited observations (only 35 countries).
2. His analysis does not systematically control for other factors influencing economic growth.
3. His work was focused on global production and neglects the other growth indicators[2].

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[1] According to Levine (2004).
[2] Productivity and capital accumulation: see King and Levine (1993).

4. The size of financial intermediaries may not accurately measure the functioning of financial system.

5. The draft Goldsmith shows the existence of a correlation. However, Golssmith made no attempt to establish whether there was a causal link going from financial development to economic growth.

6. The study did not assert which are the structures of financial systems which favor most the growth (based on financial markets or on banking financial intermediaries).

Development during the thirty years after the original empirical research Goldsmith, Statistical Information and econometric tools, helped complete the study of Goldsmith. The finance-growth link was detailed benefit, particularly with the work of King and Levine (1993)[3] who solved the most problems in the original study (Goldsmith, 1969), taking into account the lack valid proxy measures of the global financial development. The authors examined several possibilities: the best savings mobilization, effective risk diversification, the development of investment projects are all functions performed by the financial system, which may explain this positive influence on economic growth. Indeed, the authors, a sample of 80 countries between 1960 and 1989, have included other factors affecting the growth of long-period (control variables). They examined the canals of capital accumulation and productivity growth, built additional proxy measures for financial development level and tested the impact of financial development on long-run economic growth, capital stock and productivity growth.

While highlighting, the deficiencies in the early works of Goldsmith, cross-country growth regressions do not eliminate them. King and Levine (1993) have improved measures of financial development and showed that these indicators are positively and significantly correlated with economic growth and its sources. They focused, on only one segment of the financial system, banks and their indicators do not directly measure the degree to which financial systems affect the information costs and transaction costs. Note, however, that if the correlation is properly admitted, the causal direction remains disputed between, on one hand, financial development exogenous (driven by the supply of financial services), on the other hand, the endogenous financial development (demand-driven financial services). In addition, Arestis and Demetriades (1997) have pointed out some weaknesses of the statistical basis of their results. They also stressed that the growth of countries in the sample has been frequently unstable and therefore, the results could be somewhat robust to changes in the reporting period.

Empirical studies have long recognized that financial development of the banking sector; there are good reasons for studying the relationship between economic growth and long-run operation of equity markets. First, the theoretical discussion does not state that grants the largest and most liquid exert a positive or negative influence on economic growth and its sources. Secondly, some theories focus on the roles of competition from banks and markets to finance companies. Others submit to a constraint that banks and markets can arise, coexist and prosper by providing various financial functions in the economy. Other theories still emphasize complementarities between banks and markets. Competing theories have shown that the independent roles of markets and banks stimulate more economic growth.

Levine and Zervos (1998a) developed a number of measures of stock market development, to assess the relationship between the development of stock market and economic growth and its sources, a sample of 42 countries from 1976-1993. The authors show that the initial level of liquidity in the stock market and the initial level of banking development (bank credit) appear positively and significantly correlated with future rates of economic growth, capital accumulation and growth productivity over the next 18 years. This, even after taking account of control variables such as initial income, education level, inflation, public spending, the black market exchange rate premium and political stability. These results are consistent with theoretical predictions of Levine (1991), Holmstrom and Tirole (1993) and Bencivenga et al. (1995) which announced that the liquidity of the stock market facilitates the growth of long period, but with contradictory models that support the negative aspects of stock market liquidity (Bhide, 1993). In addition, these results do not explain what is the structure of the financial system (bank-based or market-based financial) is most favorable for economic growth. The results suggest rather that stock markets provide different financial functions, such as banks.

The above studies show that the impact of stock markets on growth can be distinguished from that of banks: a liquid stock market is more important for growth, whatever the stage banking sector development, as a developed banking sector stimulates growth, whatever the stock market liquidity. In addition, countries with liquid stock markets and a developed banking sector has grown much stronger than those with illiquid markets and underdeveloped banking sector. There is no therefore no objection from the stock market development and banking. Both facilities offer different financial services, but are complementary, even in industrialized countries. Deidda and Fattouh (2006) found that the impact of banking sector's size on growth is even weaker than the financial market is more developed. They both fall significantly in explaining investment rates and growth.

A large number of studies analyze the effect of the financial system on growth, econometric analysis in conducting their cross-sectional. Econometrics is thus based on averages, which assumes homogeneous behavior over time of different variables. However, the databases for the study of long-run growth have an individual dimension and time. Cross-sectional analysis use only the individual dimension, which is the reason that economist study the determinants of long-run economic growth. They have sought to optimize methods of estimation, to take the two-dimensionality of the data.

Levine et al., (2000) have used the regressions in panel data and a GMM estimator that improves the work in cross-section. The authors examined the relationship between financial development and economic growth, while Beck et al., (2000) studied the link between financial development and the sources of growth (productivity growth, the physical capital accumulation and savings). They examined a set of indicators of

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[3] King and Levine (1993 a, b, c).

financial development and also have used a set of control variables as Levine and Renelt (1992). The results show that the regression coefficients suggest an economically significant impact of financial development on economic growth. For instance, the value of Mexico for private credits, covering the period 1960-1995 is 22.9% of GDP. An exogenous increase in private credit that would have reduced the sample median, which is about 27.5% and would result in an increase of 0.4% GDP real growth per year[4].

In contrast, Levine et al., (2000) examined linear models, recent research suggests that the impact of financial development on capital accumulation, productivity growth and overall growth of GDP, may depend on more importantly other factors. For the same econometric methods and data, Rioja and Valev (2004a) found that financial development boosts growth in rich countries, primarily by accelerating productivity. However, financial development promotes growth in developing countries, mainly by accelerating the accumulation of capital. In addition, Rioja and Valev (2004b) found that the impact may be nonlinear. They concluded that a country with very low levels of financial development accelerates growth slightly by a marginal increase in financial development, while the impact is more important for rich countries and means for middle-income countries. However, we must know what the consequences of non-linearity are. In addition, Rousseau and Wachtel (2002) show that the positive impact of financial development on growth diminishes inflation rates higher.

Rousseau and Wachtel (2000) examine the relationship between stock markets, banks and growth, using annual data and the difference estimator. Beck and Levine (2004) used data in the form of medium for a period of 5 years to analyze the determinants of long-run growth. To do this, they used the system estimator, to reduce the magnitude of potential biases associated with the difference estimator and they expanded the study period to 1998.

The results show that the ratios of stock market development and banking are good indicators of growth rate in the long-run, as indicated by the coefficient estimates for both OLS and GMM. The procedure for panel data goes through the standard specification tests, which increase the confidence of the assumptions underlying the econometric methodology. What is missing here is that the market capitalization of the shares is not closely associated with growth. Thus, this is not the registration itself that is important for growth, but rather is the ability of agents to exchange ownership claims on the production technology of an economy that is decisive for economic growth.

The estimates are economically significant and consistent with the sizes obtained using different methods. For example, if the ratio of rotation of Mexico was equal to the average of OECD countries (68%) instead of 36% during the period 1996-1998, he had a growth of 0.6 percentage points higher per year. Similarly, if the bank credit was equal to the average of all OECD countries (71%) instead of 16% growth rate would have increased by 2.6 points more per year. These results suggest that exogenous components of development banks and the stock market have a significant economic impact on economic growth.

It is noteworthy that there are additional econometric problems by studying the stock markets, banks and economic growth. When incorporating the equity markets, the number of countries and years decreases, which leads to an overestimation of the data and potentially misleading inferences. It is within this context that, Beck and Levine (2004) describe and employ variants of the dynamic panel estimator to reduce the probability of overestimation and the problem of bias in their results.

4. Empirical Analysis

The aim of this section is to re-evaluate the effect of financial development on economic growth, using the traditional measures of financial development and econometric tools allowing to obtain robust and consistent estimates.

This paper is devoted to the study of correlations between financial development and economic growth, using a variety of data (World Bank and IMF). We will therefore test whether the observed variance in the variables that characterize the financial system outputs allow it to explain the evolution of different economic growth rates?

4.1. Data and Proxy Measures

Our choice of variables follows closely the widely accepted measures of financial development and economic development. We decided to keep a simple specification and standard to allow international comparisons of results.

To investigate whether the exogenous component of financial development positively influences economic growth, a growth regression model is set up with the annual growth rate of real per capita GDP as the dependent variable. The independent variables include a variable representing financial development and a conditioning information set controlling for other factors.

Many indicators of financial development have been proposed in the literature. In this study, we will retain three indicators: **Depth**, which represents the volume of financial intermediaries. This variable is considered typical indicator of the financial system overall importance in the economy as a whole, without distinguishing between different bank and nonbank financial intermediation. It reflects the economy's liquidity. In other words, **Depth** is the ratio of liquid liabilities to GDP. Despite this, the increase of this variable does not explain some improvement in bank deposits, but it reflects a greater use of currency[5] (notes and coins). **Private** is private credit to the total credit distributed. It measures the importance of the financial system as a whole in the allocation of credits to the private sector. Finally, **Bank** defined as the credit issued by deposit money banks to the private sector divided by GDP. This variable measures the degree to which commercial banks distribute the society saving. Moreover, it is regarded as an additional measure of financial development. It therefore allows measuring the availability level of the banking system to allocate credit.

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[4] Ln (27,5) – Ln (22,9) = 0,18 et 0,18 * 2,4 = 0,43 ; where 2.4 is the parameter estimation of regression.

[5] On this theme, we can also see Demetriades and Hussein (1996).

From the examination of a broad review of the theoretical and empirical literature aimed to study the impact of financial development on economic growth, we have learned a number of control variables. These include mainly the initial level of GDP per capita ($Y_{i,t-0}$), the investment ratio (**INVE**), inflation (**INF**), trade openness (**OPEN**), human capital (**CH**) and government consumption (**GOV**). These variables are defined as follows:

- **INVE**, investment is a key variable in economic growth and should have a positive effect. It is defined as the logarithm of the ratio [Gross Fixed Capital Formation (GFCF) + Change in stock] GDP. This variable presents both the private and public investment.

- **INF**, inflation, its integration as the explanatory variable of the growth is understandable by the concept of the financial repression. Indeed, a high inflation generally characterized economies, where financial repression is high and generates negative real interest rates, thereby reducing the weight of the national debt. However, high inflation discriminates against long-run investment and has a detrimental effect on growth. The expected sign for this variable is negative.

- **OUV**, like Berthélemy and Varoudakis (1998), we use the logarithm of the coefficient of trade openness that we calculate by the ratio (export + import) of goods and services / GDP. However, this indicator is not optimal, since in addition to economic policy guidelines, it reflects the influence of natural differences, such as the size and location of each country.

- **CH**, human capital may be defined as the set of skills, knowledge and skills acquired by individuals, through their education, training and experience. The empirical literature analyzing the sources of economic growth argues that human capital is an internal force contributing to the growth process. This variable is measured by the average years of schooling.

- **GOV** is equal to government final consumption, including current expenditure on procurement of goods and services, to detect the impact of the macroeconomic policies quality on growth.

The Appendix gives detailed variable definitions and sources. The data cover the regressions according to the maximum of one hundred ten and at least ten countries, depending on the availability of statistical variables. The sample includes both developing and developed countries. All data are annual and span the years 1973-2012.

4.2. Estimation Methodology

This sub-section describes the econometric method that we use to assess the impact of financial development and economic growth. In order to control for individual heterogeneity (unobserved country-specific effects); we use a dynamic panel procedure with observations per country over the period 1973-2012. We average data over non-overlapping five-year periods. So, we have eight observations per country: 1973-1977, 1978-1982, 1983-1987, 1988-1992, 1993-1997, 1998-2002, 2003-2007and 2008-2012. Our panel procedure also controls for the endogeneity of financial development. It also accounts for the bias induced by including the lagged real per capita GDP in the equation of growth. Our strategy for estimation uses the GMM estimators suggested for the dynamics of adjustment that were developed by Arellano and Bond (1991).

We consider a dynamic growth equation of the form

$$
\begin{aligned}
&\ln(y_{i,t}) - \ln(y_{i,t-\theta}) \\
&= \alpha \ln(y_{i,t-\theta}) + \beta Z_{i,t-\theta} + \eta_i + \xi_t + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

Where $y_{i,t}$ per capita GDP of country i at year t. The explanatory variables are the initial per capita GDP $y_{i,t-1}$ and $Z_{i,t}$ a set of growth determinants and our variables of interest:financial development variables that vary across time and space. η_i denotes unobserved and constant individual-specific effects that might affect economic growth (e.g., geographical and political factors, quality of institutions); ξ_t is an unobserved time-specific effect and $\varepsilon_{i,t}$ is the stochastic error term. The log-linear functional form is adopted in order to reduce likely heteroscedasticity.

Equation (1) can be rewritten as follows:

$$
y_{i,t} = \lambda y_{i,t-\theta} + \beta Z_{i,t-\theta} + \eta_i + \xi_t + \varepsilon_{i,t}
\tag{2}
$$

With: $\lambda = 1 + \alpha$ **et** $y_{i,t} = \ln(y_{i,t})$.

The growth regression presented above poses some challenges for estimation. The first is the presence of unobserved period- and country-specific effects. While the inclusion of period-specific dummy variables can account for the time effects, the common methods of dealing with country-specific effects (that is, within-group or difference estimators) are inappropriate given the dynamic nature of the regression. The second challenge is that most explanatory variables are likely to be jointly endogenous with economic growth, so we need to control for the biases resulting from simultaneous or reverse causation. The following paragraphs outline the econometric methodology we use to control for country specific effects and joint endogeneity in a dynamic model of panel data.

We use the GMM estimators developed for dynamic models of panel data that were introduced by Arellano and Bond (1991). These estimators are based, first, on differencing regressions or instruments to control for unobserved effects and, second, on using previous observations of explanatory and lagged-dependent variables as instruments (which are called internal instruments).

To eliminate the country-specific effect, we take first differences of equation (2)

$$
\begin{aligned}
y_{i,t} - y_{i,t-\theta} &= \lambda(y_{i,t-\theta} - y_{i,t-2\theta}) \\
&+ \beta(Z_{i,t-\theta} - Z_{i,t-2\theta}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\theta})
\end{aligned}
\tag{3}
$$

But the problem is that the new error term, $\varepsilon_{i,t} - \varepsilon_{i,t-0}$, is by construction correlated with the new lagged dependent variable $y_{i,t-0} - y_{i,t-2\theta}$. The Within estimator is also biased. Moreover, one of the major drawbacks of the Within estimator is to eliminate inter-individual information by taking first differences. Thus, neither the OLS estimator nor the Within estimator are completely appropriate for estimating dynamic growth regression models.

The use of instruments is required to deal with the likely endogeneity of the explanatory variables and the problem that, by construction, the new error term, $\varepsilon_{i,t} - \varepsilon_{i,t-}$

$_\theta$, is correlated with the lagged dependent variable, $y_{i,t-\theta}$ – $y_{i,t-2\theta}$. The instruments take advantage of the panel nature of the data set in that they consist of previous observations of the explanatory and lagged-dependent variables. Given that it relies on past values as instruments, this method only allows current and future values of the explanatory variables to be affected by the error term. Therefore, while relaxing the common assumption of strict exogeneity, our instrumental-variable method does not allow the **Z** variables to be fully endogenous.

Under the assumptions that the error term ε, is not serially correlated $\left(E\left[\varepsilon_{i,t}\varepsilon_{i,t\_s}\right]=0\,\forall s\geq t\right)$, that the explanatory variables, **Z**, are weakly exogenous (that is, the explanatory variables are assumed to be uncorrelated with future realizations of the error term) and and the initial conditions are predetermined by at least one period $\left(E\left[y_{i,t}\varepsilon_{i,t}\right]=0\,\text{for } i=1,\ldots.,N \text{ and } t=3,\ldots.,T\right)$, the GMM dynamic panel estimator uses the following moment conditions:

$$E\left[y_{i,t-s}\left(\varepsilon_{i,t}-\varepsilon_{i,t-\theta}\right)\right]=\grave{a} \qquad (3.1)$$
$$\text{for } s\geq 2; t=3,\ldots\ldots,T$$

$$E\left[Z_{i,t-s}\left(\varepsilon_{i,t}-\varepsilon_{i,t-\theta}\right)\right]=\grave{a} \qquad (3.2)$$
$$\text{for } s\geq 2; t=3,\ldots\ldots,T$$

for $s \geq 2$ and $t = 3,\ldots, T$. Although in theory the number of potential moment conditions is large and growing with the number of time periods, T, when the sample size in the cross sectional dimension is limited, it is recommended to use a restricted set of moment conditions. In our case, we work only with the first acceptable lag as an instrument; that is, for the regression in differences we use only the twice-lagged level of the corresponding variable.

The GMM estimator based on the conditions in 3.1 and 3.2 is known as the difference estimator. Notwithstanding its advantages with respect to simpler panel data estimators, the difference estimator has important statistical shortcomings. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) show that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. Instrument weakness influences the asymptotic and small-sample performance of the difference estimator toward inefficient and biased coefficient estimates, respectively.

This model offers particularly a consistent estimator for N sufficiently large and T relatively small. Arellano and Bond (1991) propose a suitable test for the fundamental assumption of absence of second order serial correlation in the difference equation. An over-identification (high number of instruments) of the model is expected for $T \geq 8$. The test of Sargan **(Arellano and Blond, 1991; Arellano and Bover, 1995)** allows verifying the constraints of overidentification or the validity of the instruments.

The GMM estimator is consistent only if the lagged values of the explanatory variables are valid instruments. In order to examine the overall validity of the instruments the Sargan test is widely used. Another specification test consists in investigating the second-order serial correlation of the residuals in first differences (Equation 3). In order to confirm adequate model specification, the first-order

serial correlation should be confirmed whereas the second-order serial correlation should be rejected. The well-known issue of too many instruments in dynamic panel data GMM is dealt with in Roodman (2009). According to Roodman, the instrument number should not exceed N, which is the number of individuals. Otherwise, GMM becomes inconsistent and the power of the Sargan test might diminish.

The Sargan test is based on the set of moment conditions exploited in the estimation process and assesses the validity of the instruments. It is given by:

$$S = \widehat{v}'Z\left[\sum_{i=1}^{N}Z'_i\,\widehat{v}_i\widehat{v}'_i\,Z_i\right]^{-1}Z'\widehat{v}$$

With: $\mathbf{v_i} = (\varepsilon_{i,2\theta} - \varepsilon_{i,\theta}, \ldots\ldots, \varepsilon_{i,5\theta} - \varepsilon_{i,4\theta})$' the vector of errors in difference, where $\widehat{v}=\left[\widehat{v}'_1,\ldots\ldots,\widehat{v}'_N\right]$ is a vector of estimated residuals and $\mathbf{Z_i}$ is the matrix instruments.

The null hypothesis tested is: E $[Z'_i\,v_i] = 0$

The other test (m_2) tests the hypothesis that the errors in the difference equation are not serially correlated. Typically, errors are correlated difference in $\mathbf{v_{i,t}} = \varepsilon_{i,t} - \varepsilon_{i,t-\theta}$ of order θ, but up to $\theta = 2$, they are not correlated, if $\varepsilon_{i,t}$ is not up to the order θ. In other words, accept the non self-correlation v to the order $\theta = 2$ is equivalent to not accept the self-correlation $\varepsilon_{i,t}$, to $\theta = 5$.

We consider the following notations:

$$\widehat{v}_{-2i}=\left[\widehat{v}_{i,1},\ldots,\widehat{v}_{i,(T-2)\theta}\right]',\widehat{v}_{*i}=\left[\widehat{v}_{i,3\theta},\ldots\ldots,\widehat{v}_{i,T\theta}\right]',$$

$$\widehat{v}_{-2}=\left[\widehat{v}'_{-2_1},\ldots\ldots,\widehat{v}'_{-2_N}\right]',\left[\widehat{v}'_{*1},\ldots\ldots,\widehat{v}'_{*N}\right]$$

The statistic is written:

$$m_2 = \frac{\widehat{v}'_{-2}\widehat{v}_*}{Q}$$

It could be read as an average covariances of order 2 errors of the difference equation, **Q** is a quotient appropriate standard.

The Sargan statistic is distributed according to a chi-squared (χ^2) under the null hypothesis, which we will identify the degrees of freedom (DOF) below, while the m_2 statistic follows a normal distribution (N (0,1)).

5. Estimation Results

We conduct our study, initially, on the sample in its entirety. Subsequently, we subdivide the sample into two subgroups, one of the developed countries and other developing countries. This will enable us to verify whether the effects of financial development variables on growth have the same powers.

The econometric specification tests presented support the robustness of these results. In all GMM estimations, the Sargan test confirms the validity of chosen instruments. The serial-correlation specification tests, we use a similar test of (m_2) known as Ljung-Box. Thus, we chose to apply this test on the series formed by residues in our difference, to study the partial autocorrelation of order 2. The hypothesis tested by Ljung-Box is **H₀**: all self-partial

correlations are zero cons H_1. There is at least one, which is not zero. The test statistic is written:

$$LB = Q = N^2 \sum_{i=1}^{H} \frac{(N+2)\widehat{\rho_i^2}}{N-i} \to \chi^2(H)$$

With: H is the number of lags with which the test (in our case: H = 2). The test results were satisfactory and indicate that residues in our difference are not self-correlated partially up to order 2.

In Table 1, we estimate the direct impact of the three financial development variables, without considering control variables. The first interesting result concerns the variable **Bank**, which has a significant coefficient and has a positive effect on growth, whatever the sample. For cons, the **Private** variable has a negative impact. This result does not support most empirical studies find that credit expansion has a positive effect on growth. There are two possible explanations for the cause. First, the activity of credit can have a negative effect on growth, because of multiple financial innovations that created outside the banking system[6]. Secondly, taking into account the credit mechanism as being based on money creation and processing can have a harmful effect on growth as the credit boom may be an important cause of banking crises. This result is confirmed for the two subgroups and for the entire sample. However, the coefficient value is higher in developed countries. This means that the activity of credit in developed countries is more risky for growth in developing countries.

Table 1. Financial development and economic growth (Without control variables): GMM

Variables	Sample of 72 countries	64 developing countries	8 developed countries
	Coeff	**Coeff**	**Coeff**
Constant	-0,581***	-0,572***	-0,569***
	(1,70)	(1,67)	(1,67)
GDP {1}	0,049**	0,044***	0,046**
	(2,22)	(1,91)	(1,99)
Depth{1}	0,047*	-0,043*	0,046*
	(2,98)	(2,99)	(3,17)
Private{1}	-0,043	-0,030	-0,064
	(1,30)	(1,14)	(1,56)
Bank{1}	0,067*	0,059*	0,039*
	(2,98)	(2,97)	(2,97)
Q (2)[a]	60,197	50,911	45,833
J-Specification[b]	445,509	341,604	364,566
R^2	0,594	0,593	0,567

Notes: The dependent variable is the growth rate of GDP per capita. Brackets, the value of t-statistics.
*** Significant at 10% level, ** significant at 5% level, * significant at 1%.
[a] The Q(2) statistic represents the test for second-order autocorrelation. The values shown in the table are p-values of the Q(2) statistic These values clearly show that a lack of autocorrelation of order 2.
[b] The values presented in the table represent the p-values of the J-test Specification. These values can widely accept the assumption of validity of the instruments.

Finally, the variable reflecting the liquidity of the financial system **Depth** has significant and positive coefficients in regressions of the sample and for developed countries, it is not positive for developing countries. This result may be consistent with the critical Demetriades and Hussien (1996) who consider that this indicator does not

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[6] See especially on this subject De Gregorio and Guidotti (1995).

measure bank deposits, but the volume of banknotes and coins. This suggests that unless the financial system in developing countries has liquidity to cover loans it grants, the more negative consequences on growth. By cons, developed countries need to enhance their liquidity growth.

To test the robustness of the results, an additional set of control variables is introduced in the model, in addition, indicators of financial development. Table 2 confirms the previous results. In addition, the **Private** variable is significant for sub-samples and exercises in both cases, a negative effect on economic growth.

Table 2. Financial development and economic growth (With control variables): GMM

Variables	.Sample of 70countries	62 developing countries	8 developed countries
	Coeff	**Coeff**	**Coeff**
Constant	-0,577***	-0,528***	-0,561***
	(1,93)	(1,83)	(1,96)
GDP {1}	0,044**	0,046**	-0,051**
	(2,41)	(2,46)	(2,54)
Depth{1}	0,047*	-0,046*	0,039*
	(3,55)	(3,88)	(3,37)
Private{1}	-0,060	-0,065	-0,070
	(1,33)	(1,22)	(1,63)
Bank{1}	0,045*	0,039*	0,035*
	(2,96)	(2,81)	(2,75)
INF{1}	-0,052*	-0,056*	-0,055*
	(3,85)	(3,78)	(3,91)
OUV{1}	0,009***	-0,009***	0,011***
	(1,68)	(1,65)	(1,86)
INVE{1}	0,063*	0,057*	0,079*
	(5,16)	(4,98)	(5,29)
GOV{1}	-0,005	-0,005	-0,004
	(1,29)	(1,37)	(1,28)
CH{1}	0,115*	0,099*	0,125*
	(4,29)	(3,99)	(4,85)
Q (2)[a]	34,212	25,601	22,411
J-Specification[b]	365,407	361,715	341,149
R^2	0,596	0,548	0,598

Notes: The dependent variable is the growth rate of GDP per capita. Brackets, the value of t-statistics.
*** Significant at 10% level, ** significant at 5% level, * significant at 1%.
[a] The Q(2) statistic represents the test for second-order autocorrelation. The values shown in the table are p-values of the Q(2) statistic These values clearly show that a lack of autocorrelation of order 2.
[b] The values presented in the table represent the p-values of the J-test Specification. These values can widely accept the assumption of validity of the instruments.

Regarding the control variables, our results are consistent with the usual literature on growth, that is to say significant and the sign of the coefficients is similar to previous empirical results in this domain in the following three tables (3.2, 3.3 and 3.4), which are used, respectively, the three variables of financial development.

Simultaneously, the investment has a significant effect on growth; it has a positive sign as expected. This high significance of the variable **INVE**, in all three regressions, shows a complementary relationship between savings and investment in their impact on growth. In contrast, the coefficient of the **INF** is significant and negatively correlated with economic growth as shown much of the literature on this subject. High inflation can distort investment decisions in the productive disadvantaging long-run investment and hence growth. Moreover, inflation has a negative effect on growth, probably through its effect on financial instability. The coefficient of human capital, **CH**, is positive and highly significant, as shown in the empirical literature analyzing the sources of economic growth. This variable has a very important

role in the physical capital accumulation, as well as, technical progress and therefore on economic performance.

The degree of openness has a negative effect for developing countries in contrast to developed countries and the total sample, which suggests that greater openness of developing economies has a negative effect on growth. This result goes against said what the theory says about it (**Edwards, 1998, Bekaert et al., 2005**). The three main reasons can explain this discrepancy. First, we must not forget that this indicator is not optimal. We see, then, that the variable **OUV** is not robust. Then, the influence of internal conditions determines the results of the opening of a country. Indeed, if certain conditions are not met, for the skilled human capital for example, the opening does not play a catalytic role in growth (**Fontagné and Guerin, 1997**). Finally, several authors point out that the link between openness and growth is not systematic. Grossman and Helpman (1991) emphasize that the effect of trade can be ambiguous and sometimes even harmful.

Furthermore, Table 2 confirms that the level of **GOV** is not significant for all regressions. This result corresponds perfectly to the results of the work of Nelson and Singh (1994), Devarajan et al. (1996) and Easterly et al. (1997) which stipulate that public spending in some sectors is not allocated efficiently and do not promote economic growth. The coefficient of initial GDP per capita is significant and positive for the sample as a whole and for developing countries. This result shows non convergence of these countries. By cons, developed countries, the coefficient of this variable is negative, thus supporting the conditional convergence hypothesis.

Finally, to test the sensitivity of the results and variables of financial development on different groups of countries, we performed regressions considering each variable separately.

Table 3. Assets of commercial banks (Bank)-economic growth: GMM

Variables	Sample of 84countries Coeff	72 developing countries Coeff	12 developed countries Coeff
Constant	-0,569***	-0,537***	-0,571***
	(1,93)	(1,89)	(1,90)
GDP {1}	0,044**	0,054**	-0,043**
	(2,35)	(2,42)	(2,39)
Bank{1}	0,038*	0,032*	0,029*
	(2,97)	(2,86)	(2,85)
INF{1}	-0,054*	-0,055*	-0,058*
	(3,79)	(3,97)	(4,10)
OUV{1}	0,008***	-0,003***	0,005***
	(1,72)	(1,68)	(1,69)
INVES{1}	0,065*	0,068*	0,072*
	(3,72)	(3,83)	(3,99)
GOV{1}	-0,005	-0,009	-0,004
	(1,02)	(1,01)	(0,91)
CH{1}	0,085*	0,090*	0,095*
	(4,59)	(4,75)	(4,79)
Q (2)[a]	34,563	27,523	50,990
J-Specification[b]	412,466	403,387	400,440
R[2]	0,595	0,523	0,559

Notes: The dependent variable is the growth rate of GDP per capita. Brackets, the value of t-statistics.
*** Significant at 10% level, ** significant at 5% level, * significant at 1%.
[a] The Q(2) statistic represents the test for second-order autocorrelation. The values shown in the table are p-values of the Q(2) statistic These values clearly show that a lack of autocorrelation of order 2.
[b] The values presented in the table represent the p-values of the J-test Specification. These values can widely accept the assumption of validity of the instruments.

The results are recorded in the following Table 3, Table 4 and Table 5 do not change fundamentally in relation to initial regressions of Table 2. The results of estimating regressions, as expected, **Bank** is highly robust and significant whatever the sample considered.

The level of financial development measured by the liquidity ratio **Depth** is significant but its effect is positive for developed countries. **Private** on the coefficient of this variable remained negative and significant. For control variables, the results confirm what we have said before.

Table 4. Liquid Assets (Depth)-economic growth: GMM

Variables	Sample of 70 countries Coeff	62 developing countries Coeff	8 developed countries Coeff
Constante	-0,561***	-0,513***	-0,542***
	(1,87)	(1,83)	(1,90)
PIB{1}	0,048**	0,046**	-0,049**
	(2,02)	(2,08)	(2,08)
Depth{1}	0,049*	-0,045*	0,045*
	(3,39)	(3,19)	(2,96)
INF{1}	-0,055*	-0,057*	-0,061*
	(3,07)	(3,15)	(3,49)
OUV{1}	0,008***	-0,003***	0,013***
	(1,69)	(1,68)	(1,71)
INVES{1}	0,075*	0,062*	0,078*
	(3,46)	(3,41)	(3,89)
GOV{1}	0,007	-0,008	-0,009
	(1,09)	(1,12)	(1,28)
CH{1}	0,099*	0,097*	0,113*
	(4,83)	(4,89)	(5,14)
Q (2)[a]	34,912	26,351	36,433
J-Specification[b]	443,391	437,322	409,315
R[2]	0,575	0,528	0,595

Notes: The dependent variable is the growth rate of GDP per capita. Brackets, the value of t-statistics.
*** Significant at 10% level, ** significant at 5% level, * significant at 1%.
[a] The Q(2) statistic represents the test for second-order autocorrelation. The values shown in the table are p-values of the Q(2) statistic These values clearly show that a lack of autocorrelation of order 2.
[b] The values presented in the table represent the p-values of the J-test Specification. These values can widely accept the assumption of validity of the instruments.

Table 5. Credit Financial System (Private)-economic growth: GMM

Variables	Sample of 74 countries Coeff	62 developing countries Coeff	8 developed countries Coeff
Constante	-0,533***	-0,536***	-0,579***
	(1,86)	(1,94)	(1,96)
PIB {1}	0,046**	0,039**	-0,050**
	(2,49)	(2,38)	(2,42)
Private{1}	-0,051	-0,053	-0,063
	(1,39)	(1,31)	(1,59)
INF{1}	-0,048*	-0,045*	-0,049*
	(3,87)	(3,84)	(3,98)
OUV{1}	0,011***	0,009***	-0,008***
	(1,79)	(1,71)	(1,69)
INVES{1}	0,069*	0,064*	0,079*
	(3,88)	(3,83)	(3,96)
GOV{1}	-0,008	-0,005	-0,006
	(1,01)	(1,09)	(1,05)
CH{1}	0,087*	0,092*	0,095*
	(4,67)	(4,75)	(4,98)
Q (2)[a]	35,652	26,359	52,263
J-Specification[b]	363,655	351,912	311,998
R[2]	0,595	0,508	0,589

Notes: The dependent variable is the growth rate of GDP per capita. Brackets, the value of t-statistics.
*** Significant at 10% level, ** significant at 5% level, * significant at 1%.
[a] The Q(2) statistic represents the test for second-order autocorrelation. The values shown in the table are p-values of the Q(2) statistic These values clearly show that a lack of autocorrelation of order 2.
[b] The values presented in the table represent the p-values of the J-test Specification. These values can widely accept the assumption of validity of the instruments

In sum, the econometric results in this paper confirm that the indicator that measures the importance of deposit banks relative to those of the central bank, **Bank** has a significant positive impact. These results are very close to those obtained by most of the literature on the subject (King and Levine, 1993, Levine and Zervos, 1998, Levine et al., 2000, Beck and Levine 2004; Baltagi et al., 2009). As for the variable that reflects the degree of liquidity, **Depth** positively affects economic growth, only to developed countries. This result is confirmed by several other works. Citing an example, the work done by Ram (1999), Deidda and Fattouh (2002), Rioja and Valev (2004) and Akimov et al. (2006). These authors suggested that the relationship between the liquidity of the financial system and growth in low-income countries may be negative and become positive, when countries reach a certain income level. This situation brings to mind the existence of an income threshold below which the funds had a negative effect on growth. Beyond this threshold, the relationship between the two indicators turns positive. Regarding the third measure of financial development, **Private**, we note that its impact on economic growth is significantly negative. In a similar way, De Gregorio and Guidotti (1995), Gourinchas et al, Loayza and Ranciére (2006) and Adusei (2012) come to conclude a significant negative relationship between credit of the financial system and economic growth. This result can be explained by the failure of financial liberalization policies implemented extremes in the 70 and 80 on the one hand, and secondly, given the negative impact of financial crises that hit economies.

In conclusion, it is the instability of the positive relationship between financial development and economic growth (**Andersen and Tarp, 2003**). In addition, this positive relationship depends on the nature of the indicator of financial development and the sample studied (**Zhu et al., 2004**).

6. Conclusion

Drawing on traditional work, this paper attempts to empirically test the correlation, using an econometric analysis on a sample of 110 countries and periods of five years from 1973 to 2012. Based on the results we obtained using a model approach and the dynamic panel GMM estimation method, we could establish clear results on the contribution of financial development in economic growth. The estimation results lead to say that the variable of financial development, which significantly influences economic growth and positive regardless of the sample, is the variable that reflects the availability level of the banking system (**Bank**). Contrary to the indicator which measures credits by the financial system to the private sector (**Private**), even if significant, it exerts a negative influence on growth. Finally, the measure that reflects the financial deepening of the economy (**Depth)** seems to depend positively on economic growth in developed countries and negatively for the developing countries.

Moreover, our comparative analysis between the developed and developing countries, has yielded some significant results. Contrary to the results of previous studies confirming the positive relationship between all indicators of financial development and economic growth, our results show that the effect of financial development varies depending on the sample studied and the nature of the indicator.

This dynamic panel analysis, although it allows us to determine the relative changes in growth rate following the changes in the level of financial development, provides no clear indication on the direction of the causal relationship between two variables. In addition to the econometric analysis does not answer all the questions raised by the theme of the interrelations between the development of the real and financial, but provides a good basis for reflection. To continue this work, there are three lanes will be followed:

1. It would be interesting to find a more complete decomposition, where you should find the schematic of the OECD member countries (plus a few 'Asian Tigers'), the newly industrializing countries and least developed countries (LDCs) that are actually in a real financial distress and levels of development extremely low.
2. There is a priority to empirically test the co integration and causality between financial development and economic growth in panel data.
3. It should look more deeply on the measures of financial development.

Appendix

Appendix I. Countries in the sample

Country Code	Country Name	Country Code	Country Name	Country Code	Country Name
ARG	Argentina	GHA	Ghana	NZL	New Zealand
ATG	Antigua and Barbuda	GMB	Gambia, The	OMN	Oman
AUS	Australia	GRC	Greece	PAK	Pakistan
AUT	Austria	GTM	Guatemala	PAN	Panama
BDI	Burundi	GUY	Guyana	PER	Peru
BEL	Belgium	HND	Honduras	PHL	Philippines
BEN	Benin	HTI	Haiti	PNG	Papua New Guinea
BFA	Burkina Faso	IDN	Indonesia	PRT	Portugal
BGD	Bangladesh	IND	India	PRY	Paraguay
BHS	Bahamas, The	IRL	Ireland	RWA	Rwanda
BLZ	Belize	IRN	Iran, Islamic Rep.	SAU	Saudi Arabia
BOL	Bolivia	ISL	Iceland	SDN	Sudan
BRA	Brazil	ISR	Israel	SEN	Senegal
BRB	Barbados	ITA	Italy	SGP	Singapore
BWA	Botswana	JAM	Jamaica	SLB	Solomon Islands
CAF	Central African Republic	JOR	Jordan	SLE	Sierra Leone

CAN	Canada	JPN	Japan	SLV	El Salvador
CHE	Switzerland	KEN	Kenya	SUR	Suriname
CHL	Chile	KOR	Korea, Rep.	SWE	Sweden
CIV	Cote d'Ivoire	LBR	Liberia	SWZ	Swaziland
CMR	Cameroon	LKA	Sri Lanka	SYC	Seychelles
COG	Congo, Rep.	LSO	Lesotho	SYR	Syrian Arab Republic
COL	Colombia	LUX	Luxembourg	TCD	Chad
CRI	Costa Rica	MAR	Morocco	TGO	Togo
CYP	Cyprus	MDG	Madagascar	THA	Thailand
DEU	Germany	MEX	Mexico	TTO	Trinidad and Tobago
DMA	Dominica	MLI	Mali	TUN	Tunisia
DNK	Denmark	MLT	Malta	TUR	Turkey
DOM	Dominican Republic	MRT	Mauritania	URY	Uruguay
DZA	Algeria	MWI	Malawi	USA	United States
ECU	Ecuador	MYS	Malaysia	VCT	St. Vincent and the Grenadines
EGY	Egypt, Arab Rep.	NER	Niger	VEN	Venezuela, RB
ESP	Spain	NGA	Nigeria	WSM	Samoa
FJI	Fiji	NIC	Nicaragua	ZAF	South Africa
FRA	France	NLD	Netherlands	ZMB	Zambia
GAB	Gabon	NOR	Norway	ZWE	Zimbabwe
GBR	United Kingdom	NPL	Nepal		

Appendix II. Variables and sources

Variable	Definition	Original source
y	Real per capita GDP	
Y0	Real per capita GDP for initial year of period	Financial Structure and Economic Development Database (The World Bank 2012)
INVE	Real gross fixed capital formation share of real GDP	
GOV	Government expenditure as share of GDP	
OUV	Sum of real exports and imports as share of real GDP	
INF	Log difference of Consumer Price Index	The International Statistics of the International Monetary Fund 2012, line 64
CH	Average years of schooling	Penn World Table
Depth	$\{(0.5)*[F(t)/Pe(t)+F(t!1)/Pe(t!1)]\}/[GDP(t)/Pa(t)]$, where F is liquid liabilities (line 55l), GDP is line 99b, Pe is end-of period CPI (line 64) and Pa is the average annual CPI.	
Private	$\{(0.5)*[F(t)/Pe(t)+F(t!1)/Pe(t!1)]\}/[GDP(t)/Pa(t)]$, where F is credit by deposit money banks and other financial institutions to the private sector (lines 22d+42d), GDP is line 99b, Pe is end-of period CPI (line 64) and Pa is the average CPI for the year	The International Statistics of the International Monetary Fund 2012
Bank	$DBA(t)/(DBA(t)+CBA(t))$, where DBA is assets of deposit money banks (lines 22a-d) and CBA is central bank assets (lines 12 a-d).	

Appendix III: Descriptive statistics of financial development variables: 1973-2012

	Financial Development								
	Depth			Private			Bank		
	Total sample	Developing countries	Developed countries	Total sample	Developing countries	Developed countries	Total sample	Developing countries	Developed countries
Mean	46,012	41,797	77,967	43,197	32,531	83,340	77,937	74,551	94,714
Median	37,435	35,047	60,511	29,453	25,004	80,928	83,495	78,681	96,607
Maximum	201,642	173,105	201,642	180,602	163,034	180,602	100,299	100	100,299
Minimum	2,094	2,094	19,170	1,097	1,097	12,465	2,982	2,982	69,820
Standard deviation	32,638	27,745	46,627	35,588	26,355	37,161	20,789	21,088	05,650
Observations	2145	1906	239	2539	2006	533	2989	2487	502

References

[1] Adusei, M., "Financial development and economic growth: Is schumpeter right?" *British Journal of Economics, Management & Trade*, 2(3): 265-278. 2012.

[2] Akimov, A., Wijeweera A., Dollery, "Finance-Growth Nexus: Evidence from Transition Economies" *Working Paper Series Economics*, n°5, University of New England.2006.

[3] Alonso-Borrego, C., Arellano, M, "Symmetrically Normalized Instrumental-Variable Estimation Using Panel Data," *Journal of Business and Economic Statistics*, 17, 36-49.1999.

[4] Andersen, T., Tarp, F, Financial liberalization, financial development and economic growth in LDCs. *Journal of international development* 15: 189-209. 2003.

[5] Ang, J. B., W.J. McKibbin, "Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia". *Journal of Development Economics*, 84: 215-233. 2007.

[6] Arellano M., Bond S, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations". *Review of Economic Studies* 58: 277-297. 1991.

[7] Arestis B., Demetriades P.O, Financial development and economic growth assessing the evidence. *The Economic Journal* 107: 783-799. 1997.

[8] Arellano, M., S. Bond, "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations." *Review of Economic Studies*, 58, 277-297. 1991.

[9] Arellano, M., O. Bover, "Another look at the instrumental variable estimation of error-components models." *Journal of Econometrics*, 68, 29-52. 1995.

[10] Baltagi B.H., Demetriades P.O., Law S.H, "Financial development and openness: Evidence from panel data" *Journal of Development Economics* 89: 285-296. 2009.

[11] Beck T., Levine R, "Stock Markets, Banks and Growth: Panel Evidence" *Journal of Banking and Finance* 28: 423-442. 2004.

[12] Beck T., Levine R., Loayza N, "Finance and the sources of growth" *Journal of Financial Economics* 58: 261-300. 2000.

[13] Bencivenga V., Smith B., Starr R, "Transactions Costs, Technological Choice, and Endogenous Growth" *Journal of Economic Theory* 67: 153-177. 1995.

[14] Bekaert G., Harvey C., Lundblad R? 3Does Financial Liberalization SpurGrowth?" *Journal of Financial Economics* 77: 3-56.2005.

[15] Bhide A, "The Hidden Costs of Stock Market Liquidity." *Journal of Financial Economics* 34: 1 51. 1993.

[16] Blundell, R., S. Bond, "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics*, 87(1), 115-143. 1998.

[17] De Gregorio J., Guidotti P, "Financial development and economic growth." *World Development* 23: 433-448.1995.

[18] Deidda L., Fattouh B, "Banks, financial markets and growth." *Journal of Financial Intermediation* 17: 6-36.2006.

[19] Demetriades P., Hussein K, "Does financial development cause economic growth? Time series evidence from 16 countries." *Journal of Development Economics* 51: 387-411. 1996.

[20] Demirgüç-Kunt A., Maksimovic V, "Firms as Financial Intermediaries: Evidence from Trade Credit Data." *World Bank mimeo*.2001.

[21] Devarajan S., Swaroop V., Zou H, "The Composition of Public Expenditure and Economic Growth." *Journal of Monetary Economics* 37: 318-344. 1996.

[22] Easterly W., Loayza N., Montiel P, "Has Latin America"s Post Reform Growth been Disappointing ?" *Journal of International Economics* 43: 287-311.1997.

[23] Edison H., Levine R., Ricci L., Slok T, "International Financial Integration and Economic Growth." *Journal of International Money and Finance* 21: 749-776. 2002b.

[24] Edison H.J., Klein M., Ricci L., Slok T, "Capital Account Liberalization and Economic Performance: Survey and Synthesis." *IMF Working Paper* 02/120.2002a.

[25] Edwards S, "Openness, productivity and growth: what do we really know?" *The Economic Journal* 108: 383-398. 1998.

[26] Edwards S, "Capital Mobility and Economic Performance: Are Emerging Economies Different?" *NBER Working Papers* n° 8076. 2001.

[27] Fontagné L., Guérin J.L, "Innovation, imitation et rattrapage en présence de rigidités sur le marché du travail." *Revue économique* 48: 1265-1290. 1997.

[28] Fisman R., Love I, "Trade Credit, Financial Intermediary Development, and Industry Growth." *Journal of Finance* 58: 353-374.2003.

[29] Gerschenkron A, Economic Backwardness in Historical Perspective. A Book of Essays, Cambridge: Harvard University Press.1962.

[30] Goldsmith R.W, "Financial Structure and Development" *New Haven: Yale University Press*.1969.

[31] Gurley J., Shaw E, "Financial Aspects of Economic Development." *American Economic Review* 45: 515-538. 1995.

[32] Gourinchas, P., O. Landerretche, R. Valdé´s, "Lending booms: Latin America and the world" *Economia*, 1: 47-100. 2001.

[33] Holmstrom B., Tirole J, "Market Liquidity and Performance Monitoring" *Journal of Political Economy* 101: 678-709. 1993.

[34] Kose, M. A., E. Prasad, K. Rogoff, S. J. Wei, "Financial Globalization: A Reappraisal" *Working Paper No. 12484, National Bureau of Economic Research*.2006.

[35] Kindleberger C, "A financial history of Western Europe." 2ed, New York, Oxford University Press. 1993.

[36] King R.G., Levine R, "Finance; entrepreneurship and growth: Theory and evidence." *Journal of monetary Economics* 32: 513-542. 1993a.

[37] King R.G., Levine R, "Finance and growth: Schumpeter might be right." *Quarterly Journal of Economics* 108: 717-737. 1993b.

[38] King R.G., Levine R, "Financial Intermediation and Economic Development. In: Financial Intermediation in the Construction of Europe" Eds: C. Mayer and X. Vives, London: Centre for Economic Policy Research, pp. 156-189. 1993c.

[39] Levine R, "Stock market, growth and tax policy" *Journal of Finance* 46: 1445-1465. 1991.

[40] Levine, R. "Bank-based or Market-based Financial Systems: Which is Better?" *Journal of Financial Intermediation*, 11(4), 398-428. 2002.

[41] Levine R, "Denying Foreign Bank Entry: Implications for Bank Interest Margins" In Bank Market Structure and Monetary Policy Eds: Luis Antonio Ahumada and J. Rodrigo Fuentes, Santiago, Chile: Banco Central de Chile, pp. 271-292. 2004.

[42] Levine R., Loayza N., Beck T, "Financial intermediation and growth: causality and causes" *Journal of Monetary Economics* 46: 31-77. 2000.

[43] Levine R., Renelt D, "A sensitivity analysis of gross-country growth regressions" *The American Economic Review* 82: 942-963. 1992.

[44] Levine R., Zervos S, "Stock markets; banks; and economic growth" *The American Economic Review* 88: 537-588. 1998a.

[45] Loayza, N.V., R. Ranciére, "Financial development, financial fragility, and growth" *Journal of Money, Credit and Banking,* 38(4): 1051-1076. 2006.

[46] Lucas R. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics* 22: 3-42.1998.

[47] Mayer C, "New issues in corporate finance" *European Economic Review* 32: 1167-1188. 1987.

[48] Mc kinnon R, "Money and Capital in Economic Development" Washington, D.C: The Brookings Institution.1973.

[49] Meier G., Seers D, "Pioneers in Development" Oxford University Press. 1984.

[50] Nelson M., Singh R, "The Deficit-Growth Connection: Some Recent Evidence from Developing Countries" *Economic Development and Cultural Change* 43: 167-191. 1994.

[51] Petersen M., Rajan R, "Trade Credit: Theories and Evidence" *Review of Financial Studies* 3: 661-691.1997.

[52] Ram R, "Financial development and economic growth: Additional Evidence" *Journal of Development Studies* 35: 164-174.1999.

[53] Rioja F., Valev N, "Finance and the Sources of Growth at Various Stages of Economic Development" *Economic Inquiry* 42: 27-40. 2004a.

[54] Rioja F., Valev N, "Does One Size Fit All?: A Reexamination of the Finance and Growth Relationship" *Journal of Development Economics,* forthcoming. 2004b.

[55] Robinson J, "The Generalization of the General Theory. In: the Rate of Interest and Other Essays" London: MacMillan. 1952.

[56] Roodman, D, "A note on the theme of too many instruments," *Oxford Bulletin of Economics and Statistics*, 71, 135-158. 2009.

[57] Rousseau P.L., Wachtel P, "Equity Markets and Growth: Cross-Country Evidence on Timing and Outcomes, 1980-1995" *Journal of Business and Finance* 24: 1933-1957. 2000.

[58] Rousseau P.L., Wachtel P, "Inflation Thresholds and the Finance-Growth Nexus" *Journal of International Money and Finance* 21: 777-793. 2002.

[59] Schumpeter J, "Theorie des wirtschaftlichen Entwicklung, Leipzig, Dunker and Humblot." Traduit en français: *Théorie de l'Evolution Economique,* Dalloz, Paris. 1912.

[60] Shaw E, "Financial Deepening in Economic Development" *New York: Oxford University Press*. 1973.

[61] Solow R, "A Contribution to the Theory of Economic Growth" *Quarterly Journal of Economics* 70: 65-94. 1956.

[62] Zhu A., Ash M., Pollin R, "Stock Market Liquidity and Economic Growth: A Critical Appraisal of the Levine/Zervos Model" *International Review of Applied Economics* 18: 1-8. 2004.