Financial Development and Economic Growth: Static and Dynamic Panel Data Analysis

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Abstract

The relationship between financial development and economic growth has received a lot of attention in the economic literature in recent years. This study aims to revisit different econometric approaches used in panel data in relation of financial sector development and growth. In what follows, we extend our previous study by employing updated data and also exploring more questions related to the empirical link between financial development and growth. More specifically, we will investigate the issues relevant to static and dynamic panel data effect. We investigate the role of financial development (as measured by the credits to the private sector to GDP) in enhancing growth for different groups of countries. Estimations are conducted with a panel data of 70 countries over the period 1970-2009 using both LS (fixed effect) and GMM-Difference and GMM-System estimators for dynamic panel data. While the finding of a positive correlation between indicators of financial development and economic growth cannot settle this debate, advances in computational capacity and availability of large cross-country data sets with relatively large time dimensions have enabled researchers to rigorously explore the relationship between financial development and economic growth. Empirical results reinforce the idea that financial development promotes economic growth in all econometric approaches used in this paper.

Keywords: Financial development, Banks, Stock markets, Economic growth, GMM estimator

1. Introduction

The positive relation between financial development and economic growth was elaborated in a first study of Goldsmith (1969). Moreover, empirical studies have more importance in the 1990s, especially after King and Levine (1993a) work papers. These letters have studied more than the double of the sample used by Goldsmith for a period of 30 years that is 77 countries for the period 1960-1989 by adding other control factors which affect long-run growth. These variables stand to be the conditioning information to control for other factors associated with economic growth (e.g., income per capita, education, political stability, indicators of exchange rate, trade, fiscal, and monetary policy). They examined how the financial development can affect growth rate, productivity and capital accumulation. To measure financial development, King and Levine focused on financial deepening (DEPTH) which measures the size of financial intermediaries. It equals liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP. Both authors estimated strength of empirical relation between average of DEPTH during period 1960-1989 and averages of three indicators of economic growth during the same period. The three growth indicators were (1) the average rate of real per capita GDP growth, (2) the average rate of growth in the capital stock per person, and (3) total productivity growth. Analyses include the other factors of growth control represented by the matrix (X). They estimated the following regression:

$$G(i) = a + b.DEPTH + c.X + u$$

King and Levine's results mentioned that there is a strong positive relationship between the financial development indicator, DEPTH, and the three growth indicators G(i), long-run real per capita growth rates, capital accumulation and productivity growth. The coefficient of DEPTH implies that if depth ratio exceeds 0.2 (average rate of developing countries) to 0.6 (average rate of developed countries), growth rate will be improved by 1 %. This study also examined the role of initial level of financial DEPTH in expecting long-run growth rate, capital accumulation and productivity growth in 30 years. Their results indicate that financial depth in 1960 is a good predictor of subsequent rates of economic growth, physical capital accumulation, and economic efficiency improvements over the next 30 years. Their empirical specifications, particularly the financial development measures, were widely used with some modifications in the majority of recent studies. Indeed, King and Levine (1993a) shed the light on variables of bank transactions measures (the banking sector) to determine development level. However, this measure is not without flaws, an important weakness emerges when this financial development indicator measures only the size of financial intermediaries sector. It cannot represent the functioning of financial system while it does not give information about the best banks that exercise control of companies and supply management services of risks to customers. This idea can weakens confidence to perform results of King and Levine's studies and so to assert the link existing between financial development and economic growth. Furthermore, they recommended that the financial development plans the economic growth without running the forms of causality existing between both phenomena.

These shortcomings were remedied by Atje and Javanovic (1993), Levine and Zervos (1998) adding stock markets measures to the other indicators. Thus, they examined two financial system components as banks and capital markets. The introduction of these new measures supplies information on independent impact of stock markets on growth. These analyses influenced the debate regarding comparative importance of various financial sector segments. These authors introduced indicator of market capitalization which equals the value of listed shares divided by GDP. They noticed that initial level of stock market liquidity and initial level of banking development are positively correlated to future economic growth rates, capital accumulation and productivity growth during 18 years between 1976 and 1993. The control variables of economic growth used in this study are initial income, education, inflation, government spending, exchange premium and political stability. The banking development indicator was represented by credits to the private sector divided by GDP. This measure of banking development excludes both credit granted by government and central bank and credit assigned to the government and public enterprises. Levine and Zervos support their indicator of banking development is better than that used by King and Levine because the nongovernmental financial intermediaries which assign the credit to private companies, are going to improve efficiency of credit allocation and companies control. These results are compatible with models which underline that stock market liquidity facilitates long-run growth, (Levine (1991); Bencivenga (1995)). But this doesn't urge models which underline negative aspects of stock markets liquidity, (Bhide, 1993). Meantime, the results lend many supports of models which underline reports and connections between bank and market systems.

Levine has criticized this approach which simply introduce a list of national highly-rated in stock exchanges. This does not favor inevitably allocation resources. It is the ability to negotiate the feature of productive technologies of the economy which influences this allocation. Firstly, Levine and Zervos dealt with the question of causality. Secondly, authors included stock markets, however, they excluded other financial sector component to know bond markets and services supplied by non financial institutions, (Levine, 2008). To go beyond certain purely econometric problems, economists opted for using instrumental variables to solve the simultaneity bias running the relation between financial development and economic growth. The recent research introduces these variables to extract the exogenous component of financial development. The need for these variables is going to highly specific differences from countries depending on their financial development and not on growth. Levine (1998, 1999) and Levine, Loayza and Beck (2000) used the indicators of legal origins of countries elaborated by La Porta and al. (1998). These latter's have noticed that legal origins served enacting laws of those countries. This is going to protect external investor's rights and their application will underscore effectively financial development. In fact, authors have regarded that execution of corporate laws of such country is inspired from origins of Britain, France, Germany or Scandinavian's laws. Their explanation was that most of countries obtained their legal systems by occupation and colonization. These variables can be treated in an exogenous way. The used empirical model was presented by Levine (2008) as follows:

$$G(j) = a + b.F(i) + c.X + u \quad (1)$$

G (i): the growth rate of GDP per capita, F(i): financial development indicators and X: the exogenous variables of growth. The legal origin indicators are used as instrumental variables for the measures of financial development, F(i).

The validity of instrumental variables requires no correlation with error term by using test of Hansen (1982). These studies tried to examine the role of stock markets in enhancing economic growth. Results of Atje and Javanovic (1993) showed that stock markets have positive effects on economic activity. Later, these results were confirmed by studies of Demerguc-Kunt and Maksimovic (1998) and Levine and Zervos (1998). As well a considerable interest in the relative importance of the structures of financial systems; either banks or market; for economic growth. The results of cross-country of Levine (2002) indicate that although there is a strong connection between financial development and economic growth, there is no complete empirical support for both structures of markets. By exploiting data of firms (firm-level dated) for 40 countries, Demirguc-Kunt and Maksimovic (2002) showed that financial development helped to explain the growth of firms. However, firms don't tend to grow more quickly with both bank or market systems. Quite fully proofs of the literature, Ram (1999) showed that financial development and economic growth are negatively correlated. This study investigates samples from 95 countries. The correlation between financial development and economic growth in these countries is found negative and less important than insignificant. Similar results were obtained when analyses are executed for every individual country and for every sample grouped by level of growth rate. The major discoveries of cross-section analyses are summarized in Mckibbin's study (2007). The majority of studies seem clearly, conclude that financial development exercises a positive impact on economic growth.

To overcome problems associated with cross-section regressions growth, Levine, Loayza and Beck (2000) used the GMM method developed for panel data, (see Arellano and Bond, 1991; Arellano and Bover, 1995). By comparison to previous approaches, the panel approach has also both advantages and shortcomings. The following regression was adopted:

$$Y(i,t) = a.X_1(i,t-1) + b.X_2(i,t) + C(i) + T(t) + U(i,t) \quad (2)$$

Where y represents the dependent variable, X_1 represents a set of lagged explanatory variables and X_2 a set of contemporaneous explanatory variables, C is an unobserved country-specific effect , T is a time-specific effect, U is the time-varying error term, and i and t represent country and (5-year) time period, respectively.

The first benefit from moving to a panel is the ability to exploit the time-series and cross-sectional variation in the data. Levine, Loayza and Beck have studied a panel of 77 countries for the period 1960-1995. This period was left in 7 years periods. They have confirmed their previous results in cross-section study. The evaluation of coefficients of financial development indicators is similar to those described previously. With panel data, we employ data averaged over five-year periods, yet the models we are using to interpret the data are typically models of steady-state growth. To the extent that five years does not adequately proxy for long-run relationships, the panel methods may imprecisely assess the finance growth link, (Levine, 2008). Beck and Levine (2002) have established their works on Rousseau and Wachtel (2000) papers. They used data in averages during the sub-periods of 5 years. They showed the existence of a positive link between financial development and economic growth. These studies suggested that exogenous component of financial development for both bank and stock market development has an economically impact on economic growth.

To recap, the econometric approach and both country sample and period essentially lie behind the differences of results found in author's papers in finance-growth relation.

2. Methodology

The used sample roughly consists of 70 developing and developed countries. The period of study is from 1970 to 2009. It is subdivided into 8 under 5-years periods. Every annual data is averaged on 5 years. This method has become popular in the majority of empirical works which are especially related to economic growth study. On the one hand, 5 years period allows remedying missing data and covering concerned period. On the other hand, it allows rolling panel data especially when study concerns a dynamic panel. We use all sample groups to validate the theoretical links of explanatory variables of growth rate by static and dynamic panel estimation. To investigate the relationship between growth and financial depth, we use the following model:

$$y_{i,t} = \alpha.y_{i,t-1} + \beta.x_{i,t} + u_i + \varepsilon_{i,t} \quad (3)$$

Indicators used in this model are generally retained in empirical literature of economic growth. y represents the Log of GDP per capita. In static model, this variable represents the economic growth rate. The vector x represents controls of economic growth such as the inflation rate, trade openness, education and government spending in percentage of GDP, civil liberties and political stability, (see the description of variables in appendix). u is an unobserved country-specific effect , ε is the time-varying error term, i and t index respectively country and time.

According to the implications of theoretical and empirical models of economic growth, an increase of opening and education lead to an increase of economic growth rate. Thus, the expected signs of these variables are positive.

Conversely, an increase of inflation leads to a decline of economic growth rate. Consequently, the expected sign of inflation rate is negative. We introduce the variable of civil freedom or political stability. An increase of civil freedom degree tends to be associated with an improved growth rate.

To estimate finance-growth relation, we shall use the generalized method of moments (GMM) which is developed for dynamic panel models by Holtz-Eakin and al. (1990), Arellano and Bond (1991) and Arellano and Bover (1995). The traditional regression of the growth model spells as follows:

$$y_{i,t} - y_{i,t-1} = \alpha . y_{i,t-1} + \beta' . x_{i,t} + u_i + \varepsilon_{i,t} \quad (4)$$

Where y is logarithm of real GDP per capita, x represents explanatory variables different from the delayed dependent variable, u is a non observed specific country effect, $\varepsilon_{i,t}$ is error term and (i, t) represent respectively country and time. We also include dummies variables to represent the specific time effect. Arellano and Bond (1991) propose to differentiate the equation (4):

$$(y_{i,t} - y_{i,t-1}) - (y_{i,t-1} - y_{i,t-2}) = \alpha . (y_{i,t-1} - y_{i,t-2}) + \beta' . (x_{i,t} - x_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (5)$$

Although the difference eliminates the specific country effect, it introduces a new way by construction of new error term, which is correlated to dependent variable delayed. According to the suppositions that (a) the error term (ε) is not serially correlated, and (b) the explanatory variables (X) are weakly exogenous, Arrellano and Bond propose the following moment conditions:

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \; for \; s \geq 2; \; t = 3, \dots, T \quad (6)$$

$$E[x_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \; for \; s \geq 2; \; t = 3, \dots, T \quad (7)$$

By using these conditions of moment, Arellano and Bond (1991) proposed a two step GMM estimator. In the first stage, the terms of error are assumed to be independent and homoscedastic through countries and time. In the second stage, residuals obtained in the first stage are used to build a coherent estimation of variance-covariance matrix, so relaxing suppositions of independence and homoscedasticity. The two step estimator is so asymptotically more efficient than that obtained in the first step. It is the estimator used by Rousseau and Wachtel (2000) with annual data to examine the relation between stock markets, banks and economic growth. There are, however, abstract and statistical defects with this estimator in difference. Conceptually, we would also like to study relation between financial sector development and economic growth through countries which is eliminated in estimation in difference. Statistically, Alonso-Borrego, Arellano (1999) and Blundell and Bond (1998) showed that in case of persistent explanatory variables, delayed levels are weak instruments for difference equation regression. Asymptotically, there will have an increase of the variance of coefficients. In short samples, simulations of Monte Carlo showed that weaknesses of instruments can produce biased coefficients. To reduce the potential of the way and the indistinctness associated with the GMM difference estimator, Arellano and Bover, (1995); and Blundell and Bond, (1998) suggested using a GMM system estimator which combines difference regression with level regression. Instruments for difference regression are even as above. Instruments for level regression are the delays of corresponding variables differentiated. These are instruments suited under the additional suppositions below: although it can have a correlation between the levels of the variables of the right side and the specific effect country in the equation (2) there, there is no correlation between the differences of these variables and the specific effect. Given that the delayed levels are used as instruments in difference regression, only the most recent difference is used as an instrument in level regression. The use of delays of additional differences would succeed in the conditions of moment superfluous, (Arellano and Bover, 1995). So, additional conditions of moment for level regression are:

$$E[(y_{i,t-s} - y_{i,t-s-1})(u_i + \varepsilon_{i,t})] = 0 \; for \; s = 1 \quad (8)$$

$$E[(x_{i,t-s} - x_{i,t-s-1})(u_i + \varepsilon_{i,t})] = 0 \; for \; s = 1 \quad (9)$$

Hence, we use the moment conditions presented in equations (6) to (9) and employ the system panel estimator to generate consistent and efficient parameter estimates. The consistency of the GMM estimator depends on the validity of the assumption that the error terms do not exhibit serial correlation and on the validity of the instruments. To address these issues we use two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term $\varepsilon_{i,t}$ is not serially correlated. We test whether the differenced error term is second-order serially correlated (by construction, the differenced error term is probably first-order serially correlated even if the original error term is not). Failure to reject the null hypotheses of both tests gives support to our model.

3. Results and Discussions

This section describes the indicators of stock market and bank development, the conditioning information set, and provides both OLS and GMM regressions results of stock markets, banks, and economic growth. Three techniques of estimations were used to revisit the various econometric approaches which studied the link between the financial development and the economic growth as described equations before. These methods are OLS (Fixed effect), the generalized method of moments in difference (GMM-Difference, Arellano and Bond, 1991) and in system (GMM-System, Blundell and Bond, 1995). Our results will be based on the last one which was the object of recent applications concerning the theme. In the first place, we made estimations by the LS method. This last one allows checking the problem of heterogeneity of countries. The test which is associated with is the one of Hausman which allows choosing specific fixed or random effects. As shown table1, in the majority of regressions the test appreciates the relevance of fixed effects ($p < 5$ %).

The GMM estimations in first difference and in system allow taking into account the problem of endogeniety of variables. This problem emerges especially when study concerns relation between financial development and economic growth regarding the existence of causality with double meaning between financial development and growth. The GMM-System estimator treats combination of both difference and level equations. Instruments used for the difference equation are the delayed values of variables in levels. Moreover, variables are instrumented by their first differences in level equation. This system of equations is estimated simultaneously by GMM. The simulations of Monte Carlo made by Blundell and Bond (1997) showed that system estimator is the most efficient. The tests used for over-identification are Sargan test which will be later replaced by Hansen test and test of second serial correlation of Arellano and Bond. In most regressions, results of these tests confirmed our expectations. Statistics of Hansen test allowed acceptance of validity of instruments. For serial correlation test, results validate the hypothesis of absence of second serial correlation of residuals. In all regressions, standard deviations of coefficients are corrected by White method in order to check heteroscedasticity problem.

Table (1) shows results for LS panel regressions. Tables (2) and (3) provide respectively, GMM-difference and GMM-system panel regressions. Financial development measures introduced in regressions are domestic credit to the private sector, bank credit divided by bank deposit, liquid liabilities (M3), financial system assets divided by GDP and market capitalization. These financial measures, as well as the other control variables, proxy for the steady state level of GDP. We notice that estimations of columns 1 to 5, concern the use of the civil liberty indicator. However, columns 6 to 10, introduce political stability taking the place of civil liberty indicator. This is due to the strong correlation between the two indicators.

3.1 Analysis of the Static Panel Data Estimations

Fixed effect estimation, in table.1, displays results when all financial measures are used as proxies for financial development. These latter's, except credit by deposit ratio, when significant, have a positive sign in all regressions, confirming a long-run positive relationship between financial development and growth as predicted in the majority of theoretical models. This is also consistent with the argument that well-developed domestic financial sectors in countries contribute significantly to an increase economic growth. For example, a 1% increase in the ratio of credit to private sector implies an increase in growth for 0.02%. The results are consistent with previous studies, which find a positive relationship between measures of financial development and growth (see Levine, 2005).

3.2 Analysis of the Dynamic Panel Data Estimations

The dynamic panel data is valid if the estimator is consistent. We used the criterion of Windmeijer (2005) small sample correction to have consistent stand errors. As shown in Table.2 and Table.3, the two equations present consistent estimates, with no serial correlation for the GMM estimators. Specially, in Table.3 the specification Sargan test shows that there are no problems with the validity of the instruments used for both equations. The instruments are used respectively to Roodman's program, (2006).

As shown Table 3, our results relating to the financial development indicators:

i) Private credit (CREDIT): the expected sign is positive, which is confirmed by the estimations;

ii) Liquid liabilities (M3/GDP): the expected sign is positive, and the coefficient of the variable significantly confirms this;

iii) Market capitalization: the expected sign is positive, and the coefficients of these variables are positive;

iv) Financial system assets to GDP: the results significantly confirm the expected sign which is positive;

v) Credit by deposit ratio coefficient is positively linked to growth and significant.

We conclude that whatever econometric method or indicator used, financial development exercises a positive and significant effect on the economic growth.

4. Conclusions

Our research's results validate theory suggestions. Thus, effective financial institutions and markets that help overcome market frictions, introduced by information asymmetries and transaction costs, can foster economic growth through several channels. Specifically, they help (i) ease the exchange of goods and services by providing payment services, (ii) mobilize and pool savings from a large number of investors, (iii) acquire and process information about enterprises and possible investment projects, thus allocating society's savings to its most productive use, (iv) monitor investments and exert corporate governance, and (v) diversify and reduce liquidity and inter-temporal risk.

Empirically, this paper continuously emphasized that all methods have their problems but that one problem plaguing the entire study of finance and growth pertains to the proxies for financial development. Study of finance-growth relationship is important to all countries because the development of domestic financial sector is significant in affecting the pattern of economic growth by promoting economic growth through efficient allocation of resources.

While a wide array of cross-country techniques has been applied to the finance and growth field, some techniques have not been used yet, such as identification through heterogeneity in structural shocks (Rigobon, 2003). Next, it is easy to predict that there will be further advances both in GMM techniques that better control for country heterogeneity and in techniques to assess the finance and growth relationship at different frequencies. As before, the finance and growth literature will benefit in the coming years from methodological advances in neighboring fields, especially in growth econometrics. Merging VAR and cross-country techniques are two literatures promise further methodological insights.

In conclusion, the empirical results of the later decades have provided a strongly positive relationship between financial development and economic growth. However, the choice of financial development measures, causality direction of finance and growth, econometric problems arise and the channels in linking both financial development and economic growth need to be more ameliorated to answer questions related to the finance growth nexus issues. There are challenging tasks for researchers with wide ranges of interest in the theory, measurement and techniques used.

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Countries list

Developed countries:

Austria, Belgium, France, Germany, Italy, Netherlands, the United Kingdom, Ireland, Spain, Finland, Denmark, Greece, Portugal, Sweden, Norway, the USA, Canada, Australia, New-Zélande, Japan.

Developing countries:

South Africa, Mexico, Argentina, Brazil, Chile, Colombia, Venezuela, Peru, Singapore, Thailand, Philippine, Indonesia, Malaysia, R. Korea, Egypt, Pakistan, Turkey, Morocco. Algeria, Bangladesh, Benin, Bolivia, Botswana, Burkina Faso, Burundi, Cameroon, Costa Rica, Côte d'Ivoire, Ecuador, El Salvador, Gabon, Ghana, Guatemala, Haiti, Honduras, Jamaica, Kenya, Maurice, Nicaragua, Niger, Nigeria, Panama, Papouasie-New-Guinia, Paraguay, Syria, Senegal, Sri Lanka, Togo, Tunisia, Uruguay.

Table 1. Financial Development and economic Growth: Static Panel Estimation, Fixed Effect vs. Random Effect, over the period 1970 to 2009

GrowtGrowth rate	Fixed Effets (OLS)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Initial GDP	-0.0396***	-0.0064***	-0.016***	-0.014***	-0.012***	-0.039***	-0.05***	-0.016***	-0.013***	-0.013***
	(-18.30)	(-6.641)	(-4.222)	(-6.326)	(-6.649)	(-18.68)	(-15.54)	(-4.079)	(-6.060)	(-5.586)
Trade openess	0.00332	0.00312**	0.0157**	0.0226***	0.0279***	0.00301	0.00473	0.0147**	0.0217***	0.0223***
	(0.353)	(2.232)	(2.470)	(3.779)	(3.799)	(0.325)	(0.779)	(2.332)	(3.561)	(3.595)
Education	-0.00272	0.0109***	-0.00597	-0.00684	-0.00514	-0.00254	0.00203	-0.00397	-0.00650	-0.00378
	(-0.276)	(2.942)	(-0.365)	(-0.658)	(-0.523)	(-0.261)	(0.208)	(-0.245)	(-0.628)	(-0.370)
Inflation	-0.0109	-0.0194***	-0.0107**	-0.019***	-0.001***	-0.0109	-0.0099*	-0.0112**	-0.019***	-0.022***
	(-1.370)	(-4.014)	(-1.979)	(-5.322)	(-3.564)	(-1.383)	(-1.751)	(-2.079)	(-5.509)	(-5.374)
Government consumption	-0.0470	-0.0401**	-0.0683	-0.0491	-0.093***	-0.0481	-0.0780*	-0.0675	-0.0519	-0.0672
	(-1.219)	(-2.465)	(-1.307)	(-1.152)	(-2.897)	(-1.256)	(-1.769)	(-1.298)	(-1.196)	(-1.538)
Civil freedom	0.00535	0.0109***	0.0179**	0.0144***	0.0165**					
	(0.911)	(3.988)	(2.474)	(3.035)	(2.375)					
Polical stability						0.0275***	0.00638	0.0248***	0.0191***	0.0198***
						(2.707)	(0.622)	(2.907)	(3.013)	(3.146)
Private credit/GDP	0.0280***					0.00678				
	(2.761)					(1.128)				
M3/GDP		0.00434**					0.0101*			
		(2.532)					(1.958)			
Market capitalisation/GDP			0.00408**					0.00388**		
			(2.286)					(2.178)		
Financial system assets/GDP				0.0206**					0.0213**	
				(2.128)					(2.183)	
Credit/deposit					0.00472					0.00480
					(1.462)					(1.168)
Constant	0.387***	0.0814***	0.184***	0.134***	0.107***	0.385***	0.502***	0.176***	0.128***	0.140***
	(19.22)	(8.773)	(4.454)	(5.377)	(7.382)	(19.35)	(15.47)	(4.251)	(4.910)	(5.427)
Observations	543	543	292	543	544	543	475	292	543	543
R-squared	0.555	0.1246	0.135	0.175	0.128	0.555	0.1266	0.144	0.176	0.169
Nombre de pays	68	68	57	68	68	68	68	57	68	68
Hausman Test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Notes: t-stat in parentheses.

* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.

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Table 2. Financial Development and economic Growth: Dynamic Panel Estimation, GMM-Difference, over the period 1970 to 2009:

Dependant Variable : LogGDP	*GMM en Différence*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Initial GDP	-0.039***	-0.006***	-0.016***	-0.014***	-0.012***	-0.039***	-0.051***	-0.0160***
	(-18.30)	(-6.641)	(-4.222)	(-6.326)	(-6.649)	(-18.68)	(-15.54)	(-4.079)
Trade openess	0.137***	0.0769***	-0.0119	0.0609***	0.135***	0.0769***	-0.00518	0.0601***
	(9.053)	(5.642)	(-0.773)	(3.585)	(9.197)	(5.496)	(-0.293)	(3.720)
Education	0.0784***	0.0435*	0.171***	-0.0613***	0.0833***	0.0475**	0.172***	-0.0582***
	(3.955)	(1.863)	(3.923)	(-3.215)	(3.823)	(2.198)	(4.011)	(-3.061)
Inflation	-0.0785***	-0.0780***	-0.0813***	-0.0610***	-0.0750***	-0.0797***	-0.0799***	-0.0591***
	(-8.011)	(-6.429)	(-7.430)	(-6.126)	(-7.914)	(-7.342)	(-7.062)	(-6.022)
Government consumption	-0.914***	-1.053***	-1.025***	-0.706***	-0.941***	-1.051***	-1.020***	-0.677***
	(-8.495)	(-10.04)	(-6.180)	(-4.758)	(-8.607)	(-9.019)	(-6.374)	(-4.461)
Civil freedom	0.0699***	0.0570***	0.00393	-0.000836				
	(4.921)	(3.417)	(0.326)	(-0.0636)				
Political stability					0.0575***	0.0406***	-0.0245*	-0.0192
					(3.788)	(2.940)	(-1.680)	(-1.032)
Private credit/PIB	0.216***				0.209***			
	(10.23)				(11.72)			
M3/PIB		0.536***				0.507***		
		(14.48)				(12.00)		
Market Capitalisation/GDP			0.276***				0.261***	
			(48.91)				(43.87)	
Financial system Assets/PIB				0.465***				0.458***
				(10.26)				(9.221)
Constant	2.749***	2.816***	2.875***	2.139***	2.749***	2.798***	2.847***	2.144***
	(58.47)	(63.77)	(27.33)	(26.36)	(53.12)	(66.65)	(29.56)	(27.57)
Observations	407	407	235	407	407	407	235	407
Countries	68	68	56	68	68	68	56	68
Sargan Test[b]	0.1182	0.1145	0.1568	0.1014	0.1363	0.1187	0.1399	0.0978
AR(2)[a]	0.9482	0.7566	0.6593	0.7867	0.9630	0.7559	0.6800	0.7522

Notes: t-stat in parentheses.
The regressions also include dummy variables for the different time periods that are not reported.
* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.
a The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.
b The null hypothesis is that the instruments used are not correlated with the residuals.

Table 3. Financial Development and economic Growth: Dynamic Panel Estimation, GMM-System, over the period 1970 to 2009:

Dependant Variable : LogGDP	*GMM- System*									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
initial GDP	-0.293***	-0.2363***	-0.1498***	-0.217***	-0.220***	-0.283***	-0.236***	-0.163***	-0.214 ***	-0.216***
	(-44.12)	(-34.07)	(-28.64)	(-62.36)	(-44.90)	(-56.50)	(-55.04)	(-28.08)	(-44.67)	(-45.9)
Trade openess	0.141***	0.202***	-0.125***	0.281***	0.263***	0.139***	0.195***	-0.117***	0.265***	0.247***
	(6.57)	(10.24)	(-5.609)	(10.72)	(13.81)	(6.960)	(12.06)	(-5.497)	(12.30)	(14.37)
Education	0.241***	0.0291	0.103**	0.145***	0.271***	0.230***	0.0357*	0.120***	0.151***	0.252***
	(10.70)	(1.370)	(2.567)	(8.192)	(11.30)	(11.58)	(1.871)	(3.446)	(8.692)	(15.65)
Inflation	-0.007***	-0.00780***	-0.0153***	-0.00766***	-0.00860***	-0.00653***	-0.00809***	-0.0167***	-0.00747***	-0.00881***
	(-9.65)	(-8.136)	(-7.382)	(-12.32)	(-15.92)	(-9.549)	(-11.21)	(-11.12)	(-11.44)	(-19.86)
Gouvernement Consomption	-0.915***	-1.181***	-1.820***	-1.307***	-1.251***	-0.959***	-1.239***	-1.823***	-1.288***	-1.226***
	(-14.92)	(-12.02)	(-18.61)	(-14.28)	(-12.43)	(-17.81)	(-12.45)	(-17.96)	(-12.50)	(-11.30)
Civil freedom	0.147***	0.113***	0.0403***	0.0947***	0.131***					
	(13.11)	(8.101)	(6.238)	(8.297)	(8.254)					
Political stability						0.179***	0.209***	0.107***	0.176***	0.244***
						(14.83)	(16.53)	(9.183)	(12.49)	(14.62)
Private sector credit/GDP	0.406***					0.385***				
	(22.31)					(23.59)				
M3/PIB		0.272***					0.276***			
		(9.198)					(11.92)			
Market Capitalisation/GDP			0.133***					0.154***		
			(29.33)					(49.42)		
Financial system assets/GDP				0.102***					0.0938***	
				(3.336)					(4.745)	
Credit/Deposit					0.132***					0.140***
					(8.964)					(10.99)
Constant	2.231***	2.049***	1.740***	1.806***	1.644***	2.172***	2.021***	1.799***	1.757***	1.586***
	(46.13)	(46.56)	(22.33)	(41.55)	(38.51)	(60.70)	(57.89)	(22.64)	(34.64)	(36.01)
Observations	490	490	298	490	490	483	483	293	483	483
Countries	70	70	58	70	70	69	69	57	69	69
Sargan Test[b]	0.1229	0.1220	0.1535	0.0776	0.0776	0.1271	0.1517	0.2146	0.1312	0.1084
AR(2)[a]	0.2046	0.3119	0.5838	0.3514	0.3581	0.1617	0.1816	0.6070	0.2728	0.2328

Notes: t-stat in parentheses.

The regressions also include dummy variables for the different time periods that are not reported.

* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.

a The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.

b The null hypothesis is that the instruments used are not correlated with the residuals.