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FINANCE AND GROWTH: EMPIRICAL EVIDENCE FROM DEVELOPING COUNTRIES 1960-1990

Mohamed Trabelsi

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ECONOMIC RESEARCH FORUM
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7 Boulos Hanna St. Dokki, Cairo, Egypt
Tel: (202) 3370810 – (202) 7485553 – (202) 7602882
Fax: (202) 7616042. Email: erf@idsc.net.eg. Website: http://www.erf.org.eg

Abstract

This paper examined the empirical relationship between financial intermediation and economic growth using cross-country and panel data regressions for 69 developing countries for the period 1960-1990. The main results are: (i) Financial development is a significant determinant of economic growth in cross sectional regressions. (ii) Financial markets cease to exert any effect on real activity in panel data regressions. The paradox may be explained, in developing countries, by the lack of an entrepreneurial private sector capable to transform the funds into profitable projects. (iii) The effect of financial development on economic growth is channeled mainly through an increase in investment efficiency.

I- Introduction

The relationship between financial development and economic growth has received a great deal of attention during the last few decades. Many economists [1] have underlined the importance of financial sector development in the process of economic development while others think that this importance is over-stressed.[2] However, the debate is not new in the development economics literature and can be traced back, at least to Shumpeter's (1912) Theory of Economic Development.[3] Later, Gurley and Shaw (1955) pinpointed the credit channel and more particularly the role of financial institutions in the supply of funds to the real activity and underscored the idea that differences in financial systems development may explain economic performances across countries.

The debate was also largely influenced by the pioneering contributions of Goldsmith (1969)[4], and particularly the seminal contributions of McKinnon (1973) and Shaw (1973), who have stressed the crucial role of public policies in the mobilization of savings destined for investment financing. They consider that all forms of public control on the financial market achieved by quantitative instruments (directed credits for selected strategic sectors, high reserve ratios) or price instruments (interest rate ceiling) generate a *financial repression* situation characterized by negative real interest rates, low levels of savings, investments and therefore growth. Consequently, they have underscored the need for *financial liberalization*, the elimination of all forms of public intervention and freeing the real interest rate.

Recently, a notable revival of interest in exploring the link between financial market development and economic growth, especially within the research program of the endogenous growth theory.[5] The literature on this subject has been used by some economists working in development to show that financial sector development has positive effects on steady state growth rates. More specifically, they have emphasized the role of financial intermediaries in the optimal allocation of financial resources to capital accumulation (Bencivenga and Smith, 1991; Greenwood and Smith, 1997). Some other economists have shown a be-directional relationship between financial sector development and growth (Greenwood and Jovanovic, 1990; Berthelemy and Varoudakis, 1996).

On the other hand, several investigations have been carried out to test the impact of financial development on economic growth and the causal relationship between them.[6] A synopsis of the empirical literature with different indicators used to measure the extent of financial activity is provided later in this paper. However, while the impact of financial development is broadly positive in cross-sectional studies, panel data regressions have not corroborated such an effect. Financial sector development is found to exert a negative effect on economic growth in certain studies using panel data regressions (De Gregorio and Guidotti (1995) and Berthelemy and Varoudakis (1998)). The sign of the relationship is not necessarily stable once we add the temporal dimension to the cross-sectional regressions.

The aim of this paper is specifically to test empirically the importance of financial sector development as a determinant of economic growth using *cross-country* and *panel data* regressions for a sample of 69 developing countries during the period 1960-1990. The empirical investigation is carried out by expanding the work of King and Levine (1993) with a different indicator of financial deepening. Following De Gregorio and Guidotti (1995), special attention has been given, carrying out these regressions, to the sources of growth that is whether this growth is due to investment increases, productivity improvement or both. This issue is important since the theoretical debate on the channel from financial deepening to economic growth has not been completed yet and there is no clear-cut answer on the sign of the relationship between *investment* and *financial development*.

Three main results are found in this paper. First, in line with the available empirical literature, financial development is found to affect positively economic growth in cross-country regressions using the ratio of broad money to GDP (M3Y) as an indicator of financial intermediation. Second, with panel data estimates financial markets cease to exert any effect on long run growth. This paradox was accounted for, in the case of developing countries, by the lack of an innovative entrepreneurial private sector capable to transform the available savings into productive investments. Finally, the main channel through which the financial sector affects the real sector is through an increase in investment productivity.

The paper is organized as follows: section II gives a short illustration of the link between financial development and growth. Section III discusses the main results

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[1] See the World Bank report (1989) and Levine (1997) for an exhaustive survey.

[2] Lucas (1988) and Chandavarkar (1992).

[3] Schumpeter, argued that finance does matter for economic development because financial institutions, by searching for successful innovation projects, finish by encouraging entrepreneurs to produce better and more.

[4] Goldsmith offered a more interesting contribution to the debate by defining with more accuracy the role of financial institutions. He concluded that the financial structure in the economy "*accelerates economic growth and improve economic performance to the extent that it facilitates the migration of funds to the best user, that is, to the place in the economic system where the funds will yield the highest social return"* (Goldsmith, 1969).

[5] Pagano (1993) provides an excellent survey of literature.

[6] See Demetriades and Khaled (1996) and Luintel and Khan (1999) for recent studies of the causality issue.

of empirical literature. Section IV provides the results of the empirical tests carried out. Finally, section V concludes.

II- Financial Intermediation, Productivity and Growth

In order to establish the theoretical link between financial deepening, productivity and growth, let's assume that we have a closed economy featured by an aggregate production function where output $Y(t)$ is produced during period t by capital factor only, $K(t)$:

$$Y(t) = F(K(t)) \qquad (1)$$

$K(t)$ is, as in Rebelo (1991), the aggregate capital stock including physical and human capital. Total differentiation of equation (1) gives:

$$dY(t) = \frac{\partial F}{\partial K(t)} dK(t) \qquad (2)$$

Dividing the two terms of (2) by $Y(t)$ gives the growth rate of the economy $g = dY(t)/Y(t)$ as follows:

$$\frac{dY(t)}{Y(t)} = g = \frac{\partial F}{\partial K(t)} \frac{dK(t)}{Y(t)} \qquad (3)$$

The growth rate g appears then as a product of the marginal productivity of capital $(\partial F / \partial K(t))$ and the investment rate $dK(t)/Y(t)$. In this closed economy without the government, the financial market equilibrium supposes the equality between savings and investment. However, we could envisage the hypotheses of a loss of resources during the intermediation process[7] such that in equilibrium only a fraction of saved resources $S(t)$ is channeled to investment $I(t)$ as follows:

$$\varphi S(t) = I(t) \qquad (4)$$

The amount of savings absorbed by the financial system is then $(1-\varphi)S(t)$ and the higher it is, the lesser is capital accumulation in the economy. Combining this latter equation with the growth rate of the economy, we have:

$$g = F'(K(t)) \varphi \left[\frac{S(t)}{Y(t)} \right] \qquad (5)$$

[7] The loss of resources may be due to a notable public intervention in the financial market or a higher banking intermediation margin. See for more details the World Bank report (1989) and Pagano (1993).

It appears then from this simple model that the development of the financial market may affect the growth process through:

First, the improvement of capital productivity with better resource allocation toward their most productive use. In equation (5), this corresponds to an increase in $F'(K(t))$.

Second, the channeling of more savings to investment by avoiding the loss of funds during the intermediation process through a rise in the fraction φ.

Finally, through an increase of the saving rate $(S(t)/Y(t))$ (or also the investment rate) by using economic polices affecting directly the determinants of private saving behavior.

III -Empirical Contributions to the Debate

Several empirical studies have attempted to test the relationship between financial intermediation and economic growth since the works of Cameron (1967) and Goldsmith (1969). The seminal empirical contributions of McKinnon (1973) and Shaw (1973) have given significant support to the idea that financial development plays an important positive role in the growth process. Recent studies, which have reconsidered the evidence during the eighties and the nineties and have found a significant positive effect between several indicators of financial intermediation and economic growth.

In an earlier work, Lanyi and Saracoglu (1983) proved the effect of financial repression on economic growth taking a sample of 21 developing countries. They distinguished three groups of countries and gave a value of 1 to countries with positive real interest rates, 0 to countries with moderately negative real interest rates and (-1) to countries with severely negative real interest rates. They have found a significant positive relationship between real GDP growth rate and the interest rate dummy variable for the period 1971-1980. The empirical results reported in the works of Gelb (1989), the World Bank (1989) have also shown positive and significant correlation between the real deposit rate of interest and economic growth rate for a sample of 34 countries.

Roubini and Sala-I-Martin (1991,1992) have also studied the effect of financial repression and have shown that all types of control and any government intervention in the financial market is likely to inhibit economic growth. Based on Barro's (1991) cross-sectional growth regressions for a large sample of countries for the period 1960-1985, the authors have added financial repression proxies which are an *index of the degree of real interest rate distortions (FINREP)*, the *ratio of commercial banks' reserves to money (RESERVE)* and an *index of overall price distortions (DISTORT)*. The estimated coefficients of these variables in all regressions are significantly negative which means that the shift

from economies with low degrees of financial distortions to ones with massive public intervention in financial markets reduces significantly economic growth.

King and Levine (1993 a, b) provided also the same evidence for 77 developing countries over the period 1960-1989. Using different measures of economic growth and financial development, they have shown that financial market development affects economic growth positively. The measures of economic growth are (a) *the average growth rate of per capita real GDP*, (b) *the average growth rate of capital*, (c) *the investment ratio (as a percentage of GDP)*, (d) *a proxy of productivity improvements*. The indicators of financial deepening used were linked to financial intermediation activity: (a) *the ratio of liquid liabilities to GDP (also called DEPTH),* (b) *the ratio of credit to the private sector over the total credit,* (c) *the ratio of private firms credit to GDP* (d) *Domestic assets in deposit money banks divided by domestic assets of both deposit money banks and central bank*. The authors have found that the different indicators of financial deepening are positively and significantly correlated with the measures of economic growth.

Moreover, the evidence presented by King and Levine (1993 a, b)[8] also gave support to Goldsmith (1969), McKinnon (1973) and Shaw (1973), insofar as they have claimed that *financial sector* affects economic growth *both* through the improvement of investment productivity (better allocation of capital) and through higher investment level. The King and Levine Claims' are also supported by the findings of De Gregorio and Guidotti (1995), who consider that financial deepening affects growth through a combination of the two effects but with *more importance for the efficiency effect*. This finding constitutes the principal conclusion of the empirical evidence based on a large cross-country sample where financial deepening is proxied by the ratio of bank credit granted to the private sector to GDP.

Furthermore, De Gregorio and Guidotti (1995) claimed that real interest rates are far from being good indicators of financial development or repression. As an alternative, and following Calvo and Guidotti (1991), they suggested rather that the relationship between economic growth and real interest rates might be represented by an inverted "U" curve. According to this hypothesis, and along with the Mckinnon-Shaw approach, low and negative real interest rates are likely to entail a distorted financial sector and consequently low real growth. ''... *On the other hand, very high real interest rates do not reflect improved efficiency of investment, but rather a lack of credibility of economic policy or various forms of country risk, are likely to result in a lower level of investment as well as a concentration in excessively risky projects.*'' (De Gregorio and Guidotti, 1995).

In a more original study, Rajan and Zingales (1998) tested the finance-growth nexus by focusing on the importance of the differential cost of external finance for firms. More specifically, they tried to see whether firms or sectors that need more external finance (because of the scarcity of funds available for investment opportunities) grow disproportionately faster in countries where financial markets are more developed. *The firm's dependence on external finance is defined as the ratio of capital expenditures minus cash flow from operations divided by capital expenditures*. The authors focused then on the details of a mechanism by which finance affects growth, providing by the same occasion another test of causality, since they found evidence for a channel through which finance theoretically influences growth.

In summary, we can say that despite the significant positive relationship often found between financial development and economic growth in empirical evidence, the findings are still non-conclusive regarding several aspects, which continue to give a new dimension to the debate. The origins of the debate are summarized by the following points:

The controversy concerns first the measure of the extent of financial intermediation. Each of the proxies cited below (real interest rates, several monetary aggregates, credit granted to the private sector) pose a serious problem of interpretation linked to the nature of this variable.

The second point of debate is linked to the transmission mechanism of financial development to economic growth. Although empirical works have shown a positive effect of financial development on economic growth, they have not given answers to the nature of this effect. In other words, we do not know from these empirical investigations whether growth is affected through a *higher investment (saving) rate*, a *better resource allocation (efficiency)* or *both*.

The empirical literature is also indecisive regarding the causal relationship between financial markets and economic growth: *the positive effect is running from financial development to economic growth*, the *opposite* or *both ways*.

IV- Empirical Evidence

Our empirical investigation is constituted of a set of *cross-sectional* and *pooled cross section-time series* regressions carried out using the Barro-Lee Data set (1994) and the IMF International Financial Statistics (1997). It has been carried out for a sample made of 69 developing countries during the period 1960-1990 (See appendix 1 for a list of these countries).

Our financial indicator to measure the extent of the financial intermediation activity, is the ratio of the money stock M_3 to nominal GDP (M3Y). The choice

[8] Levine and Zervos (1998) showed that stock market liquidity and banking sector development both affect economic growth, capital accumulation and productivity improvements when used together as regressors.

of a large stock of money as M_3 accords well with the McKinnon's inside money model and the financial deepening approach of Shaw (1973). However, this ratio may be considered less convenient to a financial intermediation approach initiated by Gurley and Shaw (1955) because only the less liquid aggregates are likely to reflect the extent and the size of the financial development. The illiquid component of this stock is seen to be better than the strict quasi-money stock. Moreover, the narrow monetary aggregate M_1 is destined to be used as a medium of exchange rather than to be allocated efficiently to productive investments especially in developing countries where high amounts of currency are held outside the banking system.[9]

The indicators of economic growth are of the per capita GDP growth rate (G_y) expressed in constant prices and the rate of gross national investment to GDP (INV).

IV-1-Cross-sectional Regressions

IV-1-1-Current financial development and economic growth

The first set of regressions uses the cross sectional regressions of King and Levine (1993a) augmented by the investment rate as an explanatory variable. The set of *basic* explanatory variables in the growth equation contains the initial real GDP per capita for the mentioned period (Y_i) (in log), the secondary school enrollment rate (*H*) (in log) as a proxy for human capital, the financial indicator retained and measured by the ratio of the total assets of the financial system to GDP (*M3Y*). The base growth equation is represented by the following:

$$G_Y = \alpha_0 + \alpha_1 Y_i + \alpha_2 H + \alpha_3 (M3Y) + \varepsilon \qquad (6)$$

Where G_Y and ε represent respectively per capita GDP growth rate and a random variable.

In addition to this base regression, other variables are included to account for other economic phenomena: the ratio of government spending to GDP (*GY*), the investment ratio (*IY*), the openness rate of the economy (*MPXY*) measured by the ratio of exports and imports over GDP and finally the rate of inflation (*INF*) using the consumer price index. The whole estimated equation corresponds to the following one:

$$G_Y = \alpha_0 + \alpha_1 Y_i + \alpha_2 H + \alpha_3 (M3Y) + \alpha_4 GY + \alpha_5 IY + \alpha_6 MPXY + \alpha_7 INF + \varepsilon \qquad (7)$$

These different variables are listed in appendix 2. The estimations were carried out using ordinary least squares (OLS) and the standard errors were computed using the White robust procedure. The results are summarized in table (1).

The estimated equation (1.1) in table (1) corresponds to the base regression and it shows that the financial development indicator is positively and significantly correlated with real GDP per capita growth rate with a 95 percent level of confidence. Also, the estimated coefficient on initial income per capita is negative and significant at the 5 percent risk level. This result is in line with the findings of Mankiw Romer and Weil (1992) on the convergence hypothesis: Countries which start the period with a lower income per capita tend to grow faster than those with a higher income. The human capital proxy is found also to be positively and significantly correlated with growth. The coefficient on the financial indicator also remains significant after controlling for the remaining variables. In equation (2.1), the ratio of government spending is introduced as a regressor and the coefficient on M3Y keeps its significance and does not change much.

In equation (3.1), two other variables are introduced in the base regression, the investment rate (*IY*) and the inflation rate (*INF*). In this case, although keeping its significance, the estimated coefficient of the financial intermediation variable falls to 0.013. *This result suggests that the financial sector affects economic growth mainly through an increase of the efficiency of investment*. In other words, the fall of the financial indicator coefficient from 0.018 to 0.013 indicates that approximately *one third* of the effect of M3Y on economic growth is transmitted though *investment* rising while the remaining *two thirds* represent the effects of an increase in *investment efficiency*. This outcome is in line with those of Ghani (1992), King and Levine (1993a) and De Gregorio and Guidotti (1995) and corroborates the hypothesis that the effect of financial intermediation on economic growth acts more though an increase of investment productivity.

The coefficient on the inflation rate is not significantly different from zero, such a result is supposed to be different from the empirical literature on the growth-inflation nexus (De Gregorio (1992), Easterly and Bruno (1998), King and Levine (1993 a, b), Barro (1996), Berthélemy and Varoudakis (1998), Haslag and Koo (1999)) which is in favor of a *negative* and *significant* link.

Equation (4.1) reports the estimates of the general equation (equation (7)) and completes equation (3.1) by introducing trade openness as measured by the ratio of exports and imports to GDP. The coefficient on MPXY is positive and not significant (+ 0.005). This result means that trade openness is not likely to influence economic growth. This may be explained by the fact that in these countries, economic policy was more featured by protective policies during the sixties and seventies in a way that the contribution of trade to economic growth was not substantial. Also the financial development variable becomes

[9] A high stock of liquidity in the economy may reflect a less developed financial sector due, among other things, to the lack of alternative of financial assets that could absorb the excess of liquidity and the incapacity of the financial system to offer financial products that transform the liquidity into term deposits (De Gregorio and Guidotti (1995)).

insignificantly different from zero by the introduction of trade openness which may raise the importance of the development of the financial sector for trade openness.

IV-1-2- the role of the initial financial conditions

In equation (5.1) to equation (8.1) in Table (1), the financial indicator is expressed at the beginning of the period to underline the importance of the initial financial development in influencing subsequent economic growth. In fact, one of the important conclusions of traditional growth theory is the unconditional convergence of economy, in the long run, to a unique steady state. The growth rate is determined in this context by exogenous conditions (that is scientific discoveries, abundance of natural resources,…and so forth) and at least by the demographic factors, which exclude other factors such as economic policies in the growth process. Recent developments in the growth theory, as initiated by Romer (1986,1990), Lucas (1988), Barro (1990) and Rebelo (1991) have given a new framework to understand the differences in growth performance across countries.

The endogenous growth theory has focused on the importance of economic policies in determining subsequent growth with a special emphasis on the initial conditions in influencing the observed growth gaps between countries. According to the endogenous growth theory, the convergence hypothesis is not verified and consequently the observed gaps between growth performances across countries are seen to persist as long as the initial conditions are unchanged.

The initial conditions, highlighted by endogenous growth theory, refer to human and physical capital[10], and the extent to which financial markets are well developed. However, although the first factor was largely debated, less attention has been given to the importance of the *initial* development level of financial markets and institutions and its relevance for subsequent economic growth. The nineties have witnessed an extensive empirical contribution on the relationship between financial market development and economic growth (Ghani, 1992; King and Levine, 1993a, b; De Gregorio et Guidotti, 1995; Berthélemy et Varoudakis (1996, 1998), Fry (1997)). The results found have suggested a positive impact of financial markets development and its *initial level* on economic growth.

As in the case of the initial stock of human capital, it is widely admitted that an economy with a more developed initial financial sector would tend to grow faster than an economy with less developed financial institutions and markets. In this context, and as it is stressed by the wide theoretical literature, the financial sector is found to play a major role in financing investment and growth through a better allocation of financial resources.

For that reason, the base regression in equations (5.1)-(8.1) contains the *initial* values of GDP per capita, human capital and a financial development indicator (measured by the average ratio of total assets of the financial system to GDP during the period 1960-1962). In equation (5.1), the initial financial development as well as the human capital is found to be positively and significantly correlated with economic growth at the 5 percent level. This result means that a country that starts with a more developed financial market tends to have higher subsequent growth. Also the coefficient on the initial level of per capita real GDP is negatively significant at the 1 percent level, which is in line with the convergence hypothesis as pointed out earlier.

In equations (6.1) and (7.1), the government spending ratio and the investment rate are introduced as regressors in the growth equation, the coefficient on M3YI increased from (+ 0.054) to (+0.064) as well as the t-statistic (from 2.65 to 3.17). The coefficient of public spending ratio continues to be non significant, as in the preceding equations ((2.1)-(4.1)), with a negative sign and the investment rate is the variable which improved the overall fit of the equation since the adjusted R^2 raised from 0.42 to 0.50.

Equation (8) reports the estimates of the general equation, where the opening rate (MPXY) and the inflation rate (INF) are introduced as determinants of economic growth besides the existing ones. The estimations show that none of these variables enters with a significant coefficient (the coefficient of MPXY has the wrong sign) and the coefficient of the investment rate is positive (+0.114). The coefficient of the initial financial development (M3YI) kept the same magnitude as in equation (7), although its t-statistic fell from 3.17 to 2.9.

IV-2- Pooled cross-section time-series regressions

In order to take into account the temporal dimension in explaining the growth-finance link, some regressions have been carried out using pooled cross-section time-series data with *fixed effects* during the period 1970-1990 and with a reduced sample of 40 developing countries.[11]

Table (2) summarizes the results where the growth equation estimated is the same as in King and Levine (1993a). The dependent variable is the growth rate of per capita GDP and the explanatory variables are initial per capita income, initial level of human capital, and the measure of the financial activity: the total assets

[10] The main idea supporting such a hypothesis is that a higher initial human capital in an economy makes easier the production and the absorption of new technologies, Nelson and Phelps (1966), Grossman and Helpman (1991) and Romer (1990). Barro (1991), in cross-country regressions for a 98 countries underlined the importance of the initial stock of human capital to long run growth. Levine and Renelt (1992) do the same thing in an empirical evidence covering a more larger sample.

[11] The choice of the period and the number of countries are induced by the lack of data for several countries during the sixties.

of the financial system as a percentage of GDP (M3Y). These latter variables form the base regression (equation (6)) and the initial value of per capita income and human capital is computed at the beginning of each decade as appropriate. The remaining independent variables of the equation are the government spending as a ratio of the GDP (GY), the trade openness variable (measured by the ratio of the sum of exports and imports to GDP (MPXY)) and the inflation rate computed on the base of the consumer price index.

Equation (1.2) shows the results of the base regression (equation (6)), where the initial per capita income and human capital are introduced as regressors besides the financial intermediation variable (M3Y). This last variable enters *negatively* with a non significant coefficient at the 5 percent level, while the coefficients of the initial per capita income and the human capital are significantly different from zero at the 1 percent and the 5 percent level respectively. The coefficient of the ratio of total financial assets to GDP also remains negative and non significant even with the addition of the government spending ratio (GY) and the inflation rate (INF) in equation (2.2). The coefficient of the (GY) variable is *negative* and *significant* at the 1 percent level. This result means the less important public spending as a percentage of GDP, the higher economic growth is. This conclusion is similar to that of Barro (1991), De Gregorio and Guidotti (1995) and Haslag and Koo (1999) insofar as the spending is not related to public investment.

Equation (3.2) introduces the trade openness variable as a regressor in the growth equation, after eliminating the inflation rate, as a non-significant variable. The coefficient of the financial variable (M3Y) keeps its negative sign and the value of the t-statistic below the critical level of 5 percent. The commercial variable is positively and significantly correlated to economic growth at the 5 percent level, while the government- spending ratio continues to be negative and significant at the 1 percent level. The negative sign of the indicator of financial development continues to be negative in equation (4.2), where the government-spending ratio is eliminated from the list of factors and the inflation rate is reintroduced. The magnitude of the coefficient fell from (-0.014) in equation (3.2) to (-0.017) in equation (4.2).

Equation (5.2) corresponds is an estimate of the general equation (equation (7)) taking into account all the explanatory variables introduced in the regression. The findings are in line with the preceding equations, and tend to confirm the insignificant correlation between financial intermediation activity and economic growth. These results obtained under several specifications of the growth equation may appear in sharp contrast with the cross-sectional regressions and with the theoretical foundations.

The findings may be more controversial if we consider regression (6.2), where the estimates correspond to the general equation but with the *investment rate* as a dependant variable. The estimates show that the financial indicator is positively correlated with the investment rate at the 1 percent level. The initial level of human capital and the openness rate are also found to be highly and positively correlated with the investment rate.

At a first glance, the above findings may appear puzzling since they do not give any support to the theoretical evidence. However, De Gregorio and Guidotti (1995), in their empirical study of the long run correlation between financial development and economic growth, using panel data regressions with random effects for Latin American countries during the period 1950-1985, also have found a strong negative correlation between finance and growth. They explained the finding by the effects of experiments of extreme liberalization of financial markets in some Latin American countries followed by their subsequent collapse.

Berthélemy and Varoudakis (1998) also found a negative correlation between financial development and growth using panel data regressions based on a panel set of 82 countries for the period 1960-1990. They argued that this empirical result may be explained by the existence of threshold effects associated with the existence of multiple equilibria in the long run between finance and growth. They assume that the interaction between financial and real sectors generates two stable equilibria: a *low equilibrium* with weak growth performance and an underdeveloped financial sector and a *higher equilibrium* with notable growth and normal development of the financial market. Between the two, there is an unstable equilibrium, which defines the threshold effect of the financial development on economic growth. Figure (1) provides an illustration of this explanation.

However, in the present study, the significant relationship between the investment ratio and the financial indicator may be a good reason to consider that the nature of the finance-growth link hinges on the investment behavior of the private sector in each economy. In other words, the insignificant correlation between financial development and economic growth may be explained by the lack of innovative entrepreneurial activity in developing countries.

In our proposed explanation, the effect of financial intermediation on long run growth is conditioned by the existence of an active and innovative private sector in the economy. *The financial sector, by its vocation to create and mobilize funds is unable by itself to promote growth, unless a private sector is sufficiently developed* to transform the available funds in profitable projects.[12]

[12] Other hypotheses were tried to account for this paradox, such as the importance of foreign trade in developing countries, yet regressions have not provided significant coefficients for the considered variable.

The effect of the financial development on economic growth in developing countries is then conditioned on the importance of the private sector in the economy. The regressions presented in table (3) tend to give support to such arguments, where the financial indicator (M3Y) is controlled by the importance of the private sector in the economy as measured by the ratio of private investment to total domestic and foreign investment (PS). The remaining explaining variables are the same as in table (2).

Equation (1.3) corresponds to the base regression where only the initial income per capita, human capital and the composed variable (M3YPS), defined as the product of the ratio of financial intermediation (M3Y) and the ratio of private investment to total domestic and foreign investment (PS), are present as regressors. The coefficient of the composed variable (M3YPS) is positive and significant at the 1 percent level.

This strong positive effect continues to be present in the remaining regressions even when we control for other economic phenomenon by introducing the government spending ratio (GY), the commercial opening rate (MPXY) and the inflation rate (INF) as explaining variables. The coefficient of the (M3YPS) variable takes on average the value (+0.052) and is highly significant at the 1 percent level for all equations. Moreover, the initial stock of human capital and the inflation rate are found to be insignificant, while the coefficient of the trade variable (MPXY) confirms the positive effect of the commercial openness on economic growth.

The findings of table (3) tend to confirm the positive effect of financial markets on economic growth in developing countries[13], yet the considered effect is conditioned by the existence of an entrepreneurial sector capable to transform the available resources into investments. In other words, if we consider two similar countries with the same characteristics of financial development but different sizes of private sectors, the country with a more developed private sector activity would have more chances to grow faster.

V-Conclusion

This paper studied the empirical link between financial development and long run growth for a set of developing countries. Two main findings of the study are underlined *(i)* The development of the financial sector seems to affect growth only with cross-sectional estimates. *(ii)* Regressions carried out using panel data do not give any empirical support to the theoretical hypotheses presented above.

The paradox was resolved by highlighting the importance of the private sector in the allocation of resources by financial markets. Without an innovative entrepreneurial sector continuously looking for profitable projects, the financial sector could not enhance growth substantially. This hypothesis is taken into account in the regressions using an interactive variable, defined as the product of the financial intermediation proxy and the ratio of the private investment to total investment. *(iii)* The financial sector affects economic growth mainly through an increase of investment efficiency. Such a result also supports the hypothesis that the effects of financial intermediation on economic growth are mainly transmitted through an increase in investment productivity. It is also in line with other studies on the topic.

Nevertheless, the results of the present study could notably be built on by testing the theoretical *causality* between financial intermediation and economic growth since recent contributions argue that economic growth *also induces* financial deepening. Also, the analysis of the dynamic interaction between the real and financial sectors could be improved by using more appropriate econometric techniques. In this respect, using co-integration techniques and the Granger causality test may give a clearer idea about the nature of the long run link between finance and growth.

[13] The positive effect of financial development on economic growth with panel data regressions in King and Levine (1993a) and Haslag and Koo (1999) may be explained by the presence of several developed countries in the sample besides developing ones.

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Figure 1: Financial Development and Long Run growth According to the Proposition of Berthélemy and Varoudakis, 1998

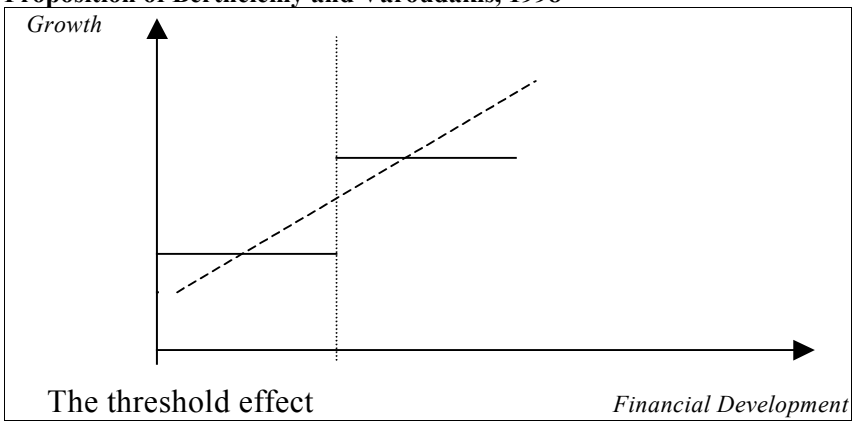

Table 1: Financial Conditions and Economic Growth: Some Cross-sectional Regressions

Equation	(1.1)[1]	(2.1)	(3.1)	(4.1)	(5.1)	(6.1)	(7.1)	(8.1)
	60-1990	60-1990	60-1990	60-1990	60-1990	60-1990	60-1990	60-1990
Constant	0.089	0.093	0.077	0.080	0.124	0.121	0.096	0.095
	(3.98)[2]	(3.39)	(3.21)	(2.57)	(3.26)	(2.94)	(2.46)	(2.15)
Y initial	-0.017	-0.015	-0.013	-0.013	-0.02	-0.017	-0.015	-0.015
(Log)	(-4.97)	(-4.16)	(-4.47)	(-3.52)	(-3.33)	(-3.22)	(-3.08)	(-2.66)
Human	0.061	0.054	0.031	0.032	0.038	0.035	0.015	0.016
capital	(6.10)	(5.31)	(3.29)	(2.75)	(2.52)[3]	(2.62)	(1.48)	(1.36)
M3Y	0.017	0.018	0.013	0.011	-	-	-	-
	(2.47)	(2.97)	(2.20)	(1.61)	-	-	-	-
M3YI	-	-	-	-	0.069	0.054	0.064	0.065
	-	-	-	-	(2.65)	(2.28)	(3.17)	(2.90)
GY	-	-0.066	-0.059	-0.057	-	-0.065	-0.050	-0.045
	-	(-1.58)	(-1.60)	(-1.25)	-	(-1.44)	(-1.03)	(-0.78)
IY	-	-	0.121	0.096	-	-	0.012	0.114
	-	-	(3.00)	(1.85)	-	-	(2.79)	(2.34)
MPXY	-	-	-	0.005	-	-	-	-0.001
	-	-	-	(0.53)	-	-	-	(-0.131)
INF	-	-	-0.0001	0.0005	-	-	-	-0.0009
	-	-	(-0.10)	(0.31)	-	-	-	(-0.44)
Adjusted R-sqared	0.44	0.42	0.52	0.34	0.46	0.42	0.50	0.42
Observ-ations.	69	69	69	69	69	69	69	69

Notes: (1) The dependant variable is the growth rate of the GDP per capita. (2) t-statistics in parentheses. (3) The human capital is calculated at the beginning of the period for the remaining equations.

Table 2: Financial Development and Economic Growth: Pooled Cross-section-time Series Regressions, (1970-1990)

Equations Variables	(1.2)[1]	(2.2)	(3.2)	(4.2)	(5.2)	(6.2)[3]
Y initial (Log)	-0.048	-0.045	-0.048	-0.052	-0.048	0.003
	(-4.97)[2]	(-4.59)	(-4.85)	(-5.29)	(-4.89)	(0.49)
$H.K_{(i)}$ (Log)	0.080	0.081	0.072	0.084	0.079	0.175
	(2.09)	(2.09)	(1.93)	(2.20)	(2.08)	(5.11)
M3Y	-0.014	-0.010	-0.014	-0.017	-0.014	0.060
	(-1.25)	(-0.93)	(-1.21)	(-1.53)	(-1.23)	(5.59)
GY	-	-0.141	-0.137	-	-0.135	-0.025
	-	(-2.96)	(-2.88)	-	(-2.85)	(-0.76)
MPXY	-	-	0.020	0.021	0.020	0.146
	-	-	(2.24)	(2.35)	(2.26)	(11.18)
INF	-	0.008	-	0.001	0.009	-0.001
	-	(0.41)	-	(0.52)	(0.46)	(-0.11)
Adjusted R-squared	0.32	0.34	0.35	0.33	0.35	0.92
Panel Observations	535	535	535	535	535	543

Notes: (1) The dependant variable is the growth rate of the GDP per capita. (2) t-statistics in parentheses. (3) The dependant variable is the investment rate (I/GDP).

Table 3: Financial Development and Economic Growth: Pooled Cross-section-time Series Regressions, 1970-1990

Equations Variables	(1.3)[1]	(2.3)	(3.3)	(4.3)	(5.3)
YI (Log)	-0.047	-0.043	-0.051	-0.046	-0.047
	(-4.62)[2]	(-4.21)	(-4.94)	(-4.47)	(-4.51)
HKI (Log)	0.047	0.047	0.051	0.040	0.046
	(1.27)	(1.27)	(1.39)	(1.12)	(1.27)
M3YPS	0.053	0.052	0.052	0.052	0.051
	(2.96)	(2.86)	(2.90)	(2.92)	(2.86)
GY		-0.149		-0.145	-0.143
		(-3.11)		(-3.06)	(-3.03)
MPXY			0.020	0.018	0.019
			(2.22)	(2.11)	(2.12)
INF		0.008	0.001		0.009
		(0.42)	(0.52)		(0.46)
Adjusted R-squared	0.36	0.37	0.36	0.38	0.38
Panel Observations	526	526	526	526	526

Notes: (1) The dependant variable is the growth rate of the GDP per capita. (2) t-statistics in parentheses. (3) The dependant variable is the investment rate (I/GDP)

Appendix 1:

Countries of the sample: Algeria, Benin, Botswana, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Egypt, Ethiopia, Gabon, Gambia, Ghana, Cote d'Ivoire, Kenya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Barbados, Costa Rica, El-Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Panama, Trinidad and Tobago, Colombia, Ecuador, Guyana, Paraguay, Venezuela, India, Indonesia, Iran, Israel, Jordan, South Korea, Kuwait, Malaysia, Nepal, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Syria, Thailand, United Arab Emirates, Turkey.

Appendix 2:

The list of the variables:

Gy: The growth rate of real per capita GDP for the period 1960-1990. The source of the data is the World Bank social development indicators data set 1999. The real GDP is expressed in 1990 prices.

YI: The initial income per capita corresponding to the ratio of GDP to the total population in the beginning of the period.

HK: The human capital variable, approximated by the secondary school enrollment ratio. Source: Barro-Lee data set 1994. HKI is the same variable expressed at the beginning of the period (1960).

M3Y: The financial deepening variable calculated as the ratio of total assets of the financial system (IFS line 55 l) and current GDP. However since M_3 is a stock and GDP is a flux, the total financial assets are calculated as the arithmetic average of the sum of total liquid liabilities at year-end and year-beginning data ($M_3(1960) = [M_3(1959) + M_3(1960)]/2$). Source of GDP: IFS of the IMF. M3YI is the same variable expressed at the beginning of the period: The average ratio for the years 1960, 1961 and 1962.

PS: The private sector investment as a percentage of the total domestic and foreign investment, Source: World Bank development indicators data set 1999.

M3YPS: An interactive variable is calculated as the product of (M3Y) and (PS).

IY: The investment rate, is the ratio of nominal domestic investment and nominal GDP. The Source: IMF International Financial Statistics data set (1997) from 1960 to 1990.

GY: The government-spending ratio from 1960-1990, source IMFIFS 1997.

MPXY: The opening rate is equal to the ratio of exports plus imports to current GDP ([M+X]/GDP). Source: IMFIFS 1997.

INF: The average of the annual inflation rate based on the consumer price index over the period 1960-1990. Source: IMFIFS 1997.