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Financial Liberalization, Foreign Direct Investment and Economic Growth: A Dynamic Panel Data Validation

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ABSTRACT: The aim of this study is to show that financial liberalization, as a determinant of financial development, can stimulate the relationship between foreign direct investment (FDI) and economic growth. Two distinct components have been analyzed. The first one is a theoretical component in which we tried to treat the relationship between financial development, internal financial liberalization, and FDI using an endogenous growth model. The second component consists of an empirical study which tried using a panel data to validate the previously stated theoretical relationship. The survey, covering a sample of sixty nine developed and developing countries enabled us to reach three fundamental results. First, when financial systems are non-liberalized, we have noted that FDIs had a negative effect on GDP growth per capita. Second, when FDI are implemented in countries characterized by their developed financial sector they generate positive effects on growth. This implies that the key variable which determines FDI efficiency is the degree of financial systems liberalization. Consequently, in non-liberalized financial systems FDI effects on growth are challenged. Third, we showed that financial development level is a strategic variable which positively affects growth.

Keywords: Financial liberalization; Foreign Direct Investment; GMM system.
JEL Classifications: B22; B26

1. Introduction

The contribution of foreign direct investment (FDI) in economic growth has been the subject of several theoretical and empirical studies (Akbes et al. (2013); Acaravci and Ozturk (2012); Laura et al. (2004 and 2006); Xiaoying and Xiaming (2004). Choong et al. (2004); Omran and Bolbol (2003); Borensztein et al. (1995) and De Mello, (1999)). This is explained mainly by the fact that FDI is supposed to be an effective mechanism to transfer technology from developed to developing countries. In other words, FDI is generally regarded as an important resource to enable industrial development in the host country and in particular in developing countries. Moreover, FDI, once established, can generate positive effects on productivity, competitiveness and job creation in host countries.

Indeed, the impact of FDI is reflected not only through capital inputs for the host country, but also, through a contribution in terms of technology and know-how as well how to access new markets. Thanks to spillovers effects that take place at different levels, FDI may contribute, in an active way, to economic growth and development (Grosssman and Helpman (1991), Barro and Sala-i-Martin (1995) and Goa (2004)).

However, it is noted that most of the studies on FDI, are based on microeconomic foundations. Such studies have focused, primarily, on communication channels through which FDI may affect economic growth in host countries. They have showed that the ineffectiveness of certain economic policies in attracting FDI totally depends on two fundamental factors: the level of development of host countries and the quality of their economic environments (Fernández-Arias and Montiel (1996)). Indeed, globalization of financial markets and the obligations developing countries faced to integrate it, required designing more efficient economic policies and institutions. Thus, the main issue facing economic policymakers is how to develop mechanisms allowing the whole economy, to attract the maximum of the expected benefits (which are normally linked to FDI) and lead domestic investments to foster long-term sustainable economic development.

UNCTAD report on trade and the determinants of FDI (1998), answered this question by identifying three main factors that affect the ability of a country to attract FDI flows. These factors are essentially of a political (such as economic and political stability, etc.), economic and environmental nature (the degree of trade liberalization in the host country). The report noted that foreign investors are seeking markets, resources and efficiency. Therefore, since the publication of this report, empirical studies (on the determinants of FDI in developed and developing countries) which are initially focused on microeconomic factors have been redesigned to include both macroeconomic and institutional factors. Thus, in our study we will focus on the role of FDI (financial liberalization) on economic growth.

In order to respond to our problematic and address this range of issues, we will analyse in the second section the theoretical aspects between financial liberalization and the FDI. The third one will be addressed to study the relationship between financial liberalization and growth. The fourth section will present the data and the sample. The fifth section will attempt to interpret the empirical results while the latest will attempt conclude the main results of the paper.

2. Financial Liberalization and FDI: Theoretical Aspects and Literature Review

Financial liberalization, as a determinant of development of financial sectors, is a necessary but not sufficient condition to encourage investment in new technologies as well as in technical progress (McKinnon and Shaw (1973)). In other words, as long as the local financial sector is developing, risks associated with modernizing old and new technologies will be reduced. Development of the local financial sector allows foreign firms to borrow in order to increase their innovative activities in the host country. This may increase technological externalities to local firms.

The availability and quality of national financial services may influence FDI and the diffusion of technologies in the host country. This dissemination process can be more appropriate once financial sectors in the host country are better developed. This allows the multinational subsidiary to increase its investments once they are settled in the host country.

Furthermore, developed financial sectors encourage local contractors to operate while ensuring modernization of existing technology and the adoption of new technologies similar to those introduced by foreign firms.

In this context, it would be plausible to note that the role of financial intermediaries is so important because they positively affect the speed of technological innovation, which improves as a result, economic growth (Huang and Xu (1999)). Hermes and Lensink (2003); Alfaro and al. (2004); Ozturk (2008) and Choong et al. (2004) showed that when financial intermediation is developed, it would have a very important role in improving FDI flows. In other words, a proper functioning of the financial system leads to eliminating the transaction costs of financial markets and positively contributes to technology dissemination process. Hermes and Lensink (2003) reported that domestic financial systems' quality can promote FDI and contribute to generating positive impacts (technology diffusion, efficiency etc.) in the host country.

This means that there is a strong link between FDI and domestic financial markets. In the same vein, Alfaro and al. (2004) and Choong et al. (2004) also showed that countries where financial markets are more developed are able to benefit more from FDI to increase their economic growth. In their research, they emphasized on the role of financial intermediaries and they proved that under-development of local financial systems can limit the economy in benefiting from spillover effects.

In summary, proper functioning of financial systems may enhance FDI effects on growth in host countries. In practice, financial sectors affect both investment financing and business activities.

Therefore, the good efficiency of local financial systems encourages production activities and attracts more FDI. This is especially true when FDI lead to the adoption of a completely new technology which will spread not only on the domestic markets but also on export markets.

Empirically, we note that there is a small number of studies which focused on the impact of financial liberalization in general - and interest-rate liberalization on financial deepening. Mosley (1999) examined, for example, the impact of financial liberalization through access to rural credit in a number of developing countries. The author showed that the impact of financial sector reforms on financial deepening (measured by M_2 and bank deposits as a percentage of GDP) varies between countries. The author concluded that there were few changes in financial depth in Madagascar and a slight decline in Malawi. Although Tanzania had undergone a sharp contraction of financial depth in the second half of the 1980s, the country has covered nearly half of the fall in the first half of the 1990s. In Uganda, a slight recovery was achieved in the first half of the 1990s after the collapse of financial depth in the 1980s, however the financial system remained very fragile and very little developed. In Zambia, the reforms have been unable to prevent a continuous drop and rapid financial depth that began in the first half of the 1980s.

Berthelemy and Varoudakis (1998), have altered the M2/GDP variable by introducing the role of financial liberalization in order to test the hypothesis that financial system size is not a factor of economic growth in periods prior to financial reforms (especially in repressed financial systems). They tried to interact the M2/GDP variable with a dummy variable (rated DREF), which takes the value 1 for the period preceding the reform and 0 for the post-reform period, to obtain, finally, a new variable [DREF × Ln (M2/GDP)].

Based on the theoretical and empirical findings presented above and on the study of Berthélemy and Varoudakis, we can note that there is a theoretical modeling between financial liberalization and financial development level. In other words we can assume that there is a function (h) which determines the financial development on the basis of financial liberalization. The relation can be written as follows:

$$FD = h(Lib) = df \times Lib, \quad \frac{\partial DF}{\partial Lib} > 0 \qquad (1)$$

Where DF is financial development and df is an indicator for measuring financial deepening. We assume too that ∂DF/∂Lib> 0. This mean that a country cannot developed its financial system, only when it is assumed relatively liberalized. On the other hand, if a country is unable to liberalize its financial system, then the latter is assumed to be fragile and underdeveloped. Thus, to express the relationship that exists between domestic financial development and foreign direct investment flows in the process of economic growth, we propose a theoretical model, in which we will try to integrate the technological model developed by Hermes and Lensink (2003) in a model of endogenous growth similar to Barro's model (1995).

According the model of Barro and Sala-I-Martin (1995), the constant rate of return, r is represented by the following equation:

$$r = \left(\frac{L}{(\eta)}\right).\psi(Lib)^{\frac{1}{(1-\alpha)}}.\left(\frac{1-\alpha}{\alpha}\right).\alpha^{\frac{2}{(1-\alpha)}} \qquad (2)$$

Where α is a proportion of capital income, η = f (FDI) is the cost of research and development, A=$\psi(Lib)$ represent the level of technology and L is the labor. In their study, Borensztein et al. (1998) state that the cost of R&D depends on FDI, namely the higher FDI inflow leads to a decline in the innovation cost. Hence, the innovation cost is a function of FDI as follows: Where ∂η/∂FDI < 0.

It should be noted that the above mentioned authors have tried to integrate, the variable "financial development" in the model of Barro (1995) and leads to a relationship that explains the level of endogenous growth according to the FDI and the level of financial development.

$$g = \frac{1}{\theta}\left[\left(\frac{L}{f(FDI)}\right).h(H)^{\frac{1}{(1-\alpha)}}\left(\frac{1-\alpha}{\alpha}\right)\alpha^{\frac{2}{(1-\alpha)}} - \rho\right] \qquad (3)$$

We note that all previous works having studied the relationship cited above have ignored the effect of the financial liberalization, as a major determinant of financial development, on economic growth. So, to deal with this deficiency and following Hermes and Lensink, we have replaced financial development by financial liberalization (expressed by equation (1)).

$$g = \frac{1}{\theta}\left[\left(\frac{L}{f(FDI)}\right).\psi(Lib)^{\frac{1}{(1-\alpha)}}\left(\frac{1-\alpha}{\alpha}\right)\alpha^{\frac{2}{(1-\alpha)}} - \rho\right] \qquad (4)$$

The expression (4) shows that the rate of growth of the economy (g) increases in L, FDI and Lib (or DF) function, and decreases on ρ and θ. Also, this expression shows that an increase in the level of flows of FDI leads on the one hand to a decrease in the level of costs and on the other hand to an increase in the rate of return on assets (r) and therefore to an increase in the rate of growth (g). In effect, an increase of (r), allows an increase on savings, investment and consumption. Consequently, the economic growth rate is increased and allows developing countries to catch-up those developed. However, this link is highly dependent on the effectiveness of the financial sector. In summary, we can report from this last equation that the new variety of intermediate goods, introduced by FDI flows, can increase economic growth under-condition that financial liberalization enhances the level of financial development and is significant enough to reduce the costs of new technologies adopted, and increase yields of new intermediate goods.

3. Financial Liberalization and Growth: Theoretical Background

At this level of analysis, the following question arises: to what extent does the liberalization of the financial sector play the role of a catalyst to strengthen and stimulate foreign direct investment and economic growth of the host country? To answer this question it would be important to note, first, that financial liberalization is generally defined as the process whereby the market is entrusted to determine quantities and prices (interest rates) of traded capital. In practice, total financial liberalization has six main dimensions: deregulation of interest rates; removal of credit controls, free entry into the banking sector; autonomy of the Central Bank; private ownership of banks and liberalization of international capital flows.

To respond to the cited question above we can note that the development of the financial sector can be considered as a prerequisite for the attraction of FDI flows. Technology diffusion speed and growth path in a country strongly relate to local developments in the financial sector (Bank World (1998), Levine, r., (1997) and Liu (1998)). Indeed, the financial system can act as a mechanism for the channelling of financial resources between surplus units and loss-making units and can also transfer technology associated with FDI flows (Choonget al. (2004)). However, what should be noted is that the financial system mobilizes, not only savings, but also has a deep impact on economic development. In this context, Levine, R., (1997) reported that, in addition to its positive effects on savings, financial systems improve allocation of resources and allows technological innovation.

Hermes and Linsink (2003) and Bailliu (2000) tried to study the significance of the relationship between foreign capital flows, financial development and economic growth. The two studies have confirmed a robust relationship between foreign capital flows and economic growth (through the financial development channel). These results indicate that positive externalities associated with capital flows can have a direct and significant impact on economic growth when the local financial system reaches a minimum development level.

Moreover, financial sector liberalization can encourage savers to transfer part of their savings (monetary or non-monetary) to financial investments (shares and bonds) allowing thus an increase in credit availability in the economy. This observation is approved by Ikhide (1992), who noted that positive real interest rates encourage financial savings at the expense of other forms of savings and, allow for the promotion of financial deepening. In the same line of ideas, financial liberalization contributes to increasing opportunities for the diversification of risk for financial institutions [for example banks]. This can also reduce the costs of borrowing supported, usually, by lenders and leads to a decrease in capital cost, an increase in investment and, probably, to a possible increase in growth rate.

Hellmann et al. (1996, 1997, and 2000) placed emphasis on the fact that liberalization can reduce franchise value of banks. The stylized facts proved, repeatedly, the aforementioned effects. As an illustration and not for exclusion we refer to Southeast-Asian countries. In the early 1960s, we noted that financial systems of most of this group of countries were submitted to regulatory measures and to financial restrictions (interest rates regulation, selective control of credit allocation, explicit and implicit taxes on financial institutions, segmentation of capital markets and international capital controls). However, financial liberalization (known by those countries in the 1970s) allowed these financial systems to become more dynamic and their monetary policies to become more efficient and more flexible.

According to McKinnon (1973) and Shaw (1973) a financially repressed sector may adversely affect economic development in various ways. First, in a repressed economy, transfer of savings is not well developed and its performance is negative and unstable. Second, it is noticed that financial intermediaries do not efficiently allocate savings collected between competing uses. Third, companies have little incentive to invest because a financially repressed sector reduces return on investment and makes them uncertain. Therefore, a recession growth is recorded. Furthermore, the authors noted that financial repression is likely to result in a double effect: a low level of deposit and an excess demand of appropriations (requiring banks to adopt credit rationing).

4. Data and Methodology of Empirical Investigation

This study covers the period between 1985 and 2008 and focuses on a panel of 69 developed and developing countries. Concerning the variables, we should note that the theory provides no clear guidelines concerning those that should be included in the growth equation. However, according to the objective of the study, different explanatory variables were retained and supposed to be important in the literature. The variables used in the empirical analysis, are essentially indicators of economic growth, FDI, financial liberalization and/or financial development and control variables. Economic growth variable is the independent variable in the estimated model and measured by the growth rate of real GDP per capita (noted GDPC) and calculated from data from the national accounts of each country in our sample.

To measure FDI, we chose net FDI inflows to GDP ratio. Several empirical studies have shown the existence of a positive relationship between FDI inflows and GDP growth registered in the host country, e.g. in Mexico (Blamestorm and Persson (1983), Blomstrom and Wolff (1994) and Kokko (1994)), in Uruguay (Kokkoet al. (1996)) and Indonesia (Sjöholm (1999b)).

Concerning financial development variable, we distinguish the banking sector from financial market indicators which are part of the independent variables. These indicators should reflect the functions performed by the financial market in the economy such as, mobilization of savings, identification of profitable projects, management and facilitation of transactions. Finally, we present an indicator which measures internal liberalization of the financial sector. To achieve this, we have chosen five indicators to measure. (i) DEPTH = M2/GDP measures financial surface (liquidity rate) or even the financial intermediaries size through the amount of due liabilities of the financial system reported to the GDP. (ii) PRIVY measures the amount of loans to the private sector compared to economy size (GDP). It measures the degree of integration of economies. (iii) BANK measures the relative share of commercial banks as to central banks in the allocation of domestic savings. (iv) Market capitalization as a percentage of GDP (CAPB) and measures financial market size. Finally, total value of transactions as a percentage of GDP (VTRAD). After Levine and Zervos (1998), this measure complements that of financial market size, because the market can be larger but inactive.

Our sample is heterogeneous because it includes a range of developed and developing countries. Thus, given the lack of detailed financial data in development countries, we had to calculate a global financial development index (Goldsmith (1969) and King and Levine (1993b)). To calculate this index, we used the same calculation procedure proposed by Chouchane-Verdier (2004) and which consists of over two stages:

-The first is to calculate the average of the indicator j on the 69 countries $\overline{X}_j$.

-The second is to calculate five standard indicators for each country i, $\left(X_j^{i*} = \frac{x_j^i - \overline{X}_j}{\overline{X}_j} \right)$ wherei = 1, 2... 69 and j = 1, 2... 5 and X_j^i corresponding to the five selected measures LLY, PRIVY, BANK, CAPB and VTRAD.

The index X_j^{i*} can be negative and positive where country j has a lag above the average on all countries sampled in the reverse case.Once the five standardized indicators are calculated, the global

financial development index will be calculated using the simple arithmetic average of these five standardized indicators, either:

$$FDI_i = \frac{1}{5}\sum_{j=1}^{5} X_j^{i*}$$

We considered that this last index is the most significant among the other indicators. Indeed, the FDI gives us a general idea about the degree of overall development of the financial system for each country (i), since it encompasses all other indicators in a single measure. Therefore, as far as this indicator is positive and high, as much as the financial system of the country (i)is supposed to be developed.

The financial liberalization variable (Lib) is determined by the date in which each country decided to liberalize its financial system (interest rate). It is 0 for the pre-liberalization period and 1 for the post-liberalization period. We need to bear in mind that, for the majority of countries, the date of the financial liberalization coincides with the date of interest rates liberalization except for the case of the Serbia and the Ukraine where we chose the date of beginning of financial reforms.

For control variables integrated in estimation we have been used the following notations *LLF (log of work force); LSCP (physical capital stock); LOUV (trade openness); LDCG (public expenditure); LINF (inflation); LDXT (external debt) and MPC (institutional quality)*. Our statistical data have been collected from the data of the World Bank (WDI-2010), the International Monetary Fund (IFS-2010), the UNCTAD 2009 report, the Financial Structure 2010 database and other international institutions.

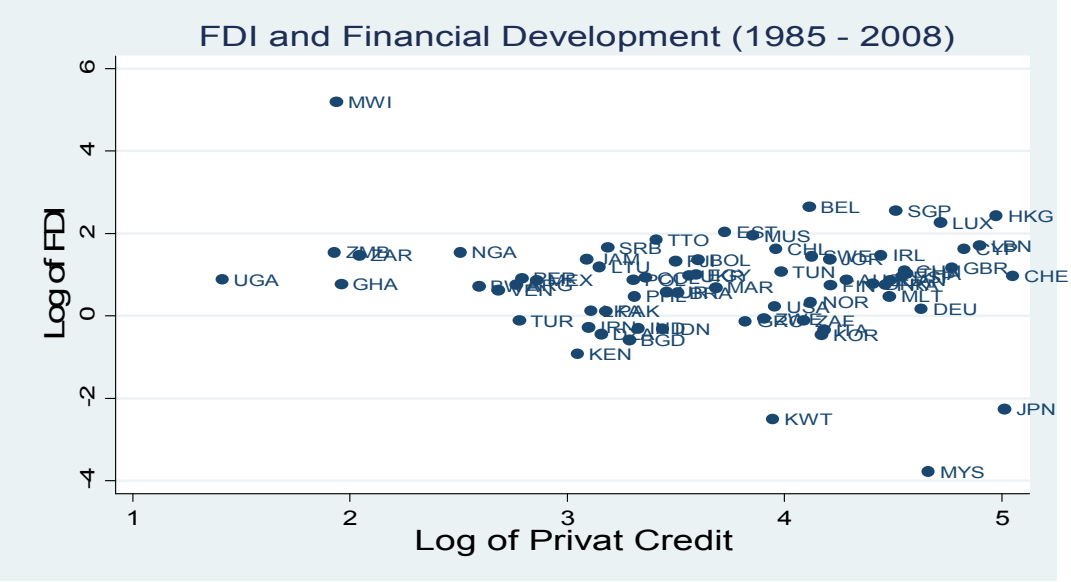
Table 1. Data Table

Variables	Definition	Indicators
Variables of Interest		
• Foreign direct investment	-	FDI = Foreign direct investment /GDP
• Financial development	- Liquid liabilities - Private sector domestic bank loans - Commercial bank assets as a ratio of total bank assets - Stock market Capitalization - Stock market value traded	- LLY: M_2/GDP - PRIVY = Credit to private sector/GDP - BANK = Commercial bank assets/ Commercial bank assets + Central bank assets - CAP = Stock market capitalization/GDP - VTRAD = Stock market value traded/GDP
• Financial Liberalization	The financial liberalization (Lib) variable is determined by the date in which each country decided to liberalize its financial system (interest rate).	Lib equal 0 for the pre-liberalization period and 1 for the post-liberalization period. We need to bear in mind that, for the majority of countries, the date of the financial liberalization coincides with the date of interest rates liberalization except for the case of the Serbia and the Ukraine where we chose the date of beginning of financial reforms.
Control Variables		
• Labor Force	-	LF = Labor Force
• Physical Capital Stock	-	PCS: measured by gross domestic capital formation (The perpetual inventory method is used with 6% depreciation rate).
• Government spending	Government consumption expenditures	GCE = average share of government spending/GDP
• Annual inflation rate	Calculated from the consumer price index	log (1 + average inflation rate)
• External Debt	Is a useful indicators to define debt's evolution and reimbursement capability	EXD = External debt/GNP

• Trade Openness	Measure of the degree of openness	TO = (Exportation + importation) /GDP.
• Institutional quality	To distinguish between countries based on political regimes	IQ = (Civil right + political right) /2

The descriptive analysis will most often provide a way to quantify and describe to what extent the financial system contributes to the attraction of FDI flows. Figure (1) shows the link between FDI (FDI share to GDP) and financial development (the share of loans to GDP).

Figure 1. Foreign direct investment and financial development.



Source: World Bank (WDI 2009) and Handbook of Statistics, UNCTAD 2009

From the graph we can easily locate the economies having, jointly, a low credit and FDI levels (the far left of the figure) like Malawi, Uganda and Zambia. However, at the far right of the figure, we find economies with a high credit and FDI levels, like Singapore, Hong Kong, Luxembourg and Lebanon. Moreover, we can conclude that there is a generally positive relationship between the two variables. However, it is also evident that there is a wide variation in the two variables given their interaction with each other. Indeed, if financial development plays an important role in influencing FDI effects on production, it can be expected that countries with the same level of FDI are trying to have very different results in terms of income levels. The following table shows some descriptive statistics for foreign direct investment and financial development.

Table 2 indicates that there is a considerable variation in terms of FDI to GDP ratio (called FDI) across the country on the reporting period. The minimum value of this ratio is registered in Luxembourg (-63.59%) in 2007, while the maximum is in Malawi (416.10%) in 1995. With regard to financial development indicators, we find that they vary widely with Bolivia scoring the minimum value for financial intermediation size (LLY) (45%) in 1985, and the maximum value is for Luxembourg (431.76%) in 2008. The lowest ratio of private credit granted to GDP (PRIVY) is registered in the Democratic Republic of Congo (0.19%) in 2002, while the highest is in Ireland (209.74%) in 2008. Zambia recorded the minimum value for the balance of commercial banks from the Bank (BANK) (12.42%) in 1998, and then Algeria recorded the maximum value for this indicator (126.44%) in 2008. Market capitalization (CAPB) is highest in Hong Kong (603.47%) in 2008 and Algeria scores the minimum value (0.06%) in 1986. Finally, Indonesia registered the lowest value of transactions (VTRAD) a total of (0.002%) in 1986, while Switzerland recorded the highest value (541.18%) in 2008.

For correlation, on the one hand, between FDI and economic growth and on the other hand, between financial development and economic growth, correlation table and charts (see appendices 1 and 2) indicate a negative correlation between the growth rate of real GDP per capita and foreign direct investment to GDP ratio (-0.0367).The first chart shows this negative correlation. Similar results are

obtained by Brewer (1991), Saltz (1992) and Hermes and Lensink (2003), showing a negative correlation between economic growth and FDI. This negative correlation is equivalent to the effect of competition and foreign firms' domination on local firms. We note also that there is a correlation, generally, positive and low between growth rate and various financial development indicators. Indeed, the slope of each point cloud is slightly greater than zero. This means that any increase in financial development produces a slight increase in growth rate of real GDP per capita. We postulate that this last result obtained on the basis of correlation between various financial development indicators and economic growth confirms the predictions of Mc kinnon (1973) and Shaw (1973).

Table 2. Descriptive Analyzes

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
FDI	1599	0.0561	0.2559	-0.6359	4.1610
LLY	1543	0.6350	0.5027	0.0450	4.3176
PRIVY	1541	0.5418	0.4308	0.0019	2.0974
BANK	1483	0.8529	0.1845	0.1242	1.2644
CAPB	1272	0.5410	0.6377	0.0006	6.0347
VTRAD	1283	0.3124	0.5522	0.00002	5.4118

To better understand the impact of financial liberalization on financial development, we will present in the following table a comparison of the various correlation coefficients between growth rate of real GDP per capita and the different variables that measure financial development level in the presence and absence of financial liberalization.

Table 3. Comparison of correlation coefficients

Variables	LPIBT	
	Without liberalization	*With liberalization*
LLY	0.099	0.131
PRIVY	0.156	0.157
BANK	0.023	0.092
CAPB	0.084	0.133
VTRAD	0.102	0.125

From the table 3, we can see that correlation between financial development level and growth rate of real GDP per capita increased taking into account financial liberalization effect. We note for example that money supply as a percentage of GDP (M2/GDP) increased from 0.099, before including financial liberalization index, to 0.131 when financial liberalization is included. This conclusion proves what is mentioned in the second chapter of the first part that financial liberalization enhances financial development level which increases in turn economic growth. Rancièr et al. (2006) found the same conclusion. According to the authors, financial liberalization has a direct effect on economic growth. Indeed, financial liberalization strengthens financial development and contributes to long-term economic growth.

5. Empirical Model and Results

In this section we present the methodology adopted to estimate the relationship between economic growth and liberalized FDI in the presence of a financial system, as well as the results of each estimate. We will use the GMM method to estimate a dynamic panel model.

5.1. Panel unit root and stationarity test

Before addressing the appropriate specification of our model, it is important to test whether or not the variables are stationary. We note that individual and temporal dimension of our sample is large, which confirms heterogeneity of the group and increases risk of presence of non-stationary variables. Therefore, according to Baltagi (2005), econometric estimations applied to data from heterogeneous and non-stationary panel are not valid.

Thus, to achieve valid results and estimates, we check stationarity of the main variables in our model, such as growth rate of GDP per capita, foreign direct investment and the six indicators of

financial development level. We will use unit root tests used in panel data from two tests. The first is the homogeneous nature of the autoregressive root under the alternative hypothesis (common to all individual autoregressive roots, Lin and Chu (2002)). The second test developed by Im, Pesaran and Shin (2003) allows under the alternative hypothesis autoregressive root heterogeneity. We also present, for this specification, another test; the Fisher-ADF test.

Unlike the two first unit root tests presented previously (known as first-generation tests), we use the test of Hadri (2000), which is based on the assumption of stationarity of zero series. In appendix (3) we discuss the different tests for each basic variable such as growth rate of real GDP (GPIBT), foreign direct investment (FDI), the volume of the callable commitments of the reported financial system to GDP (LLY), the ratio of credit granted to private sector (PRIVAT), the ratio of commercial bank assets to the sum of assets of commercial banks and the central Bank (BANK), the ratio of market capitalization to GDP (CAPB), and the total value of transactions (VLTRAD). According to the results of the stationarity test (appendix 3) we find that our basic variables are usually stationary. The Hadri's test, in particular, confirms this stationarity. Thus, the results of the econometric estimates would give statistically valid results.

5.2. The dynamic estimating model

Based on the procedure of Arellano and Bover (1991) and Blundell and Bond (1998), the dynamic model takes the following form:

$$LPIBT_{it} = \rho LPIBT_{i,t-1} + \beta_1 FDI_{it} + \beta_2 LDF_{it} + \beta_3 (FDI \times LDF)_{it} + \beta_4 CONTROLES_{it} + \alpha_i + u_{it} \quad (5)$$

With $|\rho| < 1$ to ensure stationarity. This model uses standard assumptions:

- $E(\alpha_i) = 0$, $E(u_{it}) = 0$, $E(u_{it} . \alpha_i) = 0$, $i = 1, 2, 3, \ldots, 69$ et $t = 1985, \ldots, 2008$; $\forall\, t \neq s$, $E(u_{it} . u_{is}) = 0$, $i = 1, 2, 3, \ldots, 69$.
- $E(GPIBT_{i1} . u_{it}) = 0$, $i = 1, 2, 3, \ldots, 69$ et $t = 1985, \ldots, 2008$.

We do not specify here whether αi effects are fixed or random effects. We deem that they are unimportant and the effects can always be considered as fixed. To eliminate the specific effect (country) we apply the procedure of Anderson and Hsiao (1981) who suggest estimating the model (3) in first differences.

$$y_{it} - y_{i,t-1} = \rho(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{it} - X_{i,t-1}) + (u_{it} + u_{i,t-1}) \quad (6)$$

Where y_{it} is the logarithm of GDP per capita (LPIBTit);X_{it} is the set of exogenous independent variables;β' is the vector of coefficients of dimension (1 × K); (i) is the countries index and (t)is the period index. Accordingly, this procedure eliminates the potential bias associated with specific effects (countries). The use of instrumental variables, developed at different times in the literature, are necessary to overcome endogeneity problem of independent variables and the problem caused by the new error term ($u_{it} - u_{i,t-1}$) that correlates with the lagged dependent variable ($y_{it-1} - y_{i,t-2}$), created due to the systematic values inclusion delayed as predictor variable. With the absence of the autocorrelation term u_{it}, predetermined initial conditions imply that $y_{i,t-2}$was not correlated with ($u_{it} - u_{i,t-1}$) and is, therefore, a valid instrument for the equation in first differences. Insofar as the number of country N is large and N > T, with T ≥ 3, the estimator of Anderson and Hsiao (1981) is convergent. However, it is not effective because it does not use all the instrumental availables.

Arellano and Bond (1991) proposed a GMM estimator in first differences to avoid two of the causes of the ineffectiveness of the estimators proposed by Anderson and Hsiao (1981), characterized by the low number of instruments and lack of consideration of error autocorrelation $u_{it}$of the model in first differences. Arellano and Bond (1991) noted that there are other instruments like those used by Anderson and Hsiao. They showed that if yi1 is the only instrument for the equation in first differences when t = 3, t = 4 and y_{i1}andy_{i2}can be used as instruments and t = T (in our case T = 2008) are available, such as instruments of the vector: (y_{i1}, $y_{i2} \ldots y_{i,\ T-2}$). However, the fact that the equations are over-identified and that ($u_{it} - u_{i,t-1}$) following a moving average process MA(1) makes the double squares asymptotically inefficient and requires the use of GMM.

The matrix instrument $Z_i$can be written, for an individual i, as:

$$Z_i = \begin{bmatrix} y_{i1} & 0 & 0 & \dots & 0 & \dots & 0 & [X_{i3} - X_{i2}] \\ 0 & [y_{i1} & y_{i2}] & \dots & 0 & \dots & 0 & [X_{i4} - X_{i3}] \\ \vdots & \vdots & \vdots & \dots & \vdots & \dots & \vdots & \vdots \\ 0 & 0 & 0 & \dots & [y_{i1} & \dots & y_{i,T-2}] & [X_{i,T} - X_{i,T-1}] \end{bmatrix}$$

Where the rows correspond to equations in first difference for the period t = 3, 4... T for the individual i. We operate here the conditions of orthogonality on the moments:

- E $[y_{i,t-s}.\ (u_{it}-u_{i,t-1})] = 0$ pour $s \geq 2$; $t = 3, 4, \dots, T$
- E $[X_{i,t-s}.\ (u_{it}-u_{i,t-1})] = 0$ pour $s \geq 2$; $t = 3, 4, \dots, T$

The estimator of Arellano and Bond (1991) obtained in two steps is effective, but it is also possible to obtain a GMM estimator in one step. However, there are conceptual and statistical deficiencies with this difference estimator. On the theoretical level, we will also study the relationship between FDI and GDP per capita and by country, which is eliminated in the regressions in difference. Statistically, the previous estimators are less robust insofar as the instruments weakly correlate with the independent variables in first differences. The weakness of the instruments has impacts on the asymptotic performance and the performance of small size samples in the regressions in difference. Asymptotically, the variance of the coefficients increases more and more. In small size samples, low instruments can skew coefficients.

To compensate for this lack of robustness, Blundell and Bond (1998) have proposed a GMM system approach. For each period, The GMM system returns to stack equation in difference with that in level. This method is to instrument the variables in the equation in first differences by their values in level delayed for at least a period (same instrument of Arellano and Bond (1991)) and to instrument variables in level by variables in first differences. For the GMM system, we operate two other conditions of orthogonality for the second part of the system (regression in level):

E $[(y_{i,t-s}-y_{i,t-s-1}).(\alpha_i+u_{i,t})] = 0$ for $s = 1$

E $[(X_{i,t-s}-X_{i,t-s-1}).(\alpha_i+u_{i,t})] = 0$ for $s = 1$

Most Monte Carlo simulations suggest that the system approach (GMM) improves significantly estimators' precision and reduces bias of small size samples covering time-horizons (T). Blundell and Bond (1998) have found that the GMM system estimator is more efficient than the GMM estimator in difference. It is noted that GMM estimator quality depends on both the validity of the instruments and the hypothesis of the absence of autocorrelation of second-order of the error term $E\ (\Delta u_{it},\ \Delta u_{i,t-2}) = 0$.Arellano and Bond (1991) suggested two tests to examine these two hypotheses. The first is the Sargan (1964) test of over- Identification (later replaced by the Hansen test) that is distributed according to Chi-square distribution with freedom degrees equal to the number of instruments eliminated in the second regression. The second test examines the hypothesis of lack of errors autocorrelation, in particular whether there is or not an autocorrelation of order two of the differentiated error term and a first-order error autocorrelation in the regression in difference $(u_{it} - u_{i,t-1})$.We note that we cannot use the error terms of the regression (in level) because it includes the specific effect, "country", called μ.In order to control the problem of endogeneity, specific effects (countries) and the inclusion of the initial GDP as a REGRESSOR, this study considers the effect of financial development on the relationship between FDI and economic growth. However, we examined whether FDI impact on economic growth of a host country depends on the financial development level of the latter.

We will only use the variables of financial deepening in the presence of financial liberalization to test the effect of the financial system liberalized on the relationship between FDI and growth. .Table (4) represents the estimation using GMM in first differences. The test of Arellano and Bond (1991) indicates the presence of errors autocorrelation of order two in three regressions (LLYlib, CAPBlib and VTRADlib). For the validity of the instruments, the Hansen test allows us to reject the null hypothesis of the validity of the instruments for the three regressions (LLYlib, PRIVYlib and BANKlib).

Table 4. Economic growth, FDI and financial liberalization: Estimation by GMM method in difference (Dependent variable: growth rate of real GDP per capita GPIBT)

Independent variables	*Estimations*											
	LLYlib		*PRIVYlib*		*BANKlib*		*CAPBlib*		*VTRADlib*		*IDFlib*	
	Coeff	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*
FDI	-0.1359***	-7.18	-0.0801***	-7.89	-0.1898***	-6.87	0.0482**	2.33	0.0522***	5.69	0.1883***	1.8
LDFlib	-0.0018	-1.54	-0.0015	-1.11	-0.0021*	-1.92	0.0021	1.13	0.0011	0.68	0.0033***	3.24
FDI**LDFlib*	0.0262***	6.30	0.0147***	5.10	0.0309***	6.21	-0.0032	-0.48	-0.0007	-0.32	-0.0529	-1.66
LLF	-0.2913***	-8.37	-0.2550***	-7.96	-0.2756***	-8.88	-0.3038***	-2.71	-0.3116***	-2.82	-0.2963***	-10.00
LSCP	0.6023***	14.64	0.5539***	16.08	0.5961***	16.10	0.5948***	5.66	0.65011***	6.96	0.6031***	11.61
LOUV	0.0364***	3.27	0.0373***	3.29	-0.0321***	-2.61	0.0314**	2.30	0.0262**	2.13	0.0549***	2.83
LDCG	-0.0455***	-4.32	-0.0468***	-5.24	0.0383***	3.40	-0.0252	-1.63	-0.0398**	-2.77	-0.1181***	-4.93
LINF	-0.0092**	-2.40	-0.0095***	-2.45	-0.0072***	-2.14	-0.0066**	-2.31	-0.0045*	-1.78	-0.0015	-0.51
LDXT	-0.0598***	-6.11	-0.0550***	-5.61	-0.0663***	-6.30	-0.0705***	-5.32	-0.0659***	-5.17	-0.0484***	-8.92
MPC	-0.0051**	-2.34	-0.0054***	-2.43	-0.0036*	-1.76	-0.0018	-0.71	-0.0017	-0.72	-0.0208***	-7.36
Number of obs.	834		836		816		764		780		233	
Number of groups	54		54		54		54		54		29	
Hansen test	0.018		0.013		0.038		0.373		0.542		0.338	
AR(1)	0.151		0.502		0.144		0.065		0.024		0.719	
AR(2)	0.067		0.146		0.234		0.011		0.004		0.867	

Notes: *** significance at the level of 1%, ** significance at the level of 5% and * significance the level of 10%. All variables are expressed in natural logarithm (except FDI and institutional quality). The operator (L) means the natural logarithm. The t-statistic is the Student test corrected for heteroscedasticity. AR (2): probability of significance of the second order of the statistic of the autocorrelation test.

The presence of autocorrelation of order two and the instruments invalidity, in most regressions, requires the use of the GMM system method of Blundell and Bond (1998). This method allows taking into account homogeneity of countries to deal with the variables endogeneity problem. The GMM system method is used in recent studies, in particular those studying the relationship between growth and FDI and between financial liberalization and growth. It is on the results of this method that we mainly base our conclusions.

5.3 Interpretation of Results

Table 5 represents the GMM system procedure. In this table, we notice that the autocorrelation test results do not reject the hypothesis of the absence of a second-order autocorrelation, in all the regressions. Regarding the validity of the instruments, we note that the over-identification of the Hansen-test (1982) specifies absence of correlation between instrumental variables and error term. Therefore, the instruments are therefore valid and can interpret the results of the estimations. Estimation of the model by GMM system gives results which are statistically and economically satisfactory. From these six regressions, we note that a global convergence phenomenon is observed. Indeed, the coefficient of the variable LPIBT is negative and statistically significant in four performed regressions (LLYlib, PRIVYlib, BANKlib and IDFlib) indicating a convergence of the countries in our sample.

FDI coefficient is negative and statistically significant in most estimation (except for the case where financial market variables are used). We note also that financial development coefficients are globally negative (except the variable CAPBlib coefficient). The work of Levine and Zervos (1998a) and more recently the work of Beck and Levine (2004) have proved that there should be development of financial markets to consider a high economic growth. In particular, financial markets liberalization can save a higher economic growth (Beckaert et al. (2005)). Even though the distinction between a market-oriented financial system and a system-oriented Bank seems to be outdated (Jacquet and Pollin (2007)), Tadesse (2002) showed that, in financially developed countries, financial systems dominated by banks are more advantageous for growth than market-oriented systems.

Table 5. Economic growth, FDI and financial liberalization: Estimation by GMM in system (Dependent variable: growth rate of real GDP per capita GPIBT)

Independent variables	*Estimations*											
	LLYlib		*PRIVYlib*		*BANKlib*		*CAPBlib*		*VTRADlib*		*IDFlib*	
	Coeff	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*	*Coeff*	*t-Stat*
LPIBI	-0.0164***	-3.21	-0.0150***	-2.90	-0.0199***	-4.08	-0.0021	-1.13	0.0022	1.02	-0.0209***	-3.79
FDI	-0.0485***	-2.94	-0.0190***	-2.83	-0.0672	-1.49	0.0293***	3.93	0.0392	1.57	-0.7126***	-4.28
LDFlib	-0.0169***	-4.52	-0.0184***	-3.70	-0.0084**	-2.58	-0.0025*	-1.71	-0.0021	-0.39	-0.0048***	-4.27
FDI**LDFlib*	0.0300***	5.26	0.0096***	2.74	0.0268**	2.35	0.0009	0.22	0.0453***	2.96	0.2456***	4.76
LLF	-0.0349***	-3.51	-0.0376***	-3.67	-0.0347***	-3.70	-0.0004	-0.10	0.0177*	1.73	0.0100*	1.95
LSCP	0.0817***	7.59	0.0825***	7.07	0.0793***	6.48	0.0104	1.21	0.0375**	2.45	0.0999***	6.71
LOUV	0.0878***	3.92	0.0861***	3.30	0.0863***	3.36	0.0317***	3.21	-0.0167	-0.77	0.0233**	2.43
LDCG	-0.0300***	-2.79	-0.0344***	-2.96	-0.0581***	-2.42	-0.0176***	-2.95	-0.0347	-1.05	-0.0035	-0.51
LINF	-0.0071***	-3.73	-0.0077***	-4.01	-0.0060***	-2.94	-0.0052**	-2.43	-0.0178***	-4.74	-0.0061*	-1.76
LDXT	-0.0179*	-1.94	-0.0173*	-1.89	-0.0147	-1.62	-0.0147***	-5.26	-0.0206**	-2.19	-0.0135**	-2.63
MPC	0.0120**	2.94	0.0099**	2.42	0.0201***	4.28	-0.0002	-0.14	-0.0166	-0.37	0.0023**	2.05
Intercept	-0.4401***	-2.71	-0.4200**	-2.33	-0.4079**	-2.07	-0.0267	-0.40	0.4743***	3.15	0.0119	0.20
Number of obs.	904		906		885		837		851		279	
Number of groups	54		54		54		54		54		31	
Hansen test	0.652		0.737		0.330		0.116		0.322		0.280	
AR(1)	0.005		0.002		0.004		0.009		0.015		0.070	
AR(2)	0.824		0.972		0.939		0.673		0.565		0.316	

Notes: *** significance at the level of 1%, ** significance at the level of 5% and * significance the level of 10%. All variables are expressed in natural logarithm (except FDI and institutional quality). The operator (L) means the natural logarithm. The t-statistic is the Student test corrected for heteroscedasticity. AR (2): probability of significance of the second order of the statistic of the autocorrelation test.

In sum we note that the direct effect of financial systems development on economic growth rate is negative. We can put forward two arguments which explain this result. On the one hand, most countries in our sample are known by a financial system generally fragile. On the other hand, there is an instability linked to development of some countries in our sample (e.g. Latin American and Southeast Asian countries). These two arguments neutralize the positive effects of financial development on economy. Similar results, indicating a negative relationship between financial development and economic growth have been found. De Gregorio and Guidotti (1995) found a negative relationship between financial development and economic growth in a group of Latin American countries. Moreover, Harris (1997) has shown that there is a weak relationship between financial development indicators and GDP growth per capita in a sample of 49 developed and developing countries. Berthélemy and Varoudakis (1998) found a negative relationship between financial development and economic growth in financially repressed countries. Using a cross-section method on a sample of 95 developed and developing countries, Ram (1999) found a negative relationship between financial development indicators, used by King and Levine (1993a), and GDP growth rate in these countries. Following Alfaro et al. (2004, p. 101), we can suggest that: "*this might partly be due to the fact that most countries' stock markets are even less developed compared with banks and thereby exaggerating the problem. However, irrespective of which financial market variable we use, there remains the concern that an unusually large number of countries seem to experience negative effects. One explanation could be that we have forced a linear relationship on what is essentially a non-linear interaction between FDI and financial markets. Other than this problem, the results confirm our conjecture that insufficiently developed financial institutions can choke the positive effects of FDI.*"

Regarding the variables measuring financial deepening, we note that interactions variables coefficients (FDI * LLYlib, FDI * PRIVYlib, FDI * BANKlib, FDI * VTRADlib and FDI * IDFlib) are positive and statistically significant at the 10% level (except the coefficient of the variable FDI * CAPBlib is not significant). The results obtained on the coefficient of FDI * CAPBlib interaction is not significant. This result seems more logical and closer to reality. We interpret this result as follows: First, under development of financial markets in most countries in our sample does not promote economic growth. Instead, it has a direct negative effect. Indeed, the financial markets of developing countries, which constitute almost 70% of the countries in our sample, are of embryonic character.

Second, the combined effect of market capitalization and FDI on GDP growth per capita is not significant. In other words, the marginal product of capitalization does not increase in the presence of foreign direct investment.

As in the previous section, we focus, specifically, on the combined effect of credit to the private sector from the date of interest rates liberalization and FDI on the growth of host countries.
The GMM system proves that the direct effect of credit to the private sector has a negative and not significant direct effect on GDP growth per capita. Based on previous literature, this result seems very close to reality, since most private companies in our sample are SMEs. On the other hand, interaction coefficient between PRIVYlib and FDI is positive and significant at the 1% level. This means that the combined effect of FDI and credits to the private sector on growth is positive. Both interpretations are possible for this result: the first being that the marginal product of PRIVYlib increases with FDI, the second being that the marginal product of FDI increases with more credit to private firms.

The first interpretation suggests that small private businesses can learn and benefit from the presence of FDI so that they produce more yields with credits. Thus, thanks to these benefits FDI generates more efficiency to raise the yields of local businesses. The second interpretation is that FDI marginal product increases in the presence of an important local economic activity supported by credit line. The two interpretations come down essentially to one, reflecting the link of complementarity between FDI and local businesses productivity in their relationship with economic growth.

Regarding the variables of interest to our study, we note that the interactions coefficients (FDI * LLYlib, FDI * PRIVYlib, FDI * BANKlib, FDI * VTRADlib and FDI * IDFlib) are positive and statistically significant at the 10% level (except the coefficient of the variable FDI * CAPBlib that is not significant). The results of the interaction coefficient FDI * CAPBlib is not significant. This result seems more logical and closer to reality. We interpret this result as follows:

First, development of financial markets in most countries in our sample does not promote economic growth. Instead, it has a direct negative effect. Indeed, financial markets of developing countries, which constitute almost 70% of the countries in our sample, are embryonic in character. Second, the combined effect of market capitalization and FDI on GDP growth per capita is not significant. In other words, the marginal product of capitalization does not increase in the presence of foreign direct investment.

As in the previous section, we focus, specifically, on the combined effect of credit to the private sector from the date of interest rates liberalization and FDI on the growth of host countries.
The GMM system proves that the direct effect of credit to the private sector has a negative and not significant direct effect on GDP growth per capita. Based on previous literature, this result seems very close to reality, since most private companies in our sample are SMEs.

On the other hand, the interaction coefficient between PRIVYlib and FDI is positive and significant at the 1% level. This means that the combined effect of FDI and credits to the private sector on growth is positive. Both interpretations are possible for this result: the first being that the marginal product of PRIVYlib increases with FDI, the second being that the marginal product of FDI increases with more credit to private firms. These results illustrate, generally, that the interaction between financial system development and FDI has beneficial effects on economic growth. Indeed, the direct impact of FDI on growth seems to be negative, but the interaction between FDI and liberalized financial system, in particular the banking sector, is positive and significant, which encourages the attraction of FDI in host countries.

In summary, FDI and the financial system are complementary in terms of strengthening the process of technology dissemination which allows for an increase in economic growth rate. This result confirms our assumption that the existence of a certain level of financial development, in particular a liberalized financial system, may increase absorption capacity in host countries. Financial sector development is therefore at the heart of the absorption capacity of an economy.

We can forward then, according to our results, the following point of view: Although most FDIs are in the form of foreign capital, it is essential to admit that the positive impact of FDI on the host economy heavily depends on the extent of the development of the local financial system.

Regarding the control variables, the results by the GMM system method estimation seems more important than those found by the GMM method in first differences.

In table 5, we found a positive and significant impact at the 10% level of the stock of physical capital (CPCA) in all the regressions. We found that capital stock level has a positive impact on a country's economic growth, which confirms economic theory. On the other hand, we found a negative impact of the workforce (LLF) on growth rate. This goes against most results in the literature on the effect of workforce on growth. Our result could be explained by the fact that workforce in the countries in our sample is not positively involved in the model.

In growth theory, exports were considered as a relevant independent variable for economic growth. Indeed, FDI inflows are expected to increase the competitiveness of exports of the host country and as exports increase domestic investment, they will have a multiplier effect on GDP. From table **5**, we found trade openness coefficient significant and positive in all the regressions.

Our results are consistent with those found by Ljungwall and Khin (2007) and Alfaro et al. (2004) which showed that trade openness has been a significant and positive economic growth determinant.

Generally, increase in public expenditure, increases risk to hinder GDP growth. The relationship between this variable and growth rate is negative. From the same table, we notice a negative and significant relationship between the two indicators. In other words, any increase in public expenditure by a point reduces GDP growth rate by 2.5%, on average. It was noted that Gwartney James et al. (1998) have highlighted the negative relationship between government expenditure and economic growth for 23 countries in the OECD region between 1960 and 1996. Similarly, Alesina and Silvia (2009) concluded that unsuccessful recovery initiatives, in a group of 21 industrialized countries during the period 1970 to 1990, were based on public spending.

In the same way we interpret the relationship between external debt and GDP growth rate. The results found indicate a negative and significant relationship between the two variables. Indeed, the six regressions indicate a negative and significant relationship at the 10% level. With the exception of the third column, the impact of external debt on economic growth rate is not significant. In the economic literature, increase of foreign debt, in particular in developing countries, can have a long-term negative effect on economic growth. Indeed, when debtor countries are unable to quickly fulfil their debt service obligations, they will face a deterioration of their sovereign ratings and will struggle to borrow. Accordingly, these countries will pay high rates for new credits. Pattilo et al. (2002) noted that a debt which exceeds the repayment capacity of a debtor country will discourage local and external investments due to the cost of its service, and thus hampers economic growth. Therefore, any increase in external debt by a point would decrease GDP growth rate of the countries in our sample by 1.6% on average.

As for inflation, we can notice that it has a negative and significant coefficient at the 5% and 10% levels in all regressions. This result is consistent with economic theory, stating that inflation rate has a direct negative impact on economic growth rate.

The coefficient of institutional quality variable (MPC) is positive and statistically significant at the 5%, level except for the regressions that use variables from the financial market (CAPBlib and VTRADlib). This result reveals the relevance of civil liberty and political rights or even institutional quality as factors explaining economic growth of countries in our sample. We obtained the same results as those of Tavares and Wacziarg (2001) and Rigobon and Rodrik (2005).

6. Conclusion

In this study, we defended the idea that financial liberalization as a determinant of financial development plays the role of a catalyst to strengthen the link between FDI and economic growth of the host countries. Furthermore, we investigated the relationship between internal financial liberalization and financial sector development. Finally, we found support to the idea that financial liberalization improves the impact of FDI on economic growth of the host country. Therefore, the results found generally confirm our tested theoretical hypotheses. We started with a descriptive study of the various indicators and the correlation between key variables. The cloud of points of the couple (FDI, Credit to the private sector) showed a generally positive relationship.

The GMM system method emerges from the overall negative effects of financial development on economic growth, which seems close to reality because the nature of our sample (70% of countries are developing and they are characterized by a fragile and embryonic financial sector).

The results found by this method prove that FDI has an impact on GDP growth per capita, a negative direct effect and a positive effect when it interacts with financial sector development. In

particular, liberalized financial systems play a more important role than non-liberalized systems in strengthening the potential of technology transfer and increasing productivity, therefore increasing economic growth. Indeed, liberalized financial systems play an important role in strengthening technological diffusion associated with FDI towards economic growth.

Therefore, interaction between financial liberalization, as a determinant of financial development, and FDI exerts its beneficial effects on economic growth. In summary, beyond the traditional factors of FDI location, we determined another motivating factor that seems to have a positive impact on the relationship between FDI and economic growth, that of financial development, in particular a liberalized one.

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Appendix 1: Correlation matrix

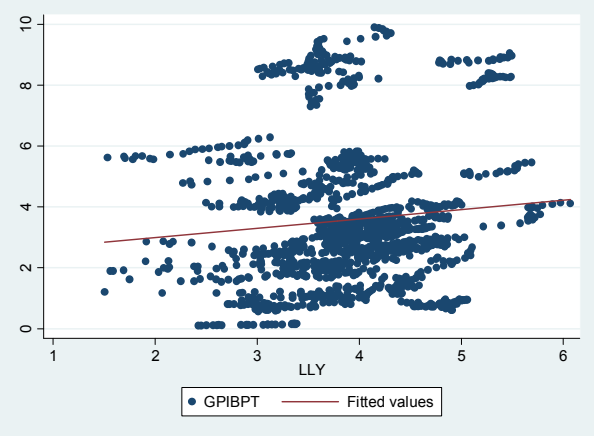
Variables	*GPIBT*	*FDI*	*LLLY*	*LPRIVY*	*LBANK*	*LCAPB*	*LVTRAD*	*LIDF*	*LSCP*	*LINF*	*LDCG*	*LOUV*	*LINV*	*LLF*	*LTCR*	*LDXT*	*MPC*
GPIBT	1.0000																
FDI	-0.0367	1.0000															
LLLY	0.0998	-0.1126	1.0000														
LPRIVY	0.1559	-0.1739	0.8589	1.0000													
LBANK	0.0229	-0.0883	0.5121	0.6209	1.0000												
LCAPB	0.0842	0.1005	0.5033	0.5507	0.2994	1.0000											
LVTRAD	0.1023	-0.0096	0.4624	0.5477	0.4357	0.7556	1.0000										
LIDF	0.2673	0.1040	0.3147	0.2905	0.1291	0.5220	0.3147	1.0000									
LSCP	0.2697	-0.1897	0.3100	0.3750	0.3003	0.1334	0.3328	0.0641	1.0000								
LINF	-0.0865	0.0543	-0.5757	-0.5587	-0.4357	-0.3799	-0.3872	-0.1819	-0.1793	1.0000							
LDCG	-0.0854	0.0133	0.2587	0.2996	0.2052	0.2329	0.1865	-0.2513	-0.0660	-0.2864	1.0000						
LOUV	0.0608	0.0706	0.3688	0.2791	0.1745	0.3555	0.1181	0.1779	-0.3810	-0.2872	0.1986	1.0000					
LINV	0.2168	0.0844	0.2758	0.2432	0.2594	0.0572	0.1589	0.0507	0.1008	-0.2573	0.0085	0.1483	1.0000				
LLF	0.0719	-0.0721	-0.1542	-0.0783	-0.0232	-0.0946	0.2080	0.0088	0.4592	0.0959	-0.2560	-0.6165	0.0074	1.0000			
LTCR	0.7013	0.0620	-0.3301	-0.3649	-0.3515	-0.2729	-0.2693	0.0606	-0.1063	0.2853	-0.3506	-0.1966	0.0899	0.2098	1.0000		
LDXT	-0.0828	0.1018	0.2277	0.1748	-0.1074	0.2661	0.0831	0.2250	-0.1587	-0.0823	0.0627	0.3777	-0.1937	-0.3145	-0.1467	1.0000	
MPC	0.0238	0.0453	-0.2225	-0.3155	-0.2953	-0.2552	-0.1908	-0.1905	-0.2071	0.2495	-0.2591	-0.0642	0.0909	0.2199	0.4355	-0.1888	1.0000

Note: The operator (L), denotes natural logarithm

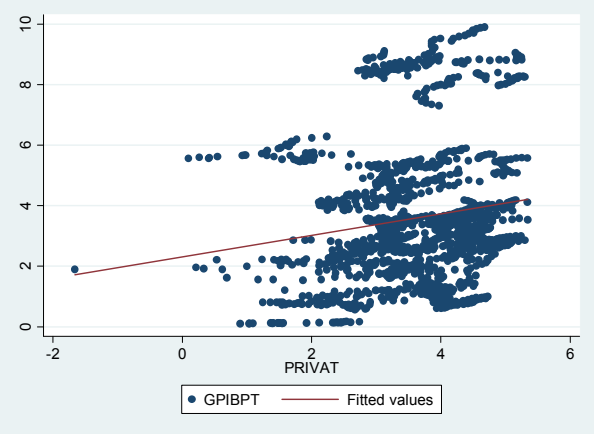
Appendix 2

Evolution of FDI and real per capita GPIB

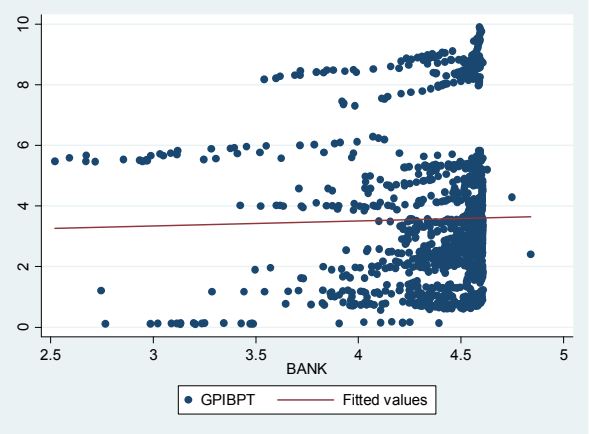
Evolution of LLYand real per capita GPIB



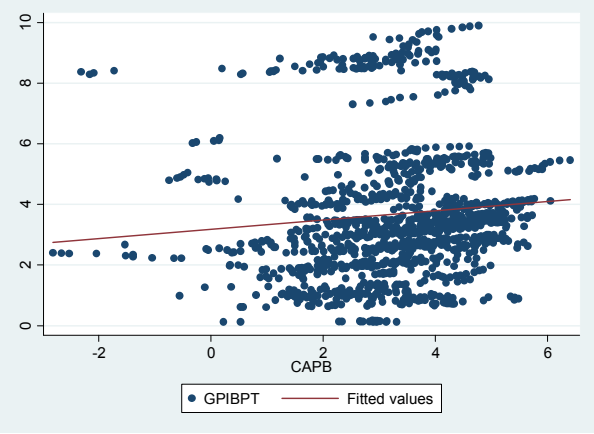
Evolution of PRIVAT and real per capita GPIB



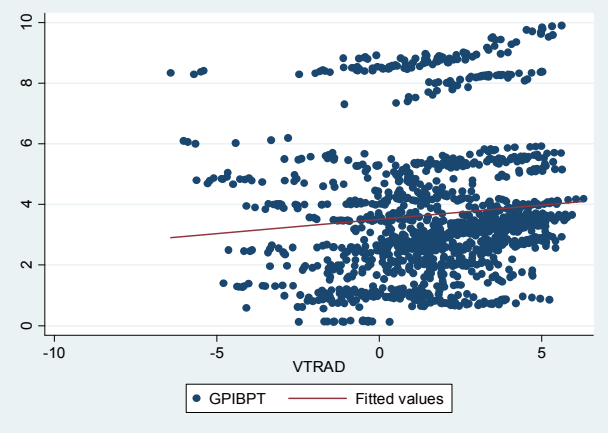
Evolution of BANK and real per capita GPIB



Evolution of CAPB and real per capita GPIB



Evolution of VTRAD and real per capita GPIB



Appendix 3

GPIBT				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-4.6918	0.0000	69	1487
Null hypothesis : individual unitary root in the panel				
Im, Pesaran and Shin W-Stat	-0.8757	0.1996	69	1487
Fisher-ADF Chi square	177.247	0.0136	69	1487
Null hypothesis : individual unitary root in the panel				
Hadri Z-Stat	18.1646	0.0000	69	1627
FDI				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-3.6658	0.0001	68	1453
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-4.2349	0.0000	68	1453
Fisher-ADF Chi square test	215.823	0.0000	68	1453
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	12.2185	0.0000	69	1599
LLY				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-1.8996	0.0287	69	1392
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-0.8635	0.1939	69	1392
Fisher-ADF Chi square test	161.582	0.0830	69	1392
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	15.1435	0.0000	69	1548
PRIVAT				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-0.6540	0.2565	69	1392
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	1.2324	0.8911	69	1392
Fisher-ADF Chi deux	121.263	0.8439	69	1392
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	14.7184	0.0000	69	1547
BANK				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-13.1537	0.0000	68	1130
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-4.1651	0.0000	68	1130
Fisher-ADF Chi square test	393.568	0.0000	68	1130
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	18.3226	0.0000	68	1487
CAPB				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-6.0901	0.0000	65	1121
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-4.0495	0.0000	65	1121
Fisher-ADF Chi square test	214.601	0.0000	65	1121
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	13.5117	0.0000	68	1273
VALTRAD				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				

Levin, Lin et Chu	-4.053	0.0000	65	1128
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-2.6222	0.0044	65	1128
Fisher-ADF Chi square test	179.433	0.0027	65	1128
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	13.9007	0.0000	69	1291
IDF				
Method	Statistic	Prob.**	Cross section	Obs.
Null hypothesis : unitary root common for all individuals of the panel				
Levin, Lin et Chu	-8.3289	0.0000	28	424
Null hypothesis : individual unitary root in the panel				
Im, Pesaran et Shin W-Stat	-4.7030	0.0000	28	424
Fisher-ADF Chi square test	142.470	0.0000	28	424
Null hypothesis : no unitary root common for all individuals of the panel				
Hadri Z-Stat	11.2950	0.0000	38	560

Note: in the LLC, IPS and Fisher tests, rejection of the null hypothesis of the presence of unitary root corresponds to a probability close to zero. In the Hadri test, rejection of the null hypothesis of the absence of a common unitary root corresponds to a probability close to zero.