Growth and Financial Development: The Role of Institutions

Long-term memory in the relationships

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1. Introduction

The financial system consists of the banking sector (including supervisory institutions such as central banks and governments), stock markets, and the money supply. As regards financial development's role in economic development, there are two main schools of thought. The first one asserts that financial development plays a limited role in accompanying the development of real activity (Robinson, 1952; Lucas, 1998). This school considers that when the economy develops, the financial system develops. For example, Robinson (1952), asserts that "where enterprises lead, finance follows" and, for Lucas (1998), economists "badly over-stress" the role of financial factors in economic growth. As for development economists, they frequently ignore this role in their studies. For Rajan and Zingales (1998) or Cameron (1967), although financial development is essential for growth, it is only "a lubricant but not a substitute for the machine". For Rajan and Zingales (1998), it is the availability of profitable investment opportunities which is essential. The second school of thought accords a crucial role to financial development in boosting the processes of growth, innovation and economic development (Bagehot, 1873, Schumpeter, 1911, Mac Kinnon 1973, Levine 1997). For these authors, causality proceeds from financial to economic development; it is only at a later stage that financial development leads on to growth. Haber, North and Weingast, (2008) assert that « countries do not have large banking systems and securities markets because they are wealthy; they are wealthy because they have large banking systems and securities markets ». Similarly, for King and Levine (1993), finance does not merely follow in the wake of economic activity. They affirm that the significant robust relationship between the degree of financial development and the rate of economic growth indicates much more than a positive association between contemporaneous shocks and financial/economic development. For Levine (1997), there is even evidence according to which the level of financial development is a good predictor of future rates of growth, of capital accumulation and of technological change[1].

Whereas the first school asserts that financial development is not important for growth, the two other schools deny this, affirming that there are no good or bad financial system

[1] However, for Rajan and Zingales (1998), financial development may predict economic growth simply because financial markets anticipate future growth. Equally, they consider that the stock market capitalizes the present value of growth opportunity, while financial institutions lend more if economic sectors grow.

configurations[2]. What is important for them is that both the bank-based and market-based systems should guarantee the efficiency of the financial system. According to Levine (2002), Demirguc-Kunt and Maksimovic (2002), Beck and Levine (2002), the availability of financial services matters more than the particular form their delivery takes. The work of Beck and Levine (2002) does not imply that institutional structure is of no importance for growth, but simply affirms that there is no one optimal structure for all countries at all times (Demirguc-Kunt, 2007). However, a "good" financial system must always enable a country to mobilize its savings for investment inside its frontiers by first allowing the most profitable projects to be identified, and then assigning resources for those projects, thanks to reduced transaction costs. Financial development also has to facilitate risk management and corporate control. Consequently, financial markets must provide for a whole range of services by:

- helping to mobilize and pool savings
- providing payment services to facilitate the exchange of goods and services
- producing and processing information about investors
- monitoring investments and exercising corporate governance
- Helping to diversify, transform and manage risk (Levine, 1997; Demirgüc-Kunt, 2007).

For Rajan and Zingales (1998), in particular, financial markets help firms, which depend on external finance for their growth, to overcome problems of moral hazard and adverse selection.

Between these two polar positions (financial development merely accompanying economic development vs. financial development as a growth factor), we can find another group of scholars for whom the market promotes growth, with growth, in turn, encouraging market formation (Greenwood and Smith, 1997, Greenwood and Jovanovic, 1990): market structures would, in this case, be endogenous. However, in Greenwood and Jovanovic's model (1990), financial intermediaries invest more productively than individuals, because they can identify investment opportunities more easily. This means that financial intermediaries promote growth by ensuring higher earnings on capital, and growth, in turn, allows costly investments to be implemented: Growth and financial developement are bound by a complex relationship and it is difficult to undertand the causality between theses two variables.

To undertand these complex relationships we choose to introduce the role of institutions. However, if there is a sizeable literature wich explains that financial development promotes growth, there is also an not insubstantial literature wich explains that institutions permits financial developpement. We think that it is necessary to join together this two theoritical

[2] Ever since Gurley and Shaw, these configurations have been defined as either "bank-based" (when the economy is mostly financed by banks), or "market-based" (when the economy is essentially financed by securities markets).

corpus to understand the long-term relationships between Growth and Financial Development. Our hypothesis is that institutions acts as a catalyst for this relationship.

According to this aim we choose to use an econometric approach (co integration), wich permits to analyse a long term relationship between severals variables. In this econometric analyse we are not so much concerned with the shape of the financial system (whether market-based or bank-based) or its financing modalities (credits or securities), as we are with its *depth, efficiency, size* and *accessibility* (financial development)[3] in relationship with growth and institutions.

2 Links between financial development and economic growth (indicators of performance)

Several empirical or theoretical studies indicate that financial development improves both growth and economic development. Empirical studies shed light on the links between financial development and growth**,** while theoretical studies explain the mechanisms that allow financial development to guarantee economic growth.

2.1 The theoretical underpinnings

Theoretical studies generally focus on the problems created by asymmetric information, transaction costs, friction and risk. For North (1981), Hicks (1969) Levine (1997), Levine and Zervos (1996), Greenwood and Smith (1997) and other authors, when particular market friction exists, financial markets and intermediaries - which provide all five financial functions needed for economic growth - can emerge. These five basic functions allow the financial system to:

1. facilitate the trading, hedging, diversifying and pooling of risk
2. allocate resources
3. monitor managers and exercise corporate control
4. mobilize savings
5. facilitate the exchange of goods and services as well as specialization.

According to Levine (1997), numerous cases of friction between lenders and borrowers arise in an economic system. If financial arrangements emerge and mitigate this by facilitating the realization of these five functions, economic growth is upgraded. For example, in AK models, these financial functions affect steady-state growth by (i) influencing the rate of capital formation, (ii) altering the savings rates or (iii) reallocating savings among different capital-producing technologies. In a technological innovation model accompanying the invention of new production processes and goods (Romer, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992), the financial system affects steady-state growth by altering the rate of technological innovation.

[3] However, many authors note that financial systems change during their development, becoming more market-based as the countries develop (Demirguc-Kunt and Levine, 1996, 2001b)

Certain high-return projects require a long-term commitment of capital, but savers do not like to relinquish control of their savings for long periods. With liquid capital markets, savers can hold liquid assets (equity, bonds, and demand deposits) that they can easily sell whenever they seek access to their savings. When liquidity risk arises, due to uncertainties associated with converting assets into a medium of exchange, high-return projects cannot be financed; this slows down growth because savers do not want to support any liquidity risk. Informational asymmetries and transaction costs may also inhibit liquidity and intensify liquidity risk. If a financial system does not increase the liquidity of long-term investments, less investment in high-return projects is likely to occur (Hicks, 1969). Technological innovations, and many inventions which require long-run commitments of capital, suppose that capital markets transform liquid financial instruments into long-term investments in illiquid production processes. Equally, the capacity to hold a diversified portfolio of innovative projects reduces risk and promotes investment in growth-enhancing innovatory activities. Financial systems which ease risk diversification can accelerate technological change as well as economic growth (King and Levine, 1993). Diamond and Dybvig's model of liquidity (1983) shows that, when there are two types of investment - illiquid but high-return projects and liquid but low-return projects - the associated risk creates incentives for investing in the liquid low-return projects. However, by eliminating liquidity risk, banks and markets can increase investment in the high-return illiquid assets and induce faster steady-state growth (Bencivenga, Smith and Starr, 1995).

For Devereux and Smith (1994) and Obstfeld (1994), risk diversification through internationally integrated stock markets is also a good means by which large stock markets can often influence economic growth. In this case, those projects offering the highest returns are financed.

Just as markets and banks can eliminate liquidity risk so, too can market-based or bank-based systems exercise equivalent intermediary functions. But, for Jacklin (1987), if liquid equity markets exist and agents can trade easily in this equity market, they will prefer equities, and no one will use banks. Banks will only emerge to provide liquidity if there are too many impediments to trade in securities markets (Gorton and Pennachi, 1990). However, banks and large securities markets always supply risk diversification services which can affect economic growth by improving resources allocation, savings rates, and also by accelerating technological change (King and Levine, 1993).

Because individual savers will be reluctant to invest in activities for which there is little reliable information and because it is not easy for them to evaluate firms, this encourages the emergence of financial intermediaries (Boyd and Prescott, 1986). These bank-based or market-based intermediaries bring down the acquisition costs of the necessary investment information (Levine, 1997). Stock markets per se may also disseminate information about firms so that resource allocation, economic growth (Merton 1987) and corporate governance are improved (Holmstrom and Tirole, 1995).

Without all these financial intermediaries, outside investors find it too costly to verify whether firms' published project returns are accurate because, for Laffont and Tirole (1988), takeover threats encourage managers to maximize a firm's equity price. If project returns are high but a

debt contract exists, insiders pay an equilibrium interest rate to outsiders, and outsiders do not monitor the firm (Gale and Hellwih, 1985). But, if project returns are low, the borrower defaults and the lender must pay the monitoring costs needed to verify the feasibility of the project. These verification costs impede investment decisions and reduce economic efficiency. The above-mentioned financial intermediaries can reduce information costs, economize on monitoring costs, and both facilitate and promote corporate control (Bodie and Merton, 1995; Jensen and Meckling, 1976). Large and efficient stock markets may also ease corporate takeovers, mitigate the principal-agent problem and improve resources allocation (Diamond and Verracchia, 1982).

The fourth function of financial systems concerns the mobilization of savings. This function has received particular attention from Hicks (1969) and North (1981). They think that the Industrial Revolution was largely due to a concentration of funds, and that the implementation of technical advances was highly capital-intensive. Without multiple investors, costly production processes would remain at economically inefficient scales (Sirri and Tufano, 1995, Bagehot, 1873), but it is far too expensive for firms to mobilize such savings, because obtaining them necessitates high transaction costs. Financial intermediaries, however, can agglomerate savers' investment capital because their good reputation makes savers feel they can entrust their funds to them (Delong, 1991; Lamoreaux, 1995). By mobilizing resources for costly projects, the financial system plays a crucial role in improving innovation and growth (Mc Kinnon, 1973). For example, Greenwood and Smith (1996), show that large stock markets can lower the cost of mobilizing savings and facilitate investment in the most productive technologies.

The fifth function indicates that the financial system can promote specialization. Specialization and trade require more transactions than those found in an autarkic environment. If the financial system allows lower transaction costs, it also provides for greater specialization and more innovations (Lamoureux and Sokoloff, 1996). However, as production technologies progress, they tend to require increasingly specialized inputs and to yield increasingly specialized outputs. The exploitation of these technological advances requires markets in which agents can trade these specialized goods and services (Greenwood and Smith, 1996).

We cannot conclude this section, however, without mentioning certain sceptical analyses concerning the role of financial development. For example, Mayer (1988) and Stiglitz (1993) assert that large stock markets have no real effect on corporate finance or corporate governance and that they will, in fact, decrease incentives for acquiring information about firms. Morck, Shleifer and Vishny (1990) consider that stock market developments can even hinder growth by facilitating counterproductive corporate takeovers.

2.2 Empirical studies

We can classify empirical studies into four categories: global, firm, industry, and country-level analyses.

Global analyses include cross-country studies (Goldsmith, 1969; King and Levine, 1993, Levine and Zervos, 1996) as well as panel and time-series estimations (Levine, Loayzya and Beck, 2000, Rousseau and Sylla, 1999; (Bekaert, Harvey and Lundblad, 2005). All these studies indicate that efficient financial systems (banks and markets) go hand in hand with faster growth: financial development helps economic and productivity growth through a better allocation of resources and an increase in investment rates.

At the firm level (Demirguc-Kunt, 1998; Beck, Demirguc-Kunt, 2006; Ayyagari, Demirguc and Maksimovic, 2006), studies show that firms grow faster when financial systems develop and when they can use this system rather than that of internal financing. This type of financial development is particularly favourable to small firms.

At the industry level, similar results have been highlighted by Rajan and Zingales (1998). Their measurement of a firm's dependence on external finance uses a large sample of countries in the 1980s. The industries concerned are heavy users of external finance, which generally benefit from financial development. In their study, Beck, Demiguc-Kunt, Laeven and Levine, 2006, also find that industries composed of small firms grow faster in financially developed economies.

Country-case studies of the US (Jayaratne and Strahan, 1996) or Italy (Guiso, Sapienza and Zingales, 2002) show that financial development and reform boost lending quality, enhance the probability of individuals starting a business, increase industrial competition and, ultimately, promote growth. In such studies, financial development also plays an important role in stabilizing a nation's economic growth before an external shock (Aghion, Angelos, Barnejee and Manova, 2004; Aghion, Barnejee, 2005).

Country-level analyses are not restricted to the firm, however; they also concern the reduction of poverty and the improvement of wealth distribution. For some scholars, although financial development benefits rich agents, its impact in favour of wealth distribution has not been clearly established (Lamoureaux, 1994; Haber, 2004 and 2005). For other authors, the fact of opening up financial services to more people - in particular to the poor, who have difficulties in finding funds - could have a strong impact on income distribution and poverty (Galor and Zeira, 1993; Aghion and Bolton, 1997; Rajan and Zingales, 2003).The cross-country studies of Beck, Demirgus-Kunt and Levine (2007) indicate, for example, that financial development has a positive impact on the poor, thereby reducing income inequality.

2.3. Financial Development measurements in empirical studies

According to what has been previously indicated, financial development can be measured in terms of: i) *size, ii) accessibility* and iii) *performance*.

i) Goldsmith's pioneering study (1969) of 35 countries over the period 1860-1963, uses the value of intermediary assets divided by GNP to gauge financial development and thereby measure the size of financial systems. King and Levine (1993), using a sample of 80 countries over the period 1960-1989, proposed four indicators of the level of financial development:

- *"Depth", to* measure the size of financial intermediaries. This variable is equal to the liquid liabilities of the financial system (M2) plus demand and the interest-bearing liabilities of bank and non-bank financial intermediaries, all subsequently divided by GDP.
- *"Bank", to* compare the different roles played by central or commercial banks in allocating credit. This variable is equal to the ratio of bank credit divided by bank credit plus central bank domestic assets. Commercial banks are likely to offer better risk management and investment information services than central banks. Financial systems that primarily fund the private sector probably provide more services than those that simply funnel credit to the government or to state enterprises.
- *"Private",* to measure the place occupied by banks and markets in the financing of the private sector. This variable is equal to the ratio of credit allocated to private enterprises divided by total domestic credit (excluding credit to banks).
- *"Privy",* to measure the place occupied by banks and markets in the financing of firms. This variable is equal to credit to private enterprises divided by GDP.

In Demerguc-Kunt's study (2007), *private credit* (value of credit by financial intermediaries to private sector divided by GDP) and *stock markets capitalization* (value of listed shares divided by GDP) are used to measure financial depth.

Levine and Zervos (1996) also use "stock market capitalization" to measure the size of stock markets. To measure stock market liquidity, they use two measurements. First, they compute the *ratio of total value of trades on the major stock exchanges divided by GDP*. This measures the value of equity transactions in relation to the size of the economy. The second liquidity measurement is equal to the ratio of the total values of trades on the major stock exchanges divided by market capitalization (*turnover ratio*).

Rajan and Zingales (1988) also uses two measurement of financial development: the first one is the ratio of *domestic credit plus stock market capitalization to GDP. T*he second, "*accounting standards"*, a proxy for financial development, is an index developed by the CIFA and research which ranks the amount of disclosure required in each country's annual company reports.

ii) In some studies, liquidity is measured by secondary market trading costs - but merely to evaluate the relationship between stock market liquidity and national growth rates, capital accumulation rate and rates of technological change. As for Demerguc-Kunt (2007), they generally use "*M2"* as a proxy of financial system size. They also use an index of freedom in the banking and the financial sector to measure banking industry openness. This index includes several dimensions: the extent of government involvement in the financial sector

through ownership and control of financial institutions, the quality of regulation and supervision, the existence of interest control, activity restriction and the ability of foreign institutions to operate freely.

To measure stock market liquidity, Levine and Zervos (1996) use two indicators: the first, "*LLY1"*, is the ratio of total value of trades on the major stock exchanges divided by GDP; the second, "*LLY2", is* equal to the ratio of the total value of trades on the major stock exchanges divided by market capitalization (*turnover ratio*).

iii) The *net interest margin* (the gap between what banks pay the providers of funds and what they obtain from bank credit users)[4] is generally employed in studies to measure market efficiency, and this is particularly the case for Demerguc-Kunt (2007).

To measure *risk diversification and international integration*, Levine and Zervos (1996) use Korajczyk's (1996) estimate of the degree of international integration of national stock markets, as well as the IAPM (International Arbitrage Pricing Model).

Table 1 reports some of these measurements and indicates the sense of their relationship with financial development.

Table 1: Financial Development Indicators

Size and accessibility			**Market performance**	
Size of private financial markets	**Possibility of access to markets for residents**	**Bank efficiency**	**Liquidity (activity volume of markets)**	**proportion of private and public assets**
Stock Market Capitalization (+)	Bank Agencies for 100,000 residents (+)	Bank Costs / Bank Revenues (-)	Negotiated Assets/ Market Capitalization (+)	Central Bank Private Sector Assets/ Total Private Sector Assets (-)
Private Bond Market/GDP (+)	Number of Cash Dispensers for 100,000 residents (+)			Bank Financing of the State/ Total Bank Financing (-)
Total Bank Assets/GDP (+)	Damage Insurance Premium (+)			Private Internal Debt/ Public Internal Debt (+/-)
Non-banking Financial Institution Assets/GDP (+)	Life Insurance Premium (+)			
	Cost of Savings Deposits (-)			
	Informal Sector (-)			

[4] NIM equals interest income minus interest expense divided by interest-bearing assets, averaged for each country's bank(s).

We should note that, in order to measure market accessibility (Table 1), it is possible to add "*informal sector",* to take into account the specificity of LDCs in which personal wealth remains the primary source of business start-up capital, since small firms have only limited access to banks. In fact, the use of bank loans is correlated with company size, and only the biggest firms have most of their start-up capital financed by bank debt. For example, Fafchamps (2004) shows in his study on Zimbabwe that bank business start-up loans were used by only 10% of firms. Loans from friends or family are significant sources of start-up capital for microenterprises and, to a lesser extent, for small firms whose contact with banks is negligible. Consequently, the existence of a large "informal sector" signifies that access to bank financing is really limited.

3. Links between financial developement and institutions (institutional indicators)

If several empirical studies have demonstrated that financial development leads to growth, other studies explain why a system does or does not develop. For many authors, it is a country's specific legal system that explains its financial development (La Porta, 1998 et al.); for others, it is due to a country's history or to its geographic endowment (Engerman and Sokoloff, 1997). However, several scholars consider that institutional arrangements matter more, and that bankers, inside and outside shareholders, depositors, savers, debtors and the government all create the institutions needed to align their incentives (Haber, 2008). These institutions may give birth to either a shallow or a deep financial system.

3.1 Law, legal systems and legal rules

The earliest attempts to explain financial system differences between countries focused on the history of the country and, in particular, on the origins of that country's legal system. For legal origins theory, a country's financial development level is determined by its colonial history. British colonies, since they had adopted the legal institutions of British common law, benefited from better protection for minority shareholders and enjoyed a more developed financial system than the French colonies, which had adopted the French Civil Code (Haber, North et Weingast, 2008, La Porta, 1998)[5].

According to Modigliani and Miller's model (Modigliani and Miller, 1958), the size of capital markets should be proportional to GNP, because their size is determined by the cash flow coming from investors. But differences in the size of financial markets in countries with similar GNP cannot be explained by this model. The agency model could, however, explain why some countries have much bigger capital markets than others, since it is clear that countries differ in the extent to which they offer legal protection to investors (La Porta and Lopez de Silanes (1998)).

La Porta and Lopez de Silanes (1998), considered two legal traditions: *common law* and *civil law.* Most English-speaking countries have inherited the common law tradition, with its commercial law being based on the British Companies Act. Other countries respect the civil law tradition, derived from Roman law. There are three main families: the French one, based

[5] We can use dummies (English or French colonies) to measure this.

on the Napoleonic code of 1804; the German one, based on Bismarck's code of 1911[6]; and the Scandinavian family, described by La Porta as being less derived from Roman law. In general, it is considered that common law countries give shareholders and creditors strong legal rights, and that French civil law countries offer only weak protection.

For La Porta and Lopez de Silanes (1998), the legal origins of law matter, and good protection and financial development are determined by different factors which concern the legal rules applying to shareholders, creditors and to contract enforcement[7].

- *Shareholders' rights: T*hese concern, in particular, the right to vote, which is shareholders' main source of power. Other rights include anti-director rights; voting powers[8]; corporate voting participation rights[9]; cumulative voting for directors; proportional board representation mechanisms[10]; legal protection against directors' oppression[11]; a pre-emptive right[12]; the capacity to call an extraordinary shareholders' meeting[13], the right to a mandatory dividend[14]; and, finally, protection from expropriation by management.

- *Creditors' rights*: in La Porta and Lopez de Silvanes (1998) there are the rules concerning creditors' rights cover loan security, asset seizure in case of loan default, and the impossibility for management to seek unilateral protection from creditors. Accordingly, La Porta and Lopez de Silvanes' study consider five dummies and an index: "No automatic stays on assets"[15]; "secured creditors paid first"[16]; "restrictions on going into reorganization"[17]; "Management cannot stay in reorganization"[18];

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[6] The first law was voted in 1883.
[7] This point is developed in part 4.3.
[8] Investors may be better protected when dividend rights are closely bound up with voting rights (i.e when companies in a country are subject to the one share/one vote rule). In the La Porta and Lopez de Silvanes study, the dummy "one share/one vote rule" is used to identify this shareholder right.
[9] Anti-director rights measure how strongly the legal system favours minority shareholders versus management or dominant shareholders in the corporate decision-making process, including the voting process. For these anti-director rights, the authors use a proxy: "voting by mail".
[10] The effect of either rule is to give minority shareholders more power to put their representatives on the boards of directors.
[11] These mechanisms may include, for example, the right to challenge the directors' decisions in court, or the right to force the company to repurchase the shares of those minority shareholders who object to certain fundamental management decisions.
[12] This right is intended to protect shareholders from dilution.
[13] It is assumed that the higher this percentage is, the harder it is for minority shareholders to organize a meeting to challenge or oust management. This percentage varies from 3 percent to 33 percent.
[14] The mandatory dividend right is a legal substitute for the weakness of other forms of minority shareholder protection.
[15] When a firm risks bankruptcy, two creditor strategies are possible: liquidation or reorganization. In some countries, in the case of re-organization, the procedures impose an automatic stay on assets. This rule protects managers and unsecured creditors against secured creditors, and prevents automatic liquidation.
[16] The dummy considers whether the secured creditors have the right or not to collateral in the event of reorganization.
[17] The dummy equals one if the reorganization procedures impose restrictions, such as creditor consent to file for reorganization. Such protection is called Chapter 11 in the USA.
[18] The dummy equals one when an official, appointed by the court or creditors, is responsible for the operation of the business during reorganization. This variable also equals one if the debtor does not keep the administration of the property pending the resolution of the reorganization process.

"creditors' rights"[19] and "Minimum mandatory legal reserve[20]". It is considered that these indicators measure the ease with which investors can exercise their powers against management.

3.2 Endowment and finance

Other authors stress the role of geographic endowments. Engerman and Sokoloff (1997) show that if geographic endowments and agricultural production fostered a large middle class, the institutions were more egalitarian but more closed if they fostered the rise of powerful elites.

3.3 Institutions and Finance

Many other scholars, however, consider that politics and political institutions matter, and are more important than legal origins (Rajan and Zingales, 2003; Acemoglu, Johnson and Robinson 2004; Lamoreaux and Rosenthal, 2005). Nonetheless, it is clear that the size and structure of banking systems are influenced by both the demand for and the supply of financial services. The demand for banks and financial services is an endogenous outcome of the size and structure of the real economy. When wealth is highly concentrated, and the overall level of development is low, demand for banks is modest[21]; but, as economies grow, and wealth becomes more widely distributed, demand for bank and financial services increases (Haber, 2008). However, according to Haber (2008), bank and financial service supply and demand depend on four factors: *expropriation, contract enforcement, imprudent bankers, and political institution centrality.*

In order to eliminate or reduce the problem of expropriation, the only solution for a country is to creation political institutions that limit the authority and discretion of government (for example, when the central bank is independent). Alesina et al.(2003), and Easterly and Levine (2003), argue that in economies where there are major ethnic differences, the ruling group tends to implement policies that expropriate resources, and to restrict the rights of other ethnic groups. In the same vein, Fafchamps (2001) shows, in a study on Kenya, Tanzania, Zambia and Zimbabwe, that in the case of "trade credit usage", there is an ethnic bias among manufacturing firms. The direction of this bias is, in general, detrimental to entrepreneurs of African descent, but favourable to entrepreneurs originating from outside Africa. In this study, statistical discrimination and network effects can exclude certain firms from credit markets and from "normal" commercial practices. Black entrepreneurs and female-headed firms appear to have a harder time obtaining supplier credit, but ethnicity and gender play no significant role in having access to bank overdrafts and formal loans.

The problem of contract enforcement: For an extensive financial system to exist in a country, property rights must be transparent and enforceable at low cost (La Porta and Sivanes 1998; Levine 1999, Beck, Levine and Loayza (2000)). In countries where the judicial system facilitates contracts between private agents, and protects the rights of property and investors,

[19] This is an index which aggregates previous creditor rights. The index ranges from 0 to 4.
[20] This is the minimum mandatory percentage of total share capital required to avoid the dissolution of an existing firm.
[21] Gini coefficient of income inequality can be use to measure this situation.

savers are more inclined to invest in financial markets The country must have laws and rules which give guarantees to debtors and banks (a property register, a law regarding bankruptcy and foreclosure, a police force with the power of coercion). Countries with effective legal systems, and whose financial systems offer lower interest, are more efficient (Demirguc-Kunt, Laeven and Levine, 2005).

In what concerns the enforcement of laws, La Porta and Lopez de Silvanes (1998) consider the quality of legal rule enforcement, as well as that of their accounting systems. Do laws give enough investor protection, especially as regards corporate bankruptcy/ reorganization? These authors use five indicators, plus an index of the quality of a country's accounting standards[22]; the efficiency of its judicial system[23]; the rule of law[24]; the level of corruption[25]; the risk of expropriation[26]; and the likelihood of governmental contract repudiation[27].

For all these points, the quality of financial institutions matters but so, too, does the particular type of religion. For Stulz and Williamson (2003), religion and culture influence financial development, so that Catholic and Muslim countries maintain, for example, more controls, and limit competition and private property rights. Consequently, we also include a dummy variable to indicate whether or not Islamic law matters in a particular coountry.

The problem of imprudent bankers: For banks to grow beyond the wealth of their initial shareholders, they must attract the wealth of outsider individuals and firms. These outsiders (depositors) will not deploy their wealth if they fear that bankers might behave imprudently. In order to avoid this, institutions can be created to reduce this risk (reserves against risk). Consequently, in what concerns financial development, the legal and judicial framework do matter.

The centrality of political institutions: Centralized and powerful states are more responsive to, and efficient at, implementing policies that protect the interest of the elite than is the case for decentralized, competitive political systems. As the banking system constitutes a source of finance for government, this means that powerful, centralized states are more sensitive to bank system control and tend to foster bank concentration (Haber 2004, Rajan and Zingales (2003). Governmental financial sources include revenues from taxes on bank capital or bank profits, dividend income from bank stock, and the mandatory purchase of government bonds. Centralized and powerful states are more likely to control these sources of funds to finance

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[22] For La Porta and Lopez de Silvanes (1998), accounting plays a crucial role in corporate governance. If investors are to know anything about the companies they invest in, basic accounting standards are needed to render company disclosures interpretable.

[23] This index, an assessment of the "efficiency and integrity of the legal environment as it affects business", is produced by Business International Corporation.

[24] This index, an assessment of the law and order tradition in the country, is produced by International Country Risk.

[25] This index, an assessment of corruption in government, is produced by International Country Risk.

[26] This index, an assessment of "outright confiscation" or "forced nationalization", is produced by International Country Risk.

[27] This index is created by examining and rating companies on their inclusion or omission of 90 items including general information, income statements, balance sheets, fund flow statements, accounting standards, stock dates.

their debt. The amount of the national debt, as well as its financing by securities or credits[28], and the size of securities markets, are good indicators of financial depth.

In this respect, relations between the financial system and government are crucial. On the one hand, central banks, which apply the country's monetary policy, are relatively independent of governments. On the other hand, intensity of competition between banks is determined by politics, and the government relies on banks and markets to provide it with a source of funds (national debt can be financed by monetary financing or by bond markets). The growth of both banks and securities markets is not possible without a government that ensures the enforcement of financial contracts. The interest conflict between these agents has a strong influence on financial development.

Equally, government policy influences financial development. In order to promote a well-functioning financial system, governments must ensure a stable political and macroeconomic environment, because instability and corruption[29] have negative effects on the business environment, financial development and growth (Detragiache, Gupta and Tressel, 2005; Ayyagari, Demirguc-Kunt and Maksimovic, 2005). Monetary policy choices also affect financial development, and empirical studies show that lower and stable inflation rates permit higher levels of financial development (banks and stock markets) (Boyd, Levine and Smith, 2001). When state-owned banks are predominant - which is often the case in LDCs - the financial system is less developed, more concentrated, and countries are more likely to face systematic risks (La Porta et al 2002).

4 Econometric relationships between Growth Financial Development and institutions: a co-integration analyse

In this section, in the first step we verify relationships between growth and financial development measured by Stock Market Capitalization (SMC) and Total Bank Assets (TBA)[30]. We use a panel consisting of emerging countries covering the period 1984 to 2005. For this purpose, data on annual frequency has been acquired through the WDI 2010 Database[31]. Growth is measured in percentage of GDP and is transformed in logarithms (notes Growth). Market Capitalization (noted SMC) and Total Bank Assets (TBA) are measured in percentage to GDP at constant 2000 prices and are also transformed in logarithms. In order to analyse long-terme relationship we use unit roots technics and cointegration tests. In the second step we introduce institutions in analyse.

3.1 Units roots and cointegration tests.

The first step in a unit root and cointegration analyses is to test whether the variables are nonstationary or not. In testing pooled balanced data for unit roots one usually comes across

[28] In our empirical study we introduce the amount of public debt financed by securities.
[29] In our empirical study we introduce corruption indicators.
[30] We choose these two variables because there are used in numerous studes to measure size of provate financial market.i
[31] WDI online.

with the Levin, Lin Chu test (2002) (noted LLC), Im, Pesaran and Shin test (2003), (noted IPS) and the residual-based Lagrange Multiplier test by Hadri (2000), (noted LMH).

Consider the following determination of variable y :

$y_{i,t} = \rho i\, y_{i,t-1} + \xi i\, z'_{i,t} + u_{i,t}$ $\quad i = 1,\ldots,N$ and, $t = 1,\ldots, T$,

Where is an autoregressive term with lag 1, zi,t is the deterministic component and ui,t is the error term. The deterministic component zi,t could be zero, one, units and/or time effects as well as a time trend.

First generation tests, are designed for panel that are cross-sectionnally independent, i.e. the stationnary processes $u_{i,t}$ and $u_{j,t}$ are stochastically independent for $j \neq i$[32]. In this vein of test, the LLC test assumes that each autoregressive (AR) coefficient is the same for all units, $\rho i = \rho$, that the error term $u_{i,t}$ is a stationary process and that units are independant acrros sections. LLC proposes three different specifications on the deterministic component $z_{i,t}$ and therefore on $y_{i,t}$ in equation (2) has :

- no deterministic component (zi,t = 0) : $y_{i,t} = \rho i\, y_{i,t-1} + u_{i,t}$ (AR(1))
- an individual specific component (zi,t = 1) :$y_{i,t} = \rho i\, y_{i,t-1} + \xi i + u_{i,t}$ (AR(1) + derive)
- an individual specific component and a time trend ($z_{i,t} = (1,t)$): $y_{i,t} = \rho i\, y_{i,t-1} + \xi i\, z'_{i,t} + u_{i,t}$ (AR(1) + trend + derive).

Testing for unit roots, the LLC test proposes a null hypothesis H0: $\rho i = 1$ (nonstationary) for all i=1,..., N against the homogenous alternative hypothesis that all individual series in the panel data are stationary. H1 : $\rho i = \rho < 1$ for all i= 1, ..., N

Relaxing the restrictive assumption of homogeneous ρ accross units assumed by the LLC tests, the IPS test allow for heterogeneous autoregressive coefficients: ρi. Im, Pesaran and Shin (1997) test considers a fixed individual effects model, without deterministics trend. The genral IPS setting is based on averaging individual units roots test statistics and assume that the error term is serially correlated across-sectional units[33]. Moreover, there might be an individual-specific intercept ($z_{i,t} = 1$) or/and a time trend ($z_{i,t} = (1,t)$). IPS test considers that there are two types of individuals in the panel: Those for which the variable is stationary and those for which not. However, the IPS testing procedure examines the null hypothesis: H0 : $\rho i = 1$ (nonstationary) of each series has a unit root against the alternative hypothesis H1 : $\rho i < 1$ (stationary) of at least one individual series in the panel is stationary.

Finally, LMH limits the determination of $y_{i,t}$ in equation (2) to a random walk of part of the error term $u_{i,t}$ and to a deterministic component $z_{i,t}$, which could be one or a time trend.

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[32] This assumption facilitates tests

[33] $Ui,t = \sum \psi\, ui,t-j + v,t$, Whereas ui,t is IID $(0, \sigma_u^2)$ and vi,t is a stationary process.

$y_{i,t} = \xi i\, z'_{i,t} + u_{i,t}$ (2)'

There is no lagged autoregressive term of $y_{i,t}$ in equation (2) and $\rho i = 0$.

In this specification, where $u_{i,t} = \sum \psi\, u_{i,t-j} + v_{i,t}$, (uit is IID $(0, \sigma_u^2)$ and $v_{i,t}$ is a stationary process), $v_{i,t}$ is assumed to either homogenous (vt~IID $(0, \sigma_u^2)$), or heterogenous (vit~IID $(0, \sigma i_u^2)$) across units to be serial correlated.[34] The LMH test assumes that each time series is level trend stationary (H0 : stationary) against the alternative hypothesis of unit root in panel data (H1 : nonstationary)[35].

In order to test for the long-run cointegration relationship, we can use the resulting error terms from the error correction model (ECM) or cointegration test proposed by Kao (1999), MacCoskey and Kao (1998) and Pedroni (1995). In the case of ECM, the first step is to estimate long – run equilibrium values in levels by removins units as well as time effects. The resulting residuals (error correction term) are used in the second step to estimate the Ec model, which is the difference of the long-run values augmented by the lagged error correction term as well as the lagged endogenous variables[36]. The t-statistic of the lagged error correction term indicates wheather it is significantly different than zero which mean that a cointegration relationship amongst variables exists. Once can also extracts the residual term from the ECM and to apply unit root tests for stationary.

In the second case there are several tests as the DF and the ADF tests proposed by Kao (1999), as well as the Phillips and Perron test of Pedroni (1995) [37], or the LMH tested by McCoskey and Kao (1998)[38].

3.2 Empirical studies and results.

Moreover, since variables are clearly trending, we follow literature and model growth with a linear time trends in theirs levels. The basic model we postulate (for cointegration estimations) is the following simple log linear relationship between Growth and Market Capitalization (or Total Asset Banks or institutions)[39].

$$LogGrowth_i - \mu_i - \tau_{it} t - \lambda i LogSMC_{it} = \upsilon_{it} \quad (1)$$

$$LogGrowth_i - \mu_i - \tau_{it} t - \lambda i LogTBA_{it} = \upsilon_{it} \quad (2)$$

LogGrowth

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[34] In this case the IID assuption is relaxed.

[35] For these tests, asymptotic normal inference can be estabilised by using sequantial limit theory with $T \rightarrow \infty$ and $N \rightarrow \infty$. The LLC and IPS require that $N \rightarrow \infty$ such as $N/T \rightarrow 0$, in finite sample. However, in finit sample there are size distorsions if N is small or N is large relative to T.

[36] It is the same process for time series when we use Granger's methodology.

[37] In thess cases residuals are derived by OLS estimation of the cointegration variables.

[38] In these cases residuals are derived by DOLS estimation of the cointegration variables. DOLS : Dynamic OLS estimaors performs better in estimating the panel equation than OLS

[39] we use "investment profile" and "governement stability) which are two indexes produced by International Country Risk

LogGrowth

Where SMC is the variable Stock Market Capitalization, TAB is the variable Total Bank Assets, GS is variable Governement stability and IP is variable Investment Profile

The index i= 1,…,N indicates the country[40] and t=1,…, T is the time index. In our application N = 22 and T = 21 (1984 to 2005). In this homogenous formulation heterogeneity across countries is only included via the individual specific intercepts μ_i, (if contained) linear time trends $\tau_{it}t$ and heterogeneity of the υ_{it} [41].

3.2.1: Stationary results

The following panel unit root tests were computed: Levin, Lin and Chu (2002),Im, Pesaran and Shin (2003), Maddala and Wu (1999) and Choi's (2001) Fisher-type test (augmented Dickey- fuller and Phillips-Perron) and the test by Hadri (2000). All this tests (except Hadri test) have the hypothesis for the presence of unit roots as their null.

The results are given in table 2 through to table 6', where two types of test are presented : assuming either individual intercepts (fixed effects) or both individual intercepts and individual trends.

[40] Country list is in annex 2.

[41] We assume cross- sectional homogeneity, i.e., $\lambda i = \lambda$ for i = 1, …, N

Table 2 : Panel unit roots : Growth

Test	Exogenous variables
Levin, Lin and chu (LLC)[42] H0: Unit root (common unit root process)	Deterministics chosen: intercepts & trend coefficient t-value t-star P > t -0.96185 -17.449 -7.67177 0.0000
	Deterministics chosen: intercepts coefficient t-value t-star P > t -0.82203 -15.599 -8.85906 0.0000
Im, Pesaran and Shin (IPS) [43] H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend t-bar cv10 cv5 cv1 W[t-bar] P-value -3.535 -2.410 -2.480 -2.620 -6.951 0.000
	Deterministics chosen: constant t-bar cv10 cv5 cv1 W[t-bar] P-value -3.284 -1.780 -1.850 -1.990 -8.531 0.000
ADF Fisher-type (Maddala and Wu)[44] H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 130.4612 Prob > chi2 = 0.0000
	Deterministics chosen: constant chi2(40) = 168.2913 Prob > chi2 = 0.0000
Phillipd-Perron Fisher-type (Maddala and Wu)[45] H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 161.0145 Prob > chi2 = 0.0000
	Deterministics chosen: constant chi2(40) = 216.8607 Prob > chi2 = 0.0000

[42] The test assumes that each individual unit in the panel shares the same AR(1) coefficient, but allows for individual effects, time effects and possibly a time trend. Lags of the dependent variable may be introduced to allow for serial correlation in the errors. The test may be viewed as a pooled Dickey-Fuller test, or an Augmented Dickey-Fuller (ADF) test when lags are included, with the null hypothesis that of nonstationarity (I(1) behavior). After transformation by factors provided by LLC, the t-star statistic is distributed standard normal under the null hypothesis of nonstationarity (Stata)

[43] IPS estimates the t-test for unit roots in heterogeneous panels developed by Im, Pesaran and Shin (IPS, 1997). It allows for individual effects, time trends, and common time effects. Based on the mean of the individual Dickey-Fuller t-statistics of each unit in the panel, the IPS test assumes that all series are non-stationary under the null hypothesis. Lags of the dependent variable may be introduced to allow for serial correlation in the errors. The exact critical values of the t-bar statistic are given in IPS. After transformation by factors provided in the paper (available for no more than 8 lags on any series), the Psi[t-bar] statistic is distributed standard normal under the null hypothesis of nonstationarity (Stata)

[44] ADF Fisher-type combines the p-values from N independent unit root tests, as developed by Maddala and Wu (1999). Based on the p-values of individual unit root tests, Fisher's test assumes that all series are non-stationary under the null hypothesis against the alternative that at least one series in the panel is stationary. Unlike the Im-Pesaran-Shin (1997) test, Fisher's test does not require a balanced panel (Stata).

[45] PP Fisher-type indicates that the Phillips-Perron test is used rather than the Augmented Dickey Fuller dfuller (Stata).

Table 2' : Panel unit roots : Growth

Hadri (2000)[46] panel unit root test for growth with 22 observations on 20 cross-sectional units				
eps	Z(mu)	P-value	Z(tau)	P-value
Homo	1.278	0.1005	2.238	0.0126
Hetero	2.634	0.0042	2.945	0.0016
SerDep	1.964	0.0248	10.140	0.0000
H0: all 20 timeseries in the panel are stationary processes				
Homo: homoskedastic disturbances across units				
Hetero: heteroskedastic disturbances across units				
SerDep: controlling for serial dependence in errors				

Table 3 : Panel unit roots : Stock Market Capitalization

Test	Exogenous variables
Levin, Lin and chu (LLC) H0: Unit root (common unit root process)	Deterministics chosen: constant & trend coefficient t-value t-star P > t -0.45058 -9.427 -1.62285 0.0523
	Deterministics chosen: constant coefficient t-value t-star P > t -0.28165 -7.646 -2.17479 0.0148
Im, Pesaran and Shin (IPS) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend t-bar cv10 cv5 cv1 W[t-bar] P-value -1.953 -2.410 -2.480 -2.620 1.115 0.868
	Deterministics chosen: constant t-bar cv10 cv5 cv1 W[t-bar] P-value -1.655 -1.780 -1.850 -1.990 -0.677 0.249
ADF Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 27.3941 Prob > chi2 = 0.9352
	Deterministics chosen: constant chi2(40) = 25.5606 Prob > chi2 = 0.9630
Phillipd-Perron Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 43.9636 Prob > chi2 = 0.3074
	Deterministics chosen: constant chi2(40) = 27.6864 Prob > chi2 = 0.9297

[46] hadrilm performs a test for stationarity in heterogeneous panel data (Hadri, 2000). This Lagrange Multiplier (LM) test has a null of stationarity, and its test statistic is distributed as standard normal under the null. The series may be stationary effect) or around a unit-specific deterministic trend. The error process may be assumed to be homoskedastic across the panel, or heteroskedastic across units. The residual-based test is based on the squared partial sum process of residuals from a demeaning (detrending) model of level (trend) stationarity. (Stata)

Table 3' : Panel unit roots : Stock Market Capitalization

Hadri (2000) panel unit root test for capitali with 22 observations on 20 cross-sectional units				
eps	Z(mu)	P-value	Z(tau)	P-value
Homo	27.424	0.0000	22.145	0.0000
SerDep	5.029	0.0000	7.889	0.0000
H0: all 20 timeseries in the panel are stationary processes				
Homo: homoskedastic disturbances across units				
Hetero: heteroskedastic disturbances across units				
SerDep: controlling for serial dependence in errors				

Table 4 : Panel unit roots : Total Asset Banks

Test	Exogenous variables
Levin, Lin and chu (LLC) H0: Unit root (common unit root process)	Deterministics chosen: constant & trend coefficient t-value t-star P > t -0.41857 -10.800 -2.82235 0.0024
	Deterministics chosen: constant coefficient t-value t-star P > t -0.20430 -7.525 -2.93797 0.0017
Im, Pesaran and Shin (IPS) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend t-bar cv10 cv5 cv1 W[t-bar] P-value -2.048 -1.780 -1.850 -1.990 -2.574 0.005
	Deterministics chosen: constant chi2(40) = 45.0450 Prob > chi2 = 0.2690
ADF Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 58.6415 Prob > chi2 = 0.0288
	Deterministics chosen: constant Prob > chi2 = 0.7666
Phillipd-Perron Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 33.2381 Prob > chi2 = 0.7666
	Deterministics chosen: constant & trend chi2(40) = 49.0076 Prob > chi2 = 0.1554

Table 4' : Panel unit roots : Total Asset Banks

Hadri (2000) panel unit root test for TAB				
eps	Z(mu)	P-value	Z(tau)	P-value
Homo	20.764	0.0000	15.352	0.0000
Hetero	21.275	0.0000 1	9.962	0.0000
SerDep	3.673	0.0001	8.335	0.0000
H0: all 20 timeseries in the panel are stationary processes				
Homo: homoskedastic disturbances across units				
Hetero: heteroskedastic disturbances across units				
SerDep: controlling for serial dependence in errors				

Table 5 : Panel unit roots : Investment Profile

Test	Exogenous variables
Levin, Lin and chu (LLC) H0: Unit root (common unit root process)	Deterministics chosen: constant & trend coefficient t-value t-star P > t -0.49567 -13.195 -4.87633 0.0000
	Deterministics chosen: constant coefficient t-value t-star P > t -0.32808 -10.483 -4.96499 0.0000
Im, Pesaran and Shin (IPS) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend t-bar cv10 cv5 cv1 W[t-bar] P-value -2.764 -2.410 -2.480 -2.620 -3.021 0.001
	Deterministics chosen: constant t-bar cv10 cv5 cv1 W[t-bar] P-value -2.321 -1.780 -1.850 -1.990 -3.888 0.000
ADF Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 95.5212 Prob > chi2 = 0.0000
	Deterministics chosen: constant chi2(40) = 53.2551 Prob > chi2 = 0.0783
Phillipd-Perron Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 61.2513 Prob > chi2 = 0.0169
	Deterministics chosen: constant chi2(40) = 43.6939 Prob > chi2 = 0.3174

Table 4' : Panel unit roots : Investment Profile

Hadri (2000) panel unit root test for IP				
eps	Z(mu)	P-value	Z(tau)	P-value
Homo	32.529	0.0000	15.170	0.0000
Hetero	25.409	0.0000	13.711	0.0000
SerDep	5.034	0.0000	9.063	0.0000
H0: all 20 time series in the panel are stationary processes				
Homo: homoskedastic disturbances across units				
Hetero: heteroskedastic disturbances across units				
SerDep: controlling for serial dependence in errors				

Table 6 : Panel unit roots : Governement Stability

Test	Exogenous variables
Levin, Lin and chu (LLC)[47] H0: Unit root (common unit root process)	Deterministics chosen: constant & trend coefficient t-value t-star P > t -0.53674 -12.914 -5.50112 0.0000
	Deterministics chosen: constant coefficient t-value t-star P > t -0.45064 -11.534 -5.83581 0.0000
Im, Pesaran and Shin (IPS) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend t-bar cv10 cv5 cv1 W[t-bar] P-value -2.816 -2.410 -2.480 -2.620 -3.285 0.001
	Deterministics chosen: constant t-bar cv10 cv5 cv1 W[t-bar] P-value -2.596 -1.780 -1.850 -1.990 -5.214 0.000
ADF Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 67.2084 Prob > chi2 = 0.0045
	Deterministics chosen: constant chi2(40) = 38.9364 Prob > chi2 = 0.5180
Phillipd-Perron Fisher-type (Maddala and Wu) H0: Unit root (individual unit root process)	Deterministics chosen: constant & trend chi2(40) = 34.2738 Prob > chi2 = 0.7251
	Deterministics chosen: constant chi2(40) = 27.6302 Prob > chi2 = 0.9308

Table 6' : Panel unit roots : Governement stability

Hadri (2000) panel unit root test for GS				
eps	Z(mu)	P-value	Z(tau)	P-value
Homo	32.300	0.0000	13.747	0.0000
Hetero	29.423	0.0000	12.677	0.0000
SerDep	4.397	0.0001	8.722	0.0000
H0: all 20 timeseries in the panel are stationary processes				
Homo: homoskedastic disturbances across units				
Hetero: heteroskedastic disturbances across units				
SerDep: controlling for serial dependence in errors				

The evidence from the levels data is somewhat mixed if a high level of significance is aimed in the hypothesis testing in the case of Growth, Investment profile and Governement stability. Results should hardly be interpreted as as pointing to an I(0) process ("It is hard to detct nonstationary in short times series" : Houskova and Wagner (2006)). However, the

[47] The test assumes that each individual unit in the panel shares the same AR(1) coefficient, but allows for individual effects, time effects and possibly a time trend. Lags of the dependent variable may be introduced to allow for serial correlation in the errors. The test may be viewed as a pooled Dickey-Fuller test, or an Augmented Dickey-Fuller (ADF) test when lags are included, with the null hypothesis that of nonstationarity (I(1) behavior). After transformation by factors provided by LLC, the t-star statistic is distributed standard normal under the null hypothesis of nonstationarity (Stata)

conclusion about the presence of unit roots in the levels data may be adopted. The Hadri test supports and interpretation that all variables exibit units roots in the levels.

However, the same panel unit root are applied to first-diference data. Annex 2 shows that in their first-difference variables are stationary for the panel of 22 countries.

3.2.2: Cointegration results

As the prevailing evidence is that variables may not be stationary in their level but rather I(1), we proceed to the panel cointegration tests.

We use the Westerlund (2007) methodology that implements the four panel cointegration tests. The underlying idea is to test for the absence of cointegration bydetermining whether there exists error correction for individual panel members or for the panel as a whole. Consider following error correction modelwhere all variables in levels are assumed to be I(1):

Tests provide (Stata) an estimate of the speed of error-correction (ai) towards the long run equilibrium

The Ga and Gt test tatistics test H0: a_i = 0 for all i versus H1: ai < 0 for at least one i. These statistics start from a weighted average of the individualy estimated ai 's and their t-ratio's respectively. Rejection of H0 should therefore be taken as evidence of cointegration of at least one of the cross-sectional units.

The Pa and Pt test statistics pool information over all the cross-sectional units to test H0: ai = 0 for all i vs H1: ai < 0 for all i. Rejection of H0 should therefore be taken as evidence of cointegration for the panel as a whole.

If the cross sectional units are suspected to be correlated, robust critical values can be obtained through bootstrapping (Stata)

Table 7 Cointegration tests for : Growth - SMC

Statistic	Value	Z-value	P-value	Robust P-value Bootstrapping critical values under H0.
Gt	-3.511	-6.299	0.000	0.000
Ga	-15.997	-2.621	0.004	0.020
Pt	-15.455	-6.869	0.000	0.000
Pa	-15.446	-4.751	0.000	0.020

H0: no cointegration

Table 8 : Cointegration tests for : Growth - TAB

Statistic	Value	Z-value	P-value	Robust P-value Bootstrapping critical values under H0.
Gt	-3.231	-4.757	0.000	0.000
Ga	-15.364	-2.205	0.014	0.010
Pt	-14.887	-6.220	0.000	0.000
Pa	-15.431	-4.739	0.000	0.010

H0: no cointegration

Table 9 : Cointegration tests for : Growth - IP

Statistic	Value	Z-value	P-value	Robust P-value Bootstrapping critical values under H0.
Gt	-2.881	-2.834	0.002	0.040
Ga	-13.874	-1.225	0.110	0.060
Pt	-12.463	-3.449	0.000	0.020
Pa	-12.875	-2.876	0.002	0.040

H0: no cointegration

Table 9 : Cointegration tests for : Growth - GS

Statistic	Value	Z-value	P-value	Robust P-value Bootstrapping critical values under H0.
Gt	-2.881	-2.834	0.002	0.040
Ga	-13.874	-1.225	0.110	0.060
Pt	-12.463	-3.449	0.000	0.020
Pa	-12.875	-2.876	0.002	0.040

H0: no cointegration

The test results show that there is panel cointegration between variables and growth and that the associated are not spurious[48]. Consequently, the estimated coefficients can be interpreted as ones representing long-term relationships between the variables IP, GS, SMC, TAB and Growth.

Starting with only a bivariate model and expanding the model subsequently, the results (OLS with fixed effects) are indicated in table 10

[48] The cointegration test also pointed to the inclusion of 1 lag in all cases.

Table 10 OLS estimate results

	Model 1	Model 2	Model 3	Model 4
Dependant variable Growth	Coef.	Coef.	Coef.	Coef.
SMC	.0101571 1.71***	.0108149 1.89**	.0104472 1.76**	.0113599 1.86**
TAB		0.0584325 5.81*	0.0584265 5.80*	.057645 5.68*
IP			.0261878	.0792658 0.56
GS				-.0796335 -0.67
_cons	4.068773 15.14*	7.909909 11.14*	7.74492 0.22	7.902072 7.52*
Fisher test Fixed effects test that all u_i=0:	test that all u_i=0: F(19, 419) = 4.49 Prob > F = 0.0000	test that all u_i=0: F(19, 418) = 6.56 Prob > F = 0.0000	test that all u_i=0: F(19, 417) = 6.54 Prob > F = 0.0000	test that all u_i=0: F(19, 416) = 6.55 Prob > F = 0.0000

In all the models, SMC and TAB are significant (at level 8% and 1%) and positive, indicating financial development promotes growth. But in all models IP and GS are not significant. Institutions do not matter for growth.

Data on Banks and Finance

	Variables	Description	Sources
Financial depth	Gdp	GDP constant $US 2000	WDI 2008
	Gini	Gini index	WDI 2008
	Inflation	Inflation, consumer prices (annual %)	WDI 2008
	GdpDeflat	Inflation, GDP deflator (annual %)	WDI 2008
	Interest	Interest rate spread (lending rate minus deposit rate)	WDI 2008
	M3	Liquid liabilities (M3) as % of GDP	WDI 2008
	M2	Money and quasi money (M2) as % of GDP	WDI 2008
	MarketCapi	Market capitalization of listed companies (% of GDP)	WDI 2008
	Risk	Risk premium on lending (%)	WDI 2008
	Credit_d	Domestic credit provided by banking sector (% of GDP)	WDI 2008
	Credit_p	Domestic credit to private sector (% of GDP)	WDI 2008
	FDI	Foreign direct investment, net inflow (Bop, current US$)	WDI 2008
	FDI_in	Foreign direct investment, net inflows (% of GDP)	WDI 2008
	FDI_out	Foreign direct investment, net outflows (% of GDP)	WDI 2008
Legal origin of law	Leg_Uk	UK origin of law	Laporta et al. (1999)
	Leg_Fr	French origin of law	Laporta et al. (1999)
	Leg_Ger	German origin of law	Laporta et al. (1999)
	Leg_Scan	Scandinavian origin of law	Laporta et al. (1999)
	Leg_Other	Islamic, Hebraic or traditionalist origin of law	Laporta et al. (1999)
	Civilcommonlaw	Civil or common law origins - Constructed variable	Constructed variable
	Islamiclaw	Islami origin of law - Constructed variable	Laporta et al. (1999)
	Protestant	The percentage of Protestant population in the country in 1997	Laporta et al. (1999)
Shareholder protection	Rule	Rule of law, from 0 to 10	Laporta et al. (2004)
	Independence	Judicial independence, average of three variables : (i) tenure of Supreme court judges ; (ii) tenure of administrative court judges ; (iii) case law	Laporta et al. (2004)

	Judicial	Efficiency of judicial system, from 0 to 10 - Laporta et al. (2004)	Laporta et al. (2004)
	Proportional	Proportional representation - Laporta et al. (2004)	Laporta et al. (2004)
	ICRGind	ICRG corruption index, from 0 to 6 where higher scores indicate less corruption	International Country Risk Guide
	Kind	Kaufmann corruption index, from -2,5 to +2,5 where higher scores indicate better governance	Kaufmann et al. (2008)
	TICind	Transparency international corruption perceptions index, from 0 to 10, where higher scores indicate less corruption - Transparency.org	Transparency.org
	HFCind	Heritage Foundation corruption index, from 0 to 100, where higher scores indicates less corruption	Heritage.org
	GCRind	Global Competitiveness Report index of corruption, from 0 to 7, where higher scores indicate less corruption	International Country Risk Guide
	Bribes	Percentage of firms that report "paying bribes to get things done"	World Bank, Enterprise Surveys
	Oneshare	One-share / One-vote rule	Laporta et al. (1999)
	Oppression	Legal mechanism against perceived oppression by directors	Laporta et al. (1999)
	Mail	Vote by mail during corporate decision-making process	Laporta et al. (1999)
	Preemp	Preemptive rights for new issues	Laporta et al. (1999)
	Cumulat	Cumulative voting for directors, or mechanisms of proportional representation on the board	Laporta et al. (1999)
	Esmvotes	Percentage of share capital needed to call an extraordinary shareholders' meeting	Laporta et al. (1999)
	Mandatory	Right to a mandatory dividend	Laporta et al. (1999)
	Blocked	Shares blocked before meeting	Laporta et al. (1999)
	Exprop	Risk of expropriation by management, from 0 to 10	Laporta et al. (1999)
	Antidir	Anti-director right index (measures how strongly the legal system favours minority shareholders versus managers or dominant shareholder in the corporate decision-making process), from 0 to 6 - Laporta et al. (1999)	

Investor protection	StayOnAss	No automatic stay on assets	Laporta et al. (1999)
	Chap11	The reorganization procedures impose restrictions (such protection is called Chapter 11 in the USA)	Laporta et al. (1999)
	Man_stay	An official appointed by the court or by creditors is responsible for the operation of the business during reorganization OR the debtor does not keep the administration of the property pending the resolution of the reorganization	Laporta et al. (1999)
	Profits	Percentage of Profits required for Legal reserve	Laporta et al. (1999)
	Creditor	Index which aggregates previous creditor rights, from 0 to 4	Laporta et al. (1999)
	Accounting	Accounting Standards index, which measures the quality of a country's accounting standards	Laporta et al. (1999)
	RepudIndex	Likelihood of contract repudiation by government	Laporta et al. (1999)

Annex 2

Country list	
Algérie	Pakistan
Argentine	Paraguay
Brésil	Pérou
Chili	Philippine
Chine	Singapour
Egypte	Thaïlande
Inde	Tunisie
Indonésie	Turquie
Malaisie	Uruguay
Mexique	
Pakistan	

Annex 3

Correlation Matrix

	Growth	SMC	GS	IP	tab
Growth	1.0000				
SMC	0.1973	1.0000			
GS	0.0799	0.3406	1.0000		
IP	0.0837	0.3526	0.5645	1.0000	
TAB	0.1283	0.4504	0.2440	0.1424	1.0000

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