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À mon seigneur ***ALLAH****,*
À toute ma famille,
À tous mes enseignants,
À tous mes amis,
Et À tous ceux qui me sont chers

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Résumé

Cette thèse examine (i) l'impact du secteur bancaire et des marchés financiers sur la croissance économique, (ii) l'effet de la qualité institutionnelle sur la détermination du développement financier, (iii) Comment la qualité des institutions affecte la relation entre le développement financier et la croissance économique. A cette fin, nous construisons un indice de qualité institutionnel pour les pays de la région MENA. Appliquant la méthode d'estimation des moindres carrés généralisés (MCG) pour un échantillon de 18 pays de la région MENA pour la période de 1984-2007 nous constatons que ni le secteur bancaire ni les marchés financiers ne contribuent à la croissance économique et qu'ils l'affectent même négativement. Adoptant l'approche d'estimation sur données de panel et celle des variables instrumentales (IV) nos résultats montrent l'importance de l'environnement institutionnel dans la détermination du développement financier de la région MENA. En outre, nos résultats montrent que la qualité des institutions a un important effet dans la relation entre développement financier et croissance économique. Plus précisement, elle permet d'atténuer l'effet négatif du développement financier sur la croissance économique. Par conséquent, nos résultats fournissent une évidence empirique, que pour que le développement financier puisse contribuer à la croissance économique, les pays de la région MENA doivent avoir un certain niveau de développement institutionnel. Examinant l'effet non-linéaire de la qualité des institutions sur la relation entre développement financier et croissance économique nos résultats montrent que la relation entre développement du secteur bancaire et croissance économique présente la forme du "U-inversé", par contre cette forme n'est pas observée lorsque les marchés financiers sont considérés.

Mots clés : Croissance économique, Développement du secteur bancaire, développement des marchés financiers, qualité des institutions, région MENA, données de panel.

Abstract

This thesis examines (i) the impact of banks and stock markets on economic growth (ii) the effect of institutional quality in determining financial development and (iii) how institutional quality affects the finance-growth nexus in the MENA region. To this end, we construct a yearly institutional index for MENA countries. Applying the generalized-method-of-moments (GMM) estimators developed for dynamic panel data for a sample of 18 MENA countries over 1984-2007 period, we find that both bank and stock market development are unimportant or even harmful for economic growth. Considering both a panel data and the instrumental variable (IV) approaches of estimation, our results outline the importance of institutional quality in determining financial development in MENA region. Moreover, our results show that institutional quality affects the finance-growth nexus in MENA countries. In fact, it mitigates the negative effect of financial development on economic growth. Therefore, our results provide empirical evidence that in order for financial development to contribute to economic growth, MENA countries must possess certain level of institutional quality. Examining the non-linear effect of institutional quality on the finance-growth nexus, our results show that banking sector development and growth exhibit an inverted-U shaped relationship. However, we do not find the same pattern in the stock market-growth relationship.

Keywords: Banking sector development, stock market development, economic growth, institutional quality, MENA region, panel data.

Contents

Introduction

The fundamental question in economic growth that has preoccupied researchers is why do countries grow at different rates. Addressing this question, an important strand of literature has paid special attention to the role of the financial system in the growth process. On the theoretical side, an important battery of models articulates mechanisms by which the financial system affects economic growth (e.g. McKinnon (1973) and Shaw (1973), Pagano (1993) and King and Levine (1993a), King and Levine (1993b)). These studies support the Schumpeterian's view, which emphasizes the positive role of financial development in determining economic growth.

However, Robinson (1952) provides a skeptical view stressing that financial development follows economic growth by declaring that *" where enterprise leads finance follows"* Robinson (1952)(p86). This view is echoed by Lucas (1988) which believes that the finance-growth relationship is not important. Hence, he asserts that economists tend to overemphasize the role of financial factors in economic growth.

Theory also provides conflicting predictions about the role of different sub-components of financial system on economic growth. Some theories emphasize the relevance of banking system on economic growth, while others highlight the benefits of stock markets[1].

On the empirical side, using different econometric methodologies, empirical results provide evidence that a range of financial indicators have a significant and a positive effect on economic growth [2].
Moreover, convincing evidence that financial system constitutes a potentially important mechanism for economic growth will underscore the need for a deeper understanding of the sources of financial development. Therefore the question of what determine financial development has emerged.

[1] Allen and Gale 1999, Boot and Thakor 1997.

[2] The early empirical evidence include: King and Levine (1993a) King and Levine (1993b) , Goldsmith (1969), Atje and Jovanic (1993. The recent empirical evidences include: Beck and Levine (2004), Dematrades and Law (2006), Hasan et al.(2009 a, b)

To address the last question, an important strand of literature has paid special attention to a particular set of institutions, most notably the legal system. Its roots can be traced in the work of La Porta *et al.* (1997) and La Porta *et al.* (1998) on how the legal rules affect financial development. In fact, weak legal systems and poor institutional environment impede financial development. For a market to function well, firms must be able to rely on the enforceability of contracts. That is, a strong institutional environment contributes to solving private contractings conflicts and information asymmetries (Fernández *et al.* (2010)).

We contribute to these strand of literature by examining the finance-growth nexus in Middle East and North African (MENA) countries. Several reasons motivate the choice of MENA countries to perform our empirical investigations. Indeed, few studies have focused on this region, and the main findings of these studies are that while MENA countries have embarked since the mid-1980 on to financial reforms, financial development has not worked as an engine of economic development in this region (Ben Naceur and Ghazouani (2007)). The growth performance of the MENA region over the past two decades or so has been rather disappointing. The region as a whole experienced the weakest real per capita growth performance among all regions in the world (Nabli and Véganzonèse-Varoudakis (2004), Bhattacharya and Wolde (2010))

Our research also extends previous evidence showing the finance growth relationship differs along with the level of institutional development. With this in mind, several question arise as follows:

- Can the banking sector and stock market stimulate economic growth in MENA region?
- What is the effect of institutional quality on financial development in MENA region?
- How do the institutional conditions affect the positive (or negative) finance-growth nexus in the MENA region?

To give responses to these questions our thesis is organized as follows:

- Chapter I provides a review of the related literature. In the first part, we review theoretical evidence defining the functions of financial system and describing the evolution of theoretical finance-growth thoughts. The second part, reviews different econometric methodologies to assess the relationship between financial development and growth and summarizes the empirical findings.

- Chapter II examines the effect of financial development on economic growth in the MENA region. More specifically we investigate the effect of both banking sector and stock market development on economic growth in a sample of MENA countries over the 1984-2007 period . To this end, we apply the generalized-method-of-moments (GMM) estimators developed for dynamic panel data. The (GMM) estimators are well designed to correct the drawbacks of previous technique of estimation (OLS): simultaneity and omitted bias. Our main results show that financial development is unimportant or even harmful for economic growth in the MENA region. One explanation to these counter-intuitive results may be that the relationship between financial development and economic growth may not be linear, but rather simply be dependent on institutional conditions[3]. Therefore, in the following two Chapters, we investigate the institutional determinants of financial development (Chapter III) and the effect of institutional environment on the finance-growth relationship (Chapter IV).

- Chapter III emphasizes the importance of institutional environment in determining financial development in MENA countries. Therefore, in the first section we present the theoretical and empirical contribution to this question. In the second section, we examine empirically the institutional determinants of financial development in MENA countries. To this end, we construct a yearly institutional index for MENA countries. The results of both Panel data and instrumental variables (IV) techniques of estimations show that while institutional quality appears as a significant determinant of most indicators of financial development, they appear more relevant for banking sector development than for stock market.

- Chapter IV aims to investigate the conditional finance-growth relationship. Specifically, we examine whether the finance-growth nexus is affected by institutional quality. Thus we consider in the first step, an empirical analysis in which the responsiveness of economic growth to financial development depends on an indicator of institutional quality. In the second step, we examine if there is a non-linear effect of the institutional quality on finance-growth relationship which allows for the possibility that, beyond a certain level, *Institutional quality* becomes more or less important in determining the marginal effect of financial development on economic growth. Thus, a quadratic model is estimated in the latest part. Our main findings are that there is a conditional relationship between financial development and economic growth. In fact, in order for financial development to contribute to economic growth, MENA countries must have an important level of institutional quality. The results of the model with the quadratic-interaction

[3]The macro-economic conditions have the subject of some empirical work such as (Deiddaa and Fattouh 2002, Rioja and Valev 2004)

show that while banking sector development and growth support the inverted-U shaped relationship. We do not find this inverted-U shaped relationship in the market-growth relationship.

Chapter 1

Financial Development and Economic Growth: Theory and Evidence

1.1 Introduction

The relationship between financial development and economic growth has been the subject of increasing attention over recent years. Theory gives contradictory predictions about the incidence of financial system development on economic growth. In fact, while some studies have sustained the Shumpeter's view, a skeptical theory has emerged to support the Robinson's view.

To clarify the relationship between financial development and economic growth, an important strand of empirical studies has emerged which goes to the Goldsmith (1969) study. A substantial body of empirical literature suggests that high levels of financial development are crucial in promoting economic growth.

In light of these conflicting views this Chapter provides an overview of the theoretical and empirical evidence on the relationship between financial development and economic growth. In the first part, we present the review of theoretical evidences defining the functions of financial system and describing the evolution of theoretical finance-growth thoughts. The second part, reviews different econometric methodologies to assess the relationship between financial development and growth and summarizes the empirical findings.

1.2 Financial Development and Economic Growth: Theory

In the theoretical Arrow-Debreu World, characterized by a state-contingent claim framework, with no information or transaction costs there is no need for a financial system "*that expends resources researching projects, scrutinizing managers, or designing arrangements to ease risk management and facilitate transaction*"(Levine (2005)p.690). Financial system becomes essential once frictions are introduced in the Arrow-Debreu model. Therefore financial intermediaries and markets have emerged to ameliorate the problems of asymmetric information and high transaction costs. The ability of the financial system to relax these frictions can lead to facilitate the allocation of resources over space and time (Merton and Bodie (1995), Levine (2005)). In arising to ameliorate information, enforcement and transactions costs, the financial system provides several functions through which it contributes to economic growth. These functions are defined in the first part of this section. Then we describe the evolution of the theoretical thinking on finance and growth nexus.

1.2.1 Functions of financial system

In a pair of papers, Levine (1997) and Levine (2005) classifies the functions of financial systems into the following five categories (Figure 1.2.1):

1.2.1.1 Producing information and allocation of capital

To make investment decisions, entrepreneurs face large fixed costs associated with evaluating firms, managers and economic decisions (Levine (2005)). Individuals' savers have very little knowledge about the investment projects involved and the investors have to find out which agents have surplus funds and how much each is willing to lend. Thus, financial systems emerge to produce information in environments in which projects owners have private information concerning their investment opportunities (Boyd *et al.* (2001a)). Greenwood and Jovanovic (1990) stress the role played by intermediaries in collecting and analyzing information. They show that resources channeled through financial intermediaries are allocated more efficiently with positive ramifications on growth. The endogenous growth model developed by Pagano (1993) has also shown that in arising to collect information to evaluate alternative investments projects financial intermediaries increase the productivity of capital, thereby promoting growth. Besides financial intermediaries, financial markets may also improve the resource allocation. In fact, financial markets have an advantage to fund new innovations investments projects since market participants can acquire relevant information on firms quickly (Ang (2008)).

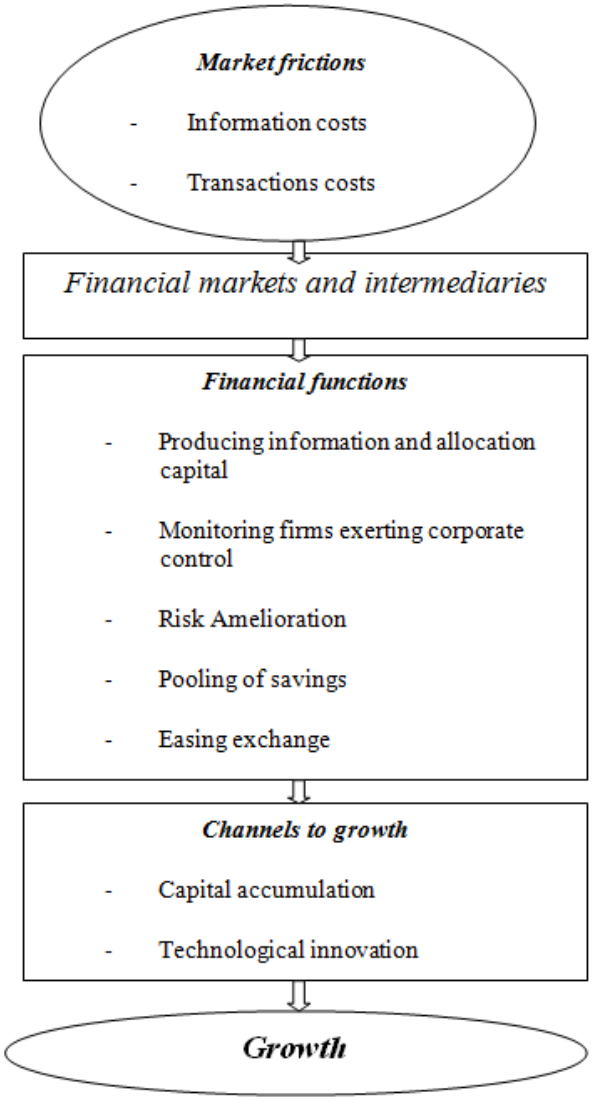

Figure 1.1: **Functions of Financial System**
Source: Levine (1997 p.690)

1.2.1.2 Monitoring firms exerting corporate control

Outside investors face large costs are associated with verifying projects returns (Ang (2008)). Thus, *"financial system emerge to mitigate the information acquisition and enforcement costs of monitoring firm managers and exerting corporate control ex-post, i.e after financing the activity"* (Levine (1997) p.696). Moreover, the presence of financial arrangements that enhance corporate governance may improve the efficiency with which firms allocate resources and make savers more willing to finance production and innovation with positive ramifications on economic growth. The latest view has been supported by several theoretical models showing that well-functioning financial system influence growth by boosting corporate governance. For example, the model developed by Harrison *et al.* (1999) shows that in the presence of asymmetric information, financial intermediaries facilitate the flow of resources from savers to investors which can enhance economic growth.

1.2.1.3 Risk Amelioration

The theoretical model developed by Pagano (1993) also shows that financial intermediaries induce individuals to invest in riskier, but more productive technologies by providing risk sharing, which increase the productivity of capital and thereby enhance economic growth. In this line, Levine (2005) argues that "*financial system can facilitate intergenerational risk sharing by investing with a long-run perspective an offering returns that are relatively low in boom times and relatively high in slack times*". In arising to eliminate liquidity risk, financial system can increase the investments in high-return projects which have a positive effect on growth Levine (1997). Some high return projects require a long-term commitment of capital, but investors are often reluctant to tie up their savings. Thus, in arising to eliminating liquidity, financial systems offer a solution by allowing investors to invest in the high-return projects and yet be able to sell the investment quickly and obtain cash when necessary (Ang (2008)).

1.2.1.4 Pooling of savings

Financial-systems are better at mobilizing and providing appropriate financing to entrepreneurs (King and Levine (1993a)). Financial systems induce mobilization of saving by pooling the savings of diverse households and making this aggregate fund available for lending. Which can provide opportunities for households to diversified portfolios, invest in efficient scale firms, and to increase asset liquidity (Levine 1997). Financial

system has also the opportunities to improve technological innovation. In fact, the theoretical model developed by King and Levine (1993b) shows that financial systems are better at mobilizing and providing appropriate financing to entrepreneurs than individuals. Thus the ability of financial system to improve the innovation activity affects the rate of economic growth.

1.2.1.5 Easing exchange

Specialization has been considered crucial to the process of economic development (Hicks (1986)). Moreover, increasing specialization will require more transactions Greenwood and Smith (1996). In arising to ease transactions costs, financial system promote specialization, which can enhance technological innovation with positive ramifications on economic growth.

1.2.2 The evolution of financial and growth theory

Theoreticians hold different perspectives on the link between financial development and economic growth. While the most early theoretical studies have focused on the effect of financial development on economic growth, as an important extension, some studies have focused on the relative merits of a bank-based financial system and a market-based financial system on economic growth. Another strand of studies have also extended this theory by stressing the nonlinearity in the finance-growth link.

1.2.2.1 The theoretical debate an the finance and growth relationship

The theoretical underpinnings of the relationship between financial development and economic growth can be traced back to the work of Schumpeter (1912) who argued that financial services are paramount in promoting economic growth. In this view entrepreneurs require credit in order to finance innovative product. Bank is considered as the key agent that play a role of debtor which facilitate these financial intermediating activities and promote economic development. Therefore, a well developed financial system can channel financial resources to more innovative products with the best chance of their success. In contrast, according to Robinson (1952)'s view, financial development follows growth or, perhaps, causation may be bidirectional; the more developed a financial system is the higher the likelihood of growth causing finance.

The notably early works on finance and development along the Schumpeterian lines include Gurley and Shaw (1955) and Goldsmith (1969). They argue that financial development is crucial in determining economic-growth which implicate that the under-

developed financial system retard economic growth.

Building on the work of Shumpeter, McKinnon (1973) and Shaw (1973) propounded the 'financial liberalization' thesis in 1973 suggesting that a higher level of financial development which can be the result of financial liberalization, will lead to increased output growth. They argued that the financial sector could raise the volume of savings as well as the quantity and quality of investment.

In the early 1990s the endogenous financial development and growth models emerged. These models point out that financial development lead to long-run economic growth. Similarly, financial distortion reduce the rate of economic growth. The endogenous growth models are models in which long-run growth is an endogenous variable (Ang (2008)), where growth rate can be related to preferences, technology, income distribution and institutional arrangements. These models provide a theoretical framework stressing the importance of financial intermediation in determining economic growth.

In this vein, Pagano (1993) develops also a theoretical model to highlight the relevance of financial factors in the process of economic growth. The developed model reveals that there are three ways in which finance can influence growth:

- Influencing saving rate.
- Raising the social marginal productivity of capital.
- Raising the proportion of saving channeled to investments.

Based on the Schumpeterian view, King and Levine (1993a) developed a theoretical model which demonstrates that a more developed financial system fosters productivity improvement by:

- Selecting the promising entrepreneurs and projects.
- Mobilizing sufficient resources for these entrepreneurs.
- Diversifying the innovative activities.
- Revealing the expected profits associated with the uncertain business of innovation.

Thus, a more developed financial system improve the probability of successful innovation and thereby accelerate economic growth. The King and Levine (1993a) model demonstrate that "*the higher cost of evaluating and financing entrepreneurs means that there is a lower rate of return at any given growth rate which lead to a lower market*

equilibrium growth rate" (King and Levine (1993a) p.525). Since, increases in the financial sector distortions raise the full cost of innovation, shifting the production.

In the late 1990s, Greenwood and Smith (1996) and Blackburn and Hung (1998) developed a theoretical endogenous finance growth model, which supports the studies above. Their findings show that finance leads to growth by demonstrating that financial development reduces informational frictions and improves resources allocation efficiency.

Besides debates concerning the role of financial development in economic growth, financial economists have debated the relative merits of a bank-based financial system and a market-based financial system in promoting economic growth.

1.2.2.2 Bank based vs Market based: Theoretical Evidence

An important strand of literature focused an relative merits of bank- and market-based financial systems in fostering economic performance (for example Allen and Gale (1999), Boot and Thakor (1997)). Levine (1997), Levine (2005) stresses that the case for a bank-based system derives from a critique of the role of markets in providing financial functions. However, in the case for a market-based system is essentially a counterattack that focuses on the problems created by powerful banks.

Boot and Thakor (1997) examine the coexistence of banks and financial markets based on assumptions about primitives-endowments, types of agents, and informational constraints. The Boot and Thakor (1997) theoretical model provide evidence that increased financial market sophistication diminishes banks market share. In fact, borrowers of higher observable qualities (i.e who pose less serious moral hazards) go directly to the capital market. However, borrowers who pose less serious moral hazards prefers bank financing. Moreover, a financial system in its infancy will be bank-dominated.

In this line, Allen and Gale (1999) interested in comparing the performance of markets and intermediaries in the evaluation and financing of new industries and new technologies. Their theoretical model provides evidence that market and financial intermediaries have different performances in financing new industries and new technologies. In fact, while market finance is best when there is diversity of opinion and information is inexpensive, intermediated finance is superior when costs of information are high and there is not much diversity of opinion.

In a recent study, Shankha and Ray (2006) examine the "*bank-based*" versus "*market-based*" debate in an endogenous growth model. Their model shows that neither a bank-based nor a market-based system is specifically better for growth. They show that

the quality of a country′ s financial and legal institutions are more important for its growth than the type of its financial system. Indeed, they show that it is possible for two countries to have different financial systems but enjoy similar growth rates. However, bank-based system outperforms a market-based one along other dimensions. Bank-based systems allow greater participation in manufacturing activities, by providing external finance to a larger number of entrepreneurs. Investment and per capita income are higher, and income inequality lower, under a bank-based system. These results are consistent with Levine (2002) cross-country findings that the type of financial system does not seem to matter much for economic growth.

1.2.2.3 Non-linear finance-growth relationship

Another strand of literature has highlighted the inadequacy of the linear specification of the finance-growth relationship.

Greenwood and Jovanovic (1990), present a paradigm in which both the extent of financial intermediation and the rate of economic growth are endogenously determined. Their findings show that financial intermediaries and growth are inextricably which provide support to the Goldsmith (1969), McKinnon (1973) and Shaw (1973)'s view. The model shows that growth leads to financial intermediaries development, while financial intermediaries in turn allowed for higher growth since investment could be more efficiently taken[1]. The model also generates a development cycle reminiscent of the Kuznests hypothesis[2]. Thus the development cycle can be summarized as follows:

- In the early stage of development in which exchange is largely unorganized, growth is slow.
- Then, as income levels rise, financial structure becomes more extensive, economic growth becomes more rapid, and income inequality across the rich and poor widens.
- In maturity, an economy has a fully developed financial structure.
- In the final stage of development, an economy attains a stable distribution of income across people, and the economy's growth rate converges (though non-monotonically) to a higher level than that prevailing during its infancy.

[1] Financial intermediaries play the role of collecting and analyzing information, thereby facilitating the migration of funds to the place in the economy in which they have the highest social return.

[2] *during the course of an economy's lifetime, income inequality rises during the childhood stage of development, tapers off during the juvenile stage, and finally declines as adulthood is reached* (Greenwood and Jovanovic (1990) p. 1077).

Berthélemy and Varoudakis (1998) support also the non-linear finance-growth relationship. They argue that the relationship between growth and financial depth may involve a "*threshold effect*". That is, countries may need to reach certain level of financial depth "a threshold" before there is significant effect on growth. Thus in the presence of threshold effects, it is inappropriate to express the contribution of financial development to growth by linear functions which necessarily ignore these discontinuities.

Hence, Deiddaa and Fattouh (2002) develop a simple model which establishes a non-linear and possibly non-monotonic relationship between financial development and economic growth. The model demonstrates that endogenously emerging financial institutions have generally a positive effect on growth whose magnitude varies positively with the level of economic development. In fact, while the growth effect of financial development is ambiguous at low levels of development, it becomes eventually positive as development proceeds. The results of empirical tests are consistent with their theoretical model. They show that in low income countries there is no significant relationship between financial development and growth whereas in high income countries they find that this relationship is positive and strongly significant.

1.3 Financial Development and Economic Growth: Empirical Evidence

Building on the theoretical evidence, a number of empirical studies emerged focusing on examining the relationship between financial development and economic growth. These studies have proceeded from using country-level data, to using industry- and firm-level data. The econometric methodologies on this subject can be broadly categorized into four groups (i) cross-country, (ii) panel studies (iii) times series (iv) Industry and firm level studies respectively.

Beck (2008) argues that the econometrics of finance and growth can be summarized in the following simple regression model:

$$g_{(i,t)} = y_{(i,t)} - y_{(i,t-1)} = \alpha + \beta_i f_{(i,t)} + C_{(i,t)}\gamma_i + \mu_i + \varepsilon_{(i,t)} \tag{1.1}$$

Where: y is the log of real GDP per capita or of another measure of welfare, g is the growth rate of y, f is an indicator of financial development, C is a set of conditioning information, μ is a country-specific element of the error term that does not necessarily have a mean of zero and ε is a white noise error with a mean of zero, i is the observational unit, it could be a country, an industry, a firm or a household, and t is the time period. The sign and significance of the coefficient $"\beta_i"$ is at the center of the debate.

A significant and positive sign of the coefficient provide evidence for a positive relation between financial development and economic growth.

This section is concerned about the econometric approaches examining the relationship between financial development and economic growth. Thus, the first subsection discusses Cross-country evidence on finance and growth. The second subsection presents the Panel studies on the finance growth relationship. The third subsection discusses time-series approaches. The fourth subsection examines the industry and firm level analysis that provide direct empirical evidence on the mechanisms linking finance and growth. Then, we review the existing work on the relative merits of a *"bank-based"* financial system and a *"market-based"* financial system in promoting economic growth.

1.3.1 Cross country evidence on Finance and Growth

1.3.1.1 Studies using Ordinary Least Squares (OLS) approach:

Empirical investigations on finance and growth relationship go back to the seminal contribution of Goldsmith (1969). He sought to assess whether finance exerts a causal influence on growth and whether the mixture of markets and intermediaries operating in an economy influences economic growth. To this end he consider data on the assets of financial intermediaries relative to GNP and data on the sum of net issues of bonds and securities plus changes in loans relative to GNP for 35 countries over the period 1860 to 1963. Applying both OLS and graphical analysis, Goldsmith (1969) finds that there is a clear relationship between financial development and economic growth. However, as cited in Levine Levine (1997) Levine (2005) (1997, p.704 and 2005, p.40)this study suffers from several weaknesses:

- The investigation involves only 35 countries.
- It does not systematically control for other factors influencing economic growth.
- The indicator of financial development, which measures the size of the financial intermediary sector, may not accurately gauge the functioning of the financial system.
- The close association between financial system size and growth does not identify the direction of causality.
- The study did not shed light on whether financial markets, non-bank financial intermediaries, or the mixture of markets and intermediaries matter for economic growth.

Several researchers have taken steps to address some of these caveats. Building on an augmented Barro growth regression as in (1.2), these studies use a standard cross-country OLS regressions where the data for each country averaged over the sample period,assuming $\beta_i = \beta$ and $\gamma_i = \gamma$ for all countries, and including the lagged dependent variable as control variable:

$$g_{(i)} = y_{(i,t)} - y_{(i,t-1)} = \alpha + \beta f_{(i)} + C_{(i)}\gamma + \delta y_{(i,t-1)} + \epsilon_{(i)} \tag{1.2}$$

Comparing with the regression (1.1), regression (1.2) has only a cross-country, but not a time series, dimension. The log of initial income per capita ($y_{(i,t-1)}$) is included to control for convergence predicted by the Solow-Swan growth models. To test for an independent partial correlation of finance with growth several other countries characteristics,are considered such economic and political environment (Beck 2008).

Based on this cross-country regression, King and Levine (1993b) adopt a sample of 77 countries over the period of 1960-1989 and control for other factors affecting long-run growth. As dependant variables, they consider three indicators of economic growth which are:

- The real per capita GDP growth.
- The per capita capital stock growth.
- The productivity growth[3],

All these indicators of economic growth are averaged over the period 1960-1989. The indicators of financial development constructed by King and Levine (1993b)King and Levine (1993a) are the following which are also averaged over the period $1960-1989$:

- The primary measure is a measure of financial intermediaries and equals to liquid liabilities to GDP ratio.
- The second indicator measures the degree to which the central bank versus commercial bank are allocating credit, it equals to the ratio of bank credit divided by bank credit plus central bank domestic assets.
- The third measure equals the ratio of credit allocated to private entreprises to total domestic credit.

To test for an independent partial correlation of finance with growth, a matrix of control variables (income per capita, education, political stability, indicators of exchange

[3]Productivity Growth = "Solow residual" = 'real per capita GDP growth - (0.3) the growth rate of the capital stock per person'.

rate, trade, fiscal, and monetary policy) is also considered in this study.
The King and Levine (1993b) findings provide some support for the Schumpeterian view that finance matters for growth. In fact, the empirical results show that there is a positive relationship between each of the financial development indicators and the three indicators of economic growth. King and Levine (1993a) confirm also this finding. In fact, using an alternative econometric method and considering both the financial and growth indicators defined by King and Levine (1993b) for a sample of 80 countries King and Levine (1993a) find that financial development promote economic growth. King and Levine (1993a) investigate also the relationship between the level of financial development and future rates of long run growth. Replacing the values of the financial indicators with the value of financial depth in 1960 and considering the average of real per capita GDP growth over 1960-1989, they find that the predetermined component of financial development is a good predictor of long-run growth over the next 10 to 30 years.

While the studies cited above focus on the finance-growth relationship through the impact of banking sector on economic growth, an important strand of studies attempt to examine the role of stock markets on economic growth. This strand of empirical evidence started with the contribution of Atje and Jovanovic (1993) who investigate the impact of both stock markets and bank on economic growth. Based on annual observations for 94 countries over the period of 1960-1985 and using an OLS analysis, Atje and Jovanovic (1993) find that while stock market have both positive levels and growth effects on economic activity, they fail to find a similar effect for bank lending.

Building on Atje and Jovanovic (1993) study, Levine and Zervos (1998) examined whether banking and stock market indicators are both robustly correlated with current and future rates of economic growth, capital accumulation, productivity improvements, and private savings. To this end they consider several measures of stock market and banking sector development indicators. Six indicators of stock market development are retained by Levine and Zervos (1998) which are described as follows:

- Stock Market size: which equals market capitalization to GDP ratio.

- Stock Market liquidity: they consider both total value traded and turnover ratio as measures of market liquidities.

- Stock Market Volatility: they measure the volatility of stock returns as a twelve-month rolling standard deviation estimate that is based on market returns.

- Stock market integration: to compute measures of integration, they use the international capital asset pricing model (CAPM) and the international arbitrage pricing model (APM).

Following King and Levine (1993a), King and Levine (1993b)and Atje and Jovanovic (1993), Levine and Zervos (1998) consider two indicators of banking sector development. The first is an indicator of financial depth, the second measure is the private credit[4] and it equals to the value of loans made by banks to private entreprises divided by GDP.
As dependant variable they consider four indicators of economic growth which are: (i) the real per capita GDP, (ii) capital accumulation, (iii) productivity improvements, and (iv) saving rates.
Applying the OLS technique of estimation to a sample of 49 countries for the period of 1976-1996 and controlling for economic, legal, and political factors that may influence growth, they find that while stock market liquidity is positively and significantly correlated with current and future rates of economic growth, capital accumulation, and productivity growth, stock market size, volatility, and integration are not robustly linked with growth. Their finding also show that the initial levels of both stock market liquidity and banking sector development predict future rates of growth, capital accumulation, and productivity growth.

Controversially, Ram (1999) provides contrary evidence to the previous studies. Based on the data for 95 individual countries over the period of 1960-1989 and adopting the OLS technique of estimation, he finds that there is a weakly negative or negligible association between financial development and growth. The latest results are robust for both developed and developing countries.

However, the studies cited above are subject to criticism: They include only the measures of the functioning of stock markets and bank and they ignore the other subcomponents of financial system such bond markets and the financial services provided by nonfinancial firms. Also these studies do not deal with the issue of causality.

1.3.1.2 Studies using Instrumental Variable approach (IV)

To overcome the biases related to OLS, the classical approach adopted in cross-country growth regressions is to identify an instrumental variable that explain cross-country differences in financial development but are uncorrelated with economic growth beyond their link with financial development and other growth determinants. Thus, building in the seminal contribution of La Porta *et al.* (1997), La Porta *et al.* (1998), who identified countries's legal origin[5] as a historical exogenous factor explaining current variation in

[4]Private credit is considered as the better indicator of banking sector development

[5]La Porta *et al.* (1997) and La Porta *et al.* (1998) have classified the countries' origin in legal in Common law which derives from British origin and civil law which drives from French, German or Scandinavian countries

country's level of financial development, an extensive literature has used this variable to extract the exogenous component of financial development.

As underlying in Beck (2008) the instrumental variable estimation has the following specification:

$$g_{(i)} = y_{(i,t)} - y_{(i,t-1)} = \alpha_1 + \beta_1 f_{(i)} + C_{(i)}\gamma_1 + \delta_1 y_{(i,t-1)} + \varepsilon_{(i)} \tag{1.3}$$

$$f_{(i)} = \alpha_1 + Z_{(i)}\beta_2 + C(i)\gamma_2 + \delta_2 y_{(i,t-1)} + \nu_{(i)} \tag{1.4}$$

$$f^*_{(i)} = f_{(i)} + \mu_{(i)} \tag{1.5}$$

where C are the included exogenous and Z the excluded exogenous control variables which are also referred to as instrumental variables which allow to extract the exogenous component of *f(i)* that is not correlated with $\varepsilon(i)$, i.e.$E[Z(i)'\varepsilon(i)] = 0$, and $E[Z(i)'\mu(i)] = 0$. Thus Beck (2008) argues that estimating equation (1.3) with instruments can help alleviate biases arising from reverse causation, omitted variable and measurement error.

As complement of La Porta *et al.* (1997), La Porta *et al.* (1998), the study of Levine (1998) examines the legal determinants of banking development and traces this connection through to long-run rates of per capita GDP growth, capital stock growth, and productivity growth. To this end, he uses a sample of 42 countries for the period of 1976-1993. He considers three legal variables:

- Creditor Rights: which measure the ability of banks to persuade firms (such as the rights of banks to repossess collateral or liquidate firms in the case of default, the rights of banks to remove managers in corporate reorganizations)

- Enforcements: which measure the efficiency of the legal system in enforcing contracts.

- Legal Origin: four legal families are retained in this study. (English, French, German and Scandinavian legal systems)

As indicator of banking sector development, he uses the measure of banking development, constructed by Levine and Zervos (1998) which equals to the value of loans made by commercial banks and other deposit banks to the private sector divided by GDP. Examining the legal determinants of banking sector development, Levine (1998) finds that countries where the legal system emphasizes creditor rights and rigorously enforces contracts have better-developed banks than countries where laws do not give a high priority to creditors.

In the next exercise, Levine (1998) examines the relationship between banking sector development and economic growth. In contrast with traditional cross-country investigations, Levine (1998) examines whether cross-country variations in the exogenous component of banking sector development explain cross-country variations in the rate of economic development. Thus, Levine (1998) uses the legal determinants of banking development as instrumental variables for banking sector development indicator and he considers either GDP per capita growth, productivity growth or per capita capital stock growth as indicators of economic growth which is defined as the dependent variable. As a result he finds that the exogenous component of banking development [6] is positively associated with all indicators of economic growth.

In the vein of Levine (1998), Levine (1999) also examines how the legal environment affects financial development, and then asks how this in turn is linked to long-run economic growth. Unlike Levine (1998) study in which only one indicator of banking sector development is considered, Levine (1999) considers four measures of banking sector development which are defined by King and Levine (1993a) . Using a sample of 77 countries over 1960-1989, his findings are in line with those of Levine (1998). In fact, Levine (1999) finds that: (i) financial intermediaries are more developed in countries with a better legal environments and (ii) the exogenous component of financial intermediary development (which is defined by the legal and regulatory environment) is positively associated with economic growth.

Like Levine (1998) and Levine (1999), Levine *et al.* (2000) examine whether the exogenous component of financial intermediary development influences economic growth. And they investigate the legal, regulatory, and policy determinants of financial development. In this study they focus on three indicators of financial intermediaries development for a sample of 71 countries over the period of 1960-1995:

- A measure of the overall size of the financial intermediation sector, which equals Liquid Liabilities to GDP ratio.

- A measure of whether commercial banking institutions, or the Central Bank, is conducting the intermediation,which equals the ratio of commercial bank assets divided by commercial bank plus central bank assets.

- A measure of the extent to which financial institutions funnel credit to private sector activities, which equals the value of credits by financial intermediaries to the private sector divided by GDP.

[6] The component defined by the legal environment: Creditor rights, Enforcement and Legal Origin

To examine whether cross-country variations in the exogenous component of financial intermediary development explain cross-country variations in the rate of economic growth, Levine *et al.* (2000) consider the legal origin indicators as instrumental variables for financial development indicators. In line with Levine (1998) and Levine (1999) they find that the exogenous component of financial intermediary development is positively associated with economic growth. Their findings also show that *"legal and accounting reforms that strengthen creditor rights, contract enforcement, and accounting practices can boost financial development and accelerate economic growth"* Levine *et al.* (2000) (p.36).

Similar to Levine *et al.* (2000), to extract the exogenous component of financial intermediary development Beck *et al.* (2000b) consider also the legal origin of each country as an instrumental variable. However, while Levine *et al.* (2000) examine the relationship between financial intermediary and economic growth, the Beck *et al.* (2000b) contribution is to investigate the relation between financial intermediary development and the sources of growth. Thus, the dependent variable considered by Beck *et al.* (2000b) is, in turn, real per capita GDP growth, real per capita capital stock growth, productivity growth, or private savings rates. The indicator of financial intermediary development employed are similar to these adopted by Levine *et al.* (2000). Using the sample of 63 countries which are averaged over the period 1960-1995 and considering also a wide array of conditioning information to control for other factors associated with economic development, they find that while higher levels of financial intermediary development produce faster rates of economic growth and total factor productivity growth, the effect to physical capital growth and savings are ambiguous.

While the cross-sectional IV regressions address biases related to omitted variables, reverse causation and measurement error, they suffer from two important caveats Beck (2008):

- Only the endogeneity and measurement error of financial development are controlled. However, they do not control the endogeneity and measurement error of other explanatory variables entering the growth regressions

- In the presence of country-specific omitted variables, the lagged dependent variable is correlated with the error term if it is not instrumented.

1.3.2 Panel evidence on Finance and Growth

To accounts explicitly biases induced by the inclusion of the lagged dependent variable and to controls for the potential endogeneity of all explanatory variables, researchers

have utilized dynamic panel regressions as an alternative to cross-sectional IV regressions. Estimation using the panel data has also the advantage that it allows to exploit the time-series and cross sectional variation in the data.

As an alternative to cross-sectional IV regressions, researchers have therefore used dynamic panel regressions of the following format:

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta FD_{i,t} + \delta X_{i,t} + \mu_i + \varepsilon_{i,t} \tag{1.6}$$

Where y_{it} refers to the log of per capita GDP in the ith country for some time-period. $y_{i,t-1}$ is the log of initial income per capita. FD is the indicator of financial development. X represents a set of conditioning variables, and μ_i is an unobserved country specific effect, and $\varepsilon_{i,t}$ is the error term.
In the panel data three estimators are considered: (i)Arellano Bond Generalized Method of Moments, (ii) Pooled Mean Group estimators (PMG) and (iii) Panel Data Cointegration.

1.3.2.1 Arellano Bond Generalized Method of Moments estimators:

In our best knowledge, Levine (1999), Rousseau and Wachtel (2000), Beck *et al.* (2000b), Levine *et al.* (2000) are among the first studies that have used the dynamic panel analysis. More specifically they consider the Generalized-method-of-moments (GMM) estimators developed by Holtz-Eakin *et al.* (1988), Arellano and Bond (1991), and Arellano and Bover (1995).

Rousseau and Wachtel (2000) examine the relationships between equity markets, financial intermediaries and economic growth using the difference estimator with annual data over the period 1980 to 1995 across 47 countries. They consider two indicators of equity market and a one indicator of financial intermediaries:

- Market Capitalization to GDP ratio is an indicator of equity market size.
- Total value traded is an indicator of market liquidity.
- M3/GDP ratio is taken as indicator of financial intermediaries.

Rousseau and Wachtel (2000) find that developing deep and liquid financial markets boost economic growth.

Besides the traditional cross-section, instrumental variable procedures (descried above), Levine *et al.* (2000) use the recent dynamic panel techniques *"system estimator"* to examine the relationship between financial intermediary and growth relationship. They use a panel data set of 74 countries, where the data are averaged over each of

the seven 5-year intervals composing the period 1960-1995. The dependent variable is the growth rate of the real per capita Gross Domestic Product (GDP). The regressors include the level of financial intermediary development, along with a broad set of variables that serve as conditioning information. As with the traditional cross-section, the results of dynamic panel data show that exogenous changes in financial intermediary development imply large changes in economic growth.

Similar to Levine *et al.* (2000) Beck *et al.* (2000b), consider the dynamic Generalized-Method-of-Moments (GMM) panel estimator to examine the relation between financial intermediary development and what we term the sources of growth. Constructing a panel data set with data averaged over each of the seven 5-year periods between 1960 and 1995, they provide evidence that that the strong connections between financial intermediary development and both real per capita GDP growth and total factor productivity growth are not due to biases created by endogeneity or unobserved country-specific effects. In fact, there is a significant and strong positive relationship between financial intermediary and both economic growth and total factor productivity growth.

Benhabib and Spiegel (2000) use the generalized method of moments (GMM). The indicators of financial development were obtained from King and Levine (1993b) King and Levine (1993a). Using grouped data into balanced panels of five-year periods from 1965 through 1985 for a sample of four countries (Argentine, Chile, Indonesia and Korea) the results show that indicators of financial development are correlated with both total factor-productivity growth and investment. However, the results are sensitive to the inclusion of country fixed effects and different indicators of financial development.

In the same vein Beck and Levine (2004) examine the relationship between growth and both stock markets and bank development. The data used in this study are averaged over 5-years periods between 1976 and 1998 for a sample of 40 countries. To measure stock market development they employ the three measures used by Rousseau and Wachtel (2000): (i) turnover ratio,(ii) total value traded and (iii) market capitalization. Following Levine and Zervos (1998), they use *bank credit* as indicator of banking sector development which equals bank claims on the private sector by deposit money banks divided by GDP. As controls variables, Beck and Levine (2004) consider the initial real per capita GDP to control for convergence, to control for human capital accumulation, the average years of schooling are considered, the black market premium, the trade openness, and to control macroeconomic stability, they use inflation rate and the ratio of government expenditures to GDP.
Applying the *system* panel estimator to mitigate potential biases associated with the difference estimator, Beck and Levine (2004) find that stock markets and banks affect positively and significantly economic growth and these effects are not due to potential

biases induced by simultaneity, omitted variables or unobserved country-specific effects.

Ben Naceur and Ghazouani (2007) contribute to this strand of empirical investigations by examining the relationship between stock markets, banks and economic growth in 11 MENA countries over the 1979-2003. They use three indicators of stock market development (market capitalization to GDP, total value traded and turnover ratio) and two indicators of banking sector development which are: (i) private credit and (ii)liquid labilities. Besides these usual measures of financial development they use a composite index of stock market (*SMINDEX)* and banking sector development *(BANKINDEX)*, which are similar to the algorithm developed by Demirgüç-Kunt and Levine (1996a). Contraries to the findings observed in the studies cited above, the results of GMM-in level estimates show that financial development is unimportant or even harmful for economic growth in MENA region.

Hasan *et al.* (2009a) contribution is to analyze the role of legal institutions, financial deepening and political pluralism on growth rates at the regional level, specifically in China. Therefore, they use sub-national data for a sample of 31 Chinese provinces over the period of 1986-2003. They consider two measures of financial development:

- The measure of banking sector depth equals to total bank loans to GDP.
- The indicator of non-bank financial market activity which equals to the ratio of equity and non-financial corporate debt issuance to GDP.

In their econometric analysis, Hasan *et al.* (2009a) first use GMM-system estimates with annual data in the first exercise, second they use growth rate averaged over several years as the dependent variable and the initial values of all independent variables. The results show that while capital market, legal environment, awareness of property rights and political pluralism have a strong influence on growth, the impact of bank lending is not significant and sometimes negative.

Hasan *et al.* (2009b) contribute to the regional studies on financial development and growth relationship. They use unconsolidated financial data for approximately 7,000 banks in 11 EU countries between 1996 and 2004. Unlike the studies cited above, financial development is measured in two ways: (i) by volume of financial development which equals to regional aggregate credit relative to GDP and (ii) by the quality of financial development which measured as regional mean bank efficiency in converting inputs into a production set while maximizing profits. The results of *GMM-system* show that either a quantity, a quality, and an interaction effect of regional credit and bank efficiency affect economic growth in Europe.

However, Both the cross-sectional and the dynamic panel regressions (GMM techniques) assume a homogenous relationship between finance and growth across countries. Thus, to control for country heterogeneity in the finance-growth relationship, researchers have utilized Pooled Mean Group (PMG) estimators.

1.3.2.2 Pooled Mean Group (PMG) estimator

The PMG estimator developed by Pesaran *et al.* (1999) is well suited to the analysis of dynamic panels, where it has the advantage of being able to accommodate the long run equilibrium and the possibly heterogeneous dynamic adjustment process. This technique of estimation is considered by Loayza and Ranciere (2006) and Demetriades and Law (2006) in their examen of finance and growth relationship.

Based on the distinction between the short- and long-run effects of financial intermediation, Loayza and Ranciere (2006) contribute to the analysis of the apparent contradiction between two strands of the literature on the effects of financial intermediation on economic activity. In the one hand an important strand of literature finds a positive effect of financial development on economic growth. However, on the other hand the banking and currency crisis literature finds that monetary aggregates, such as domestic credit, are among the best predictors for crises. Thus, using a sample of 75 countries and annual data during the period 1960-2000 and based on econometric technique is the PMG estimator, they find that while economic growth is affected positively and significantly by financial intermediation in the long run, this effect is significantly negative in the short-run. They attempt to link the short-run negative effect of financial intermediation with the presence of financial volatility and the likelihood of banking crises. Their findings show that the contrasting effects of financial intermediation come from different aspects associated to the process of financial development-financial depth and fragility.

However, both the cross-sectional and the dynamic panel regressions discussed up to now ignore the integration properties of their data. Therefore, it is not clear whether they eventually estimate a long-run equilibrium relationship between finance and growth or a spurious one offering thus misleading conclusions. Thus, a new strand of literature re-examines the nature of finance-growth relationship by applying a new econometric technique '*Panel Data Cointegration*'.

1.3.2.3 Panel Data Cointegration

The first contribution in the finance-growth relationship literature that employs panel data cointegration technique is the study of Christopoulos and Tsionas (2004). To

investigate the relationship between growth and financial depth, they use the following model:

$$y_{it} = \beta_{0i} + \beta_{1i}F_{it} + \beta_{2i}S_{it} + \beta_{3i}p_{it} + \mu_{it} \tag{1.7}$$

Where y_{it} is real output in country i and year t, F_{it} is a measure of financial depth which equals to the ratio of total bank deposits liabilities to nominal GDP and the share of investment, $S_{it}$is the output share of investment, p_{it} is inflation, and μ_{it} is an error term. Since the direction of causality is not clear they specify the following model:

$$F_{it} = \beta_{0i} + \beta_{1i}y_{it} + \beta_{2i}S_{it} + \beta_{3i}p_{it} + \nu_{it} \tag{1.8}$$

The panel-based econometric procedures defined by Christopoulos and Tsionas (2004) as follows:

- The first step: Testing of integration, they test that all variables are integrated of order one in levels. Thus they use the panel unit root tests due to IM *et al.* (1997) and Maddala and Wu (1999).

- The second step: Testing for cointegration, they test for the existence of a long run relationship among y, F and the control variables S and p. In this step they use a test due to Levin and Lin (1993) in the context of panel unit roots, to estimated residuals from (supposedly) long run relations, and the unit root tests developed by Harris and Tzavalis (1999).

- Testing for unit roots in threshold autoregressive models: They use tests for unit roots from threshold autoregressive (TAR) models, following Caner and Hansen (2001).

- Estimating the long run relationship: Having established that the dependent variable is structurally related to the explanatory variables, and thus a long run equilibrium relationship exists among these variables, they proceed to final step when they estimate the equation (1.10) by the method of fully modified OLS appropriate for heterogeneous cointegrated panels (Pedroni (2000)). Thus, they consider the following cointegrated system for panel data:

$$y_{it} = \alpha_i + x'_{it}\beta + \mu_{it} \tag{1.9}$$

$$x_{it} = x_{i,t-1} + \varrho_{it} \tag{1.10}$$

Where $\xi_{it} = [\mu_{it}\varrho'_{it}]$ is stationary with covariance matrix.

Using a sample of 10 developing countries over the period of 1970-2000, the empirical results of Christopoulos and Tsionas (2004) are supportive for the hypothesis that there is a single equilibrium relation between financial depth, growth and ancillary variables, and that the only cointegrating relation implies unidirectional causality from financial depth to growth.

However, as argued by Apergis *et al.* (2007) the study of Christopoulos and Tsionas (2004) has some shortcomings since this study limits its attention only to few developing countries and employs only one measure of financial deepening. Thus, taking into account these shortcomings, Apergis *et al.* (2007) contribute to the relevant literature by using a large and heterogeneous sample of 65 countries over the period 1975 to 2000. To test for cointegration and causality between financial depth and growth, they based on the following specification:

$$y_{it} = a_{0i} + a_{1i}F_{it} + a_{2i}X_{it} + \mu_{it} \tag{1.11}$$

Where y_{it} is GDP per capita, F_{it} is a measure of financial development, X_{it} is a set of control variables, and μ_{it} is the error term. Unlike Christopoulos and Tsionas (2004), who use only one indicator of financial development, Apergis *et al.* (2007) employ three measures of financial development which are (i) the liquid liabilities of the financial system, (ii) credit by deposit money banks to the private sector divided by GDP (iii) credits by deposit money banks and other financial institutions to the private sector divided by GDP. The control variables are: average years of schooling, output share of investment, government splending as share of GDP and volume of trade as share of GDP.

Apergis *et al.* (2007) use the panel cointegration techniques developed by Pedroni (1999). They proceed their econometric analysis in five steps:

- Testing of Integration: To check the stationarity and non-stationarity, they use the panel unit root tests due Im *et al.* (2003) since it is less restrictive and more powerful compared to some other panel unit root tests.

- Examining the heterogeneity, i.e., variation of the intercept over countries and time across a cross-section using standard Chow-type F tests.

- Testing for cointegration: Once the order of stationarity has been defined, they use the approach developed by Pedroni (1999) to test cointegration.

- Having established that the variables are cointegrated, Apergis *et al.* (2007) estimate the long-run relationship using the dynamic OLS (DOLS) approach proposed by Stock and Watson (1993). In the DOLS estimation, extra terms are added to the original cointegration equation, so that the bias is corrected. These

terms consist of lags and terms of the first order differences of the explanatory variables:

$$y_{i,t} = x'_{i,t}\beta + \sum_{j=-p1}^{p_2} c_j \triangle x_{i,j} + \mu_i + \mu_{i,t} \tag{1.12}$$

Where c_j is the coefficient of a lead or lag of first differenced explanatory variables.

- Finally, to examine the direction of the direction of the panel data causal links among the variables under consideration they estimate causality using the Pooled Mean Group (PMG) estimator of Pesaran *et al.* (1999).

Apergis *et al.* (2007) provide evidence that there is a strong and positive and statistically significant equilibrium relation between financial development and economic growth. Also, they point out that there is a strong bi-directional causality between financial development and economic growth.

In more recent study, Kyran *et al.* (2009) employ also the recently developed panel data unit root tests and the Pedroni panel data cointegration techniques to examine the long-run relationship between financial development and economic growth for a panel of 10 emerging countries over the period $1968 - 2007$. Thus they use the following specification:

$$Y_{it} = \beta_{0i} + \beta_{1i} F_{it} + \beta_{2i} X_{it} + \mu_{it} \tag{1.13}$$

Where: Y_{it} is the GDP per capita , X_{it} is a set of control variables , μ_{it} is the error term and F_{it} is a measure of financial development. Three indicators of financial development are considered:

- The liquid liabilities of financial system.

- Bank credit which equals to credits of deposit money banks to the private sector divided by GDP.

- Private sector credit equals the value of credits by deposit money banks and other financial institutions to private sector divided by GDP.

The Kyran *et al.* (2009) methodology proceed on three steps:

- First, they investigate the stationarity properties of the variables. Thus, they consider the panel unit root tests suggested by Im *et al.* (2003), Maddala and Wu (1999).

- Second, they test for the existence of a long-run relationship between financial development and economic growth. Therefore, they employ the seven panel cointegration tests introduced by Pedroni (1995), Pedroni (1999) and Pedroni (2000).

- Finally they estimate the long-run relationship using FMOLS approach suggested by Pedroni (2000).

The results of Kyran *et al.* (2009) show that financial development has a positive and significant effect on economic growth.

However, Loayza and Ranciere (2006) argue that the cointegration literature derives two misconceptions: The first one is that long-run relationships exist only in the context of cointegration among integrated variables. The second one is that standard methods of estimation and inference are incorrect.

1.3.3 Time-series approach

The main differences between the time series approach and the cross country approach are: (i) the use of higher-frequency data, and (ii) the concept of causality (Beck 2008). The time-series approach relies on the concept of *Granger causality*, as first developed by Granger (1969).

Gupta (1984) represents the first author that conducts the times series investigation to study the finance-growth nexus. Using quarterly industrial output data from ($1961Q1$ to $1980Q4$) to measure the level of economic development for 14 developing countries his findings show that causality run from financial systems to economic growth. However, the Gupta (1984) analysis suffer from three important shortcomings (Demetriades and Hussein (1996)). The first relates to the fact that in developing countries industrial output represents only a small component of total output, thus the latest indicator is not a satisfactory indicator for economic development. The second limitation is that the span of the data is much more important than the number of observations in the time series tests. The third relates to the Gupta's causality tests have more to say about whether money causes output than about the issue of whether financial deepening promotes economic development. Since he uses the M3 to GDP ratio as measure of financial development.

The second important study on the issue of causality, carried out by Jung (1986). Using an annual data on 37 less developed countries and 19 developed countries and applying a VARs and Granger causality tests Jung (1986)'s findings show that causality runs from economic development to financial development in developed countries, and from financial development to economic development in less developed countries.

Demetriades and Hussein (1996) study has taken steps to address some of the problems encountered by previous time-series work. They consider two indicators of financial development which are (i) the ratio of bank deposit liabilities to nominal GDP and (ii) the ratio of bank claims on the private sector to nominal GDP. The indicator of economic development is real GDP per capita. The preliminary step in their analysis is to examine the integration of each variable using the Dickey-Fuller procedure. In the second step, they examine the cointegration tests in order to test for the existence of a stable relationship between the level of real GDP and the state of development of the financial system. To this end, they use cointegration tests based on the Engle and Granger (1987) and Johansen (1988) methods, respectively. Demetriades and Hussein (1996) findings provide little support to the view that finance is a leading sector in the process of economic development. They also find evidence for bidirectional causality and reverse causation from income to finance across a sample of 16 developing countries with at least 27 annual observations.

More recently, Luintel and Khan (1999) examine the long-run relationship between financial development and economic growth in a multivariate vector autoregression VAR framework. As measure of financial development they use an indicator of financial depth which equals to the ratio of total deposit liabilities of deposit banks to one period lagged nominal GDP. Using data for 10 developing countries with 36-41 observations (Costa Rica, Colombia, Greece, India, Korea, Malaysia, Philippine, Sri Lanka, South Africa and Thailand)Luintel and Khan (1999) find bi-directional causality between financial development and economic growth in all the sample countries.

In a broad study of 41 countries over the $1960 - 1993$, XU (2000) uses a multivariate vector autoregression to control the effect of permanent financial development on economic growth. As proxy for the level of financial development he uses the total bank deposits to GDP. The results show that there is strong evidence that financial development stimulate economic growth both in the short term and in the long term and that investment is an important channel through which financial development affects GDP growth.

Ghirmay (2005) explores the causal links between financial development and economic growth in a sample of 13 sub-Saharan African countries (Benin, Cameroon, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Rwanda, South Africa, Tanzania, Togo and Zambia). He bases in the time series data of the individuals countries using cointegration analysis and error correction model. In the first step of the econometric analysis, he undertakes both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) uni-root tests to examine the integration of the variables. In the next step, he use the Johansen cointegration tets to examine the cointegration. Finally, to identify

the direction of causality Ghirmay (2005) consider the vector error correction model (VECM) representation of a VAR model which can be written as follows:

$$\triangle Z_{it} = \Pi Z_{i,t-1} + \sum_{i=1}^{p+1} \Gamma_1 \triangle Z_{t-1} + \delta\phi + E_t \tag{1.14}$$

Where Z_t is a $n \times 1$ vector composed of non stationary variables, Π and Γ are $n \times n$ matrices of coefficients, ϕ is a set of deterministic variables such as constant, trend and dummy variables, and E_t is a vector of normally and independently distributed error terms. The rank of the matrix Π gives the dimension of the cointegrating vector. Using an increase in real GDP as measure of economic growth, and the level of credit to the private sector by the financial intermediaries as indicator of financial development, Ghirmay (2005) finds that there is a long-run relationship between financial development and economic growth in almost all (12 out of 13) countries of the countries. The evidence points to the causality running from financial development to economic growth, again in eight of the countries.

While the previous studies investigate the financial intermediaries development and growth relationship, Caporale *et al.* (2005) re-examine the relationship between stock market development and economic growth. Specifically they examine '*the hypothesis of endogenous growth models that financial development causes higher growth through its influence on the level of investment and its productivity'*. Thus, to test the latest hypothesis they applied a VAR procedure developed by Toda and Yamamoto (1995) in four developing countries, (Chile, Korea, Malaysia and the Philippines)using quarterly data from 1979Q1 to 1998Q2. They use two standard indicators of stock market development: the market capitalization ratio, which equals the value of listed shares divided by GDP and the value-traded ratio, which equals the total value of shares traded on the stock exchange divided by GDP. As measure of economic development they consider GDP in levels. The results provide evidence that the causality running from stock market development to economic growth through increasing investment efficiency.

Rousseau and Vuthipadadorn (2005) examine links between financial development and real economic performance (investment and growth) in 10 Asian countries (India, Indonesia, Japan, Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, and Thailand) from 1950 to 2000. Two indicators of financial development are considered which are (i) the difference between broadly defined and narrow money ($M2 - M1$) and (ii) Credit allocated to the private sector serves as an alternative measure. Gross domestic product and gross domestic fixed investment are used as measures of economic performance. The econometric methodology used by Rousseau and Vuthipadadorn (2005) proceed as follow:

- First, to examine the stationarity properties of each measure of financial and real activity they use both the Augmented Dickey Fuller (ADF) and Phillips and Perron (PP) tests.

- Second, they apply the Johansen (1991) test to determine the cointegration of the variables in each system and if so, how many cointegrating vectors can be identified.

- Finally they use vector autoregressive models (VARs) and vector error correction models (VECMs) to examine the nature of statistical causality between measures of financial and real sector activity.

The results show a strong uni-directional link from finance to investment for most of these countries, supporting the factor accumulation channel. However, there is less support for a causal link from finance to the level of output.

The contribution of Boulila and Trabelsi (2004) in the finance-growth nexus consists of investigating empirically this causality between financial development and economic growth in 16 MENA countries (Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey and UAE). They use unit root and cointegration techniques, within a bivariate vector autoregressive model (bVAR) for (1960 to 2002) periods. Three measures of financial development are used in this study:

- The ratio of the liquid liabilities (M3) to the nominal GDP as a financial deepening indicator.

- The ratio of the claims to the private sector to GDP.

- The ratio of financial saving (M3-M1) to GDP

Economic growth is measured by the real GDP per capita.

Their findings show that there is a tendency for a directional causality running from real growth to the development of the financial sector. Which can provide little support to the view that finance is a leading sector in the determination of long run growth in the MENA countries.

Abu-Bader and Abu-Qarn (2008a) examine the causal relationship between financial development and economic growth for six Middle Eastern and North African countries (Algeria, Egypt, Israel, Morocco, Syria, and Tunisia) for the period of 1960 to 2004. This study has taken steps to address some of the weaknesses of the previous empirical analysis of the causality between financial development and economic growth in MENA countries. Therefore, they use a causality testing procedure developed recently by Toda

and Yamamoto (1995) that does not require pre-testing for integration or cointegration properties of the VAR system,thus avoiding the potential problems of pre-testing biases to test the direction of causality between financial development and economic growth. Unlike most of the previous studies that based on a bivariate VAR analysis, Abu-Bader and Abu-Qarn (2008a) apply a quadvariate vector autoregressive (VAR) system To overcome the misspecification bias. In fact, besides the real GDP per capita and financial development indicator they introduce two of the major variables commonly used in estimating growth equations to their VAR system; (i) the share of investment in GDP and (ii) the share of government expenditures in GDP. They consider four commonly measures of financial development:

- The ratio of money stock to nominal GDP (M2/GDP).
- The ratio of M2 minus currency to GDP.
- The ratio of bank credit to the private sector to nominal GDP.
- The ratio of credit issued to nonfinancial private firms to total domestic credit.

The empirical results point to the unidirectional causality running from financial development to economic growth in five out of the six countries. This causality ran through enhancing investment efficiency rather than through enhancing capital accumulation. Based on their econometric results, Abu-Bader and Abu-Qarn (2008a) suggest *"the need to accelerate the financial reforms that have been launched since the mid 1980s and to improve the efficiency of these countries financial systems to stimulate saving/investment and, consequently, long-term economic growth"* (Abu-Bader and Abu-Qarn (2008a) p.803).

Using VAR models, the contribution of Choe and Moosa (1999) lies in providing a rigorous, time-series analysis of financial system-growth link in Korea. More specifically they examine the relative development of financial intermediaries and capital markets, and their impact on the portfolio behavior of the household and business sectors using annual data covering 1970-1992. They provide evidence that financial development leads to higher economic growth in Korea; Also they find that financial intermediaries are more important than capital markets in this causal relationship.

In more recent study Bell and Rousseau (2001) examine whether financial intermediaries have played a leading role in influencing India′ s economy from 1951 to 1995. Using Johansen cointegration tests, VAR and VECM approaches and Granger causality, they find that financial sector plays an important role in stimulating the economic performance in India.

In this vein, Thangavelu and James (2004) empirically examine the dynamic relationship between financial development and economic growth in Australia in terms of bank based and market-based financial structure. Therefore, to estimate the relationship, Thangavelu and James (2004) employ time series methodology of vector autoregressive (VAR) model and Granger causality test. The time span of this study cover from 1960 to 1999, and with the use of quarterly data. Their results suggest that financial intermediaries [7] (bank-based system) and financial markets[8] (market-based system) tend to have different role in promoting growth[9] in the economy. Indeed, the empirical results using financial intermediaries indicators are consistent with the Robinson's hypothesis that economic growth promotes financial development. However, the results of using financial market indicators are consistent with the Schumpeter's view that market-based system promotes economic growth in the Australian economy.

Using VAR models, Hondroyiannis *et al.* (2005) examine the relationship between the development of the banking system and the stock market and economic performance for the case of Greece over the period of 1986 to 1999. Their finding show that both bank and stock market financing can promote economic growth, in the long run, although their effect is small. However, contribution of the stock market to growth is limited compared to bank finance which can be explained by the minor role traditionally played by stock market in Greece.

Abu-Bader and Abu-Qarn (2008b) examine the causal relationship between financial development and economic growth in Egypt during the period 1960 to 2001. They consider trivariate vector autoregressive (VAR). Indeed, in addition to economic growth and financial development indicators they include the share of fixed investment in GDP. The inclusion of investment in a VAR system allows us to assess the channels in which financial development affects economic (increasing productivity or through accumulation of resources). The measures of financial development are the same considered in Abu-Bader and Abu-Qarn (2008a). Applying Granger causality tests using the cointegration and vector error-correction (VEC) methodology they provide strong evidence of a bi-directional Granger causality between economic growth and financial development in Egypt. 'The evidence of causality from financial development to economic growth after controlling for investment support the hypothesis that the enhancement of investment efficiency through the rise in private investment led to a rebound in economic

[7] The indicators of financial intermediaries used in this study are: the ratio of bank claims on private sectors to nominal GDP and the ratio of domestic bank deposit liabilities to nominal GDP.

[8] The measure of financial market development is the ratio of equities turnover to nominal GDP which reflect the level of liquidity in the stock markets.

[9] They use real per capita GDP as measurement of economic growth.

performance of Egypt in the 1990s'.

While the literature above abounds with tests of unidirectional causality between financial development and economic growth, there has virtually been no investigation on the degree of dependence or the extent of various kinds of feedback between them. Taking into account this caveat, Calderón and Liu (2003) use Geweke′s (1982) measure of linear dependence to examine the direction of causality between financial development and economic growth. The Gewek′ s(1982) approach '*is developed to test the degree of dependence, which states that linear dependence and feedback between two time series x and y can be measured as the sum of linear feedback from x to y, linear feedback from y to x, and instantaneous linear feedback between x and y*' (Calderón and Liu (2003), p. 323). They use two indicators of financial development (i) the ratio of broad money (M2) to GDP and (ii) the ratio of credits provided by financial intermediaries to the private sector to GDP. The measure of economic growth is the real GDP per capita growth rate. They also consider a basic set of controls: initial human capital, initial income level, a measure of government size, black market exchange rate premium, and regional dummies (Latin America, East Asia, and Africa). Using sample of 109 industrial and developing countries, with data spanning the 1960 to 1994 period, Calderón and Liu (2003) find that financial development generally leads to economic growth and financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries, financial development affect economic growth through both a more rapid capital accumulation and productivity growth.

However, time series studies suffer from several limitations. Owing to data constraints, the estimation period used in many time series studies is often short. Also the majority of the available time series studies are subject to omitted variable problem.

1.3.4 Industry and Firm level studies

To resolve causality issues and to document in greater detail the mechanisms, if any, through which finance influences economic growth, an important strand of researchers have chosen to investigate these question at the industry-level and firm-level data across a broad cross section of countries.

1.3.4.1 Industry level analysis

The seminal contribution goes back to the study of Jayaratne and Strahan (1996), who provide evidence that financial markets can directly affect economic growth by studying the relaxation of bank branch restrictions in the United States over the period 1970 to

1995. Using a generalized "difference-in-differences"[10] method they estimate the change in economic growth rates before and after branch reform relative to a control group of states unaffected by reform. In their empirical model they base on the theories implying that state economic growth rates will increase after intrastate branch restrictions are lifted. Thus, to construct a measure of intrastate branch reform they include in their econometric model dates associated with deregulation of prohibitions on branching via merger and acquisitions. Therefore, the empirical model used in this study has the following specification:

$$Y_{t,i}/Y_{t-1,i} = \alpha_t + \beta_i + \gamma D_{t,i} + \epsilon_{t,i} \tag{1.15}$$

Where $Y_{i,t}$ equals a measure of real per capita income (output) during year t in state i, and $D_{t,i}$ branching indicator equals to one for states without restrictions on branching via '*Mergers and Acquisitions*', β_i measures the state-specific component of long-run economic growth; α_t measures the common, economy wide shock to growth at time t, and γ measures the increase in per capita economic growth stemming from branch deregulation. This specification is a generalization of the '*difference-in- differences*' approach '*where the effect of deregulation is estimated as the difference between the change in growth before and after deregulation with the difference in growth for a control group not experiencing a change in their deregulation status*' (Jayaratne and Strahan (1996), p.649). To estimate the model they use both ordinary least squares (OLS) and by weighted least squares (WLS) with weights proportional to the size of the state economy.

Their findings show that economic growth accelerated following intrastate branching reform. The annual growth rates increase by 0.51 to 1.19 percentage points following intrastate branch deregulation. They also find evidence that the finance-growth nexus worked through improved lending efficiency rather than more lending and investment.

Related to Jayaratne and Strahan (1996), in more recent study Rajan and Zingales (1998) consider a '*differences-in-differences*' approach. They also focus on providing evidence for a microeconomic channel through which finance is supposed to work rather than examining, as they do, the broader correlation between finance and growth. The model estimated by Rajan and Zingales (1998):

[10] *"The 'differences-in-differences technique can be understood as a "smoking-gun" or controlled treatment approach'. Specifically, traditional differences-in-differences estimation consists of comparing the difference between the treatment and the control groups before and after a treatment, such as a policy change, thus controlling for other confounding influences on growth"* (Beck 2008, p.22)

$$\begin{aligned} GROWTH_{j,k} &= \alpha_i + \lambda_k \\ &+ \beta(External Dependence of industry \\ &\times Financial Development of country k) \\ &+ \gamma(Industry j share of manufacturing in country k in 1980) \\ &+ \theta((Industry(k) \times Country(i)) \\ &+ \varepsilon_{j,k} \end{aligned} \tag{1.16}$$

Where $GROWTH$ the dependent variable which is the average annual real growth rate of value added in industry j in country k over the period 1980 to 1990. *Industry* is a vector of other industry characteristics that do not vary across countries; and *Country* is a vector of other country characteristics that do not vary across industries. By including industry and country specific effects, the coefficient β measures the differential growth impact of financial development on high-dependence industries relative to low-dependence industries. Using a sample of 41 countries and 36 manufacturing industries Rajan and Zingales (1998) find that financial development influences industrial growth by influencing the availability of external finance.

While Rajan and Zingales (1998) investigate whether industries that are naturally heavy users of external finance grow relatively faster in economies with higher levels of financial development, Beck and Levine (2002) examine whether industries that are naturally heavy users of external finance grow faster in bank-based or market based systems. Thus, they evaluate whether financial structure influences the flow of capital to firms that depend heavily on external finance. Three indicators of financial structure are considered by Beck and Levine (2002) which are (i) measure of the comparative size and activity of markets and banks, (ii) a measure of regulatory restrictions on banks, and (iii) a measure of state ownership of banks. They extend the Rajan and Zingales (1998) methodology to focus on research and development R&D intensive and labor-intensive industries rather than on externally dependent industries. Thus they assess whether R&D intensive and labor-intensive industries grow faster in bank-based or market-based financial systems using the three measures of financial structure. To assess the impact of financial development and financial structure on industry growth Beck and Levine (2002) apply the following specification:

$$\begin{aligned} Growth_{i,k} &= \sum_j \alpha_j Country_j + \beta_l \sum_l Industry_l \\ &+ \gamma Share_{i,k} + \delta_1 (External_k \times FD_i) \\ &+ \delta_2 (External_k \times FS_i + \varepsilon_{i,k} \end{aligned} \tag{1.17}$$

where $Growth_{i,k}$ is the average annual growth rate of value added or the growth in the number of establishments, in industry k and country i, over the period 1980 to 1990. *Country* and *Industry* are country and industry dummies, respectively, and $Share_{i,k}$is the share of industry k in manufacturing in country i in 1980. $External_k$ is the measure of dependence on external finance for industry k as measured for a sample of U.S. companies over the period 1980 to 1989. FD_i and FS_i are indicators of financial development and financial structure for country i, respectively. Applying two-stage least squares (TSLS) regressions for a sample of 42 countries and 36 industries they find that industries requiring more external finance grow faster in financially more developed economies, but financial structure does not have a significant impact on industrial growth patterns.

In this vein Beck *et al.* (2008) examine whether financial development accelerates growth by boosting small firm growth. Thus, they extend the Rajan and Zingales (1998) methodology to examine whether financial development enhances economic growth by easing constraints on industries that are technologically more dependent on small firms. Instead of only considering each industry′s technological dependence on external finance, they also examine each industry′s technological firm size. Using a sample of 44 countries and 36 industries in the manufacturing sector they test whether industries that are technologically more dependent on small firms grow faster in countries with more developed financial systems. The results show that financial development boosts the growth of industries that are naturally composed of small firms more than large-firm industries. "*This suggest that financial development accelerates economic growth by removing growth constraints on small firms and also implies that financial development has sectoral as well as aggregate growth ramifications*" Beck *et al.* (2008) (p.1380).

1.3.4.2 Firm level approach

The first contribution in this vein goes back to the Demirgüç-Kunt and Maksimovic (1998) who examine whether the underdevelopment of legal and financial systems does prevent firms in some countries from investing in potentially profitable growth opportunities. Specifically, they focus on the use of long-term debt or external equity to fund growth. They adopt a financial planning model to estimate, for each firm in their

sample, the maximum rate of growth that can be financed internally or with limited access to the market for long-term capital. To estimate the firm′s constrained growth rate Demirgüç-Kunt and Maksimovic (1998) use the standard "*percentage of sales*" approach to financial planning. This approach makes three simplifying assumptions about the relation between the growth rate of the firm′s sales and the need for investment funds:

- The ratio of assets used in production to sales is constant. Thus, the required total investment increases in proportion to the firm′s growth in sales.
- The firm′s profit rate per unit of sales is constant
- The economic depreciation of existing assets equals that reported in the financial statements.

Given these assumptions, the firm′s financing need EFN in period t of a firm growing at rate g_t is given by:

$$EFN_t = g_t * Assets_t - (1 + g_t) * Earnings * b_t \tag{1.18}$$

where EFN_t is the external financing need and b_t is the proportion of the firm′s earnings that are retained for reinvestment at time t. Earnings are calculated after interest and taxes. The first term on the right-hand side is the required investment for a firm growing at g_t percent. The second term is the internally available capital for investment, taking the firm′s dividend payout as given.

They present three progressively less constrained estimates of a firm′s maximum attainable growth rate:

- The internally financed growth rate (IG_t),which is the maximum growth rate that can be financed if a firm relies only on its internal resources and maintains its dividend.
- The short-term financed growth rate (SFG_t) which is an estimate of the maximum rate of growth of a firm that reinvests all its earnings and obtains enough short-term credit to maintain the ratio of its short-term borrowing to assets. SFG_t is given by:

  $$SFG_t = ROLTC_t/(1 - ROLTC_t) \tag{1.19}$$

  where $ROLTC_t$ is given by the ratio of earnings, after tax and interest, to long-term capital

- The "maximum sustainable growth rate" (SG_t) which is attainable if the firm does not pay dividends and obtains just enough short-term and long-term debt financing to maintain a constant ratio of total debt to assets.

Then, to analyze whether financial development spurs firm growth, Demirgüç-Kunt and Maksimovic (1998) run the following cross-country regression:

$$ExcessGrowth_{firm_i} = \alpha + \beta_1 FD_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \tag{1.20}$$

Where $ExcessGrowth_{firm_i}$ is the proportion of years in the sample period that a firm grows faster than its maximum short-term financed growth rate (SFG_t), $FD_{i,t}$ is an indicator of financial development. Demirgüç-Kunt and Maksimovic (1998) consider three measures of financial development: (i) the ratio of market capitalization to GDP, (ii) turnover ratio and (iii) the ratio of the domestic assets of deposit banks to GDP. $X_{i,t}$ is a set of control variables which are the rate of inflation, the ratio of government subsidies to GDP, the ratio of market values to book values, the growth rate of the real GDP per capita, the net fixed assets divided by total assets of firms in the economy, and the level real per capita GDP, the law and order tradition of the economy.

The results observed in Demirgüç-Kunt and Maksimovic (1998) study provides firm-level support for the proposition that the development of financial markets and institutions facilitates economic growth. In fact, their results show that both an active stock market and banking sector development are important in facilitating firm growth. Thus, firms in countries that have active stock markets and developed banking sector are able to obtain external funds and grow faster.

Beck *et al.* (2005) also use firm level data to investigate the effect of financial development on firms growth rates. Thus, using a size-stratified survey of over 4,000 firms in 54 countries they examine the effect of financial development on easing the obstacles that firms face to grow faster. Their findings show that financial development weakens the impact of various barriers to firm growth and that small firms benefit the most from financial development.

1.3.5 Bank based vs Market based: Empirical Evidence

As we have seen, a growing body of evidence using very different methodologies and data sets find that financial development exerts a first-order impact on economic growth. There is also considerable interest in examining the relative importance of a bank-based or market-based financial system in economic growth. These empirical works employ the same methodology used in the financial development and growth literature. In the cross-country context, Levine (2002) investigates the relationship between economic

growth and the degree to which countries are bank-based or market-based. Thus, he considers the following cross-country regression equations:

$$G = a'X + bS + U(1) \tag{1.21}$$

$$G = c'X + dF + U(2) \tag{1.22}$$

$$G = f'X + hS + jF + U(3) \tag{1.23}$$

Where G is real per capita GDP growth and X is a set of conditioning variables. S is a measure of financial structure[11], four measures of financial structure are considered:

- Structure- Activity: is a measure of the activity of stock markets relative to that of banks.

- Structure-Size: is a measure of the size of stock markets relative to that of banks.

- Structure-Efficiency: is a measure of the efficiency of stock markets relative to that of banks.

- Structure-Aggregate: is a conglomerate measure of financial structure based on activity, size, and efficiency. It is the first principal component of Structure-Activity, Structure-Size, and Structure-Efficiency.

- Structure-Regulatory: is an aggregate measure of regulatory restrictions on commercial bank activities

F measures overall financial sector development: Four measures of overall financial development are considered:

- Finance-Activity: He use the total value traded and private credit ratios as a measure of financial activity of stock market and bank activity respectively.

- Finance-Size: The market capitalization and the private credit are considered as indicators of financial size.

- Finance-Efficiency: is a measure of financial sector efficiency, total value traded ratio and overhead costs are used as measures of financial efficiency.

- Finance-Aggregate: is the first principal component of the first three financial development indicators of activity, size, and efficiency.

[11] Larger values of S signify more market-based, while smaller values signify more bank-based

U(i) is the error term in equation, $i = 1, 2, 3$ respectively, and a, b, c, d, f, h, and j are coefficients.

Constructing an assortment of measures for 48 countries over the 1980−1995 period, Levine (2002) finds that although overall financial development helps explain cross-country growth variations, there is no support for either the bank-based or the market-based view. These results hold when using instrumental variables to control for simultaneity bias.

Using industry-level data, the results of Beck and Levine (2002) are consistent with those of Levine (2002). In fact, The results give no support to either the market-based or bank-based views. Industries that depend heavily on external finance do not grow faster in either bank based or market-based financial systems. Their findings also provide support to the view that industries that depend heavily on external finance grow faster in economies with higher levels of overall financial development. The results are robust to a battery of sensitivity checks.

Demirgüç-Kunt and Maksimovic (2002) investigate whether this difference in the organization of financial systems affects firms ability to obtain external financing for growth. Using firm-level data from a panel of 40 countries their finding show that while the overall financial development helps explain the excess growth[12] of firms across countries, the degree to which countries are bank-based or market-based do not help to explain excess growth.

In summary, the findings of the studies cited above are consistent and show that financial structure is irrelevant. However, these studies are subject of criticisms from Luintel *et al.* (2008) who argue that doubts have been raised on these (multicountry) studies because: "*(i) they cannot address the cross-country heterogeneity and thus mask important cross-country differences in the relationship under investigations;(ii) the panel and the country-specific parameters (estimates) may not be equivalent hence limiting the economic value of panel estimates; and (iii) various countries in the panel are unlikely to be on the balanced growth path raising concern on pooled regressions*" Luintel *et al.* (2008) (p.198). Thus tacking into account these weaknesses, Luintel *et al.* (2008) analyze 14 low- and -middle-income countries using both time series and Dynamic Heterogeneous Panel methods. Augmenting "Cobb-Douglas" production function by measures of financial structure and financial development, Luintel *et al.* (2008) $'$s basic specification is presented as follows:

[12]The excess growth is the proportion of firms where mean growth of real sales exceeds their mean internally financed growth rate

$$\begin{aligned} Log(Q/L)_t &= a_0 + a_1 Log(K/L)_t \\ &+ a_2 Log(F^S)_t + a_3 Log(F^D)_t \\ &+ e_1 \end{aligned} \tag{1.24}$$

Where, Q is Output, L is Labor, K is physical capital stock, F^S and F^D respectively are measures of financial structure and financial development. a_2 is the most important sign and e_1 is the error term. Indeed a significant a_2 implies that financial structure matters:

- If $a_2 > 0 \Leftrightarrow$ a market-based financial system.

- If $a_2 < 0 \Leftrightarrow$ a bank-based financial system.

The measures of financial structures and financial development are computed following Beck and Levine (2002) and Levine (2002). Two measures of financial structure are considered which are:

- Structure-activity which is computed as the log of the ratio of Stock Market Total Value Traded to Private Credit.

- Structure-size which equal to the log of the ratio of Stock Market Capitalization to Private Credit.

Two measures of financial development are also considered:

- Finance-Activity: which include the log of the product of Private Credit Ratio and Stock Market Value Traded Ratio.

- Finance-Size: computed as the log of the product of Private Credit Ratio and Stock Market Capitalization Ratio

Applying the Fully Modified OLS (FMOLS) for their time-series analysis and using the Dynamic Heterogeneous Panel Estimator for panel estimates of 14 low- and-middle-income countries their results provide evidence that financial structure and financial development matter for output levels and economic growth. They attribute the difference between their finding and those of Beck and Levine (2002) and Levine (2002) to their empirical approach, which allows for cross-country heterogeneity in parameters and adjustment dynamics.

1.4 Conclusion

This chapter reviewed theoretical and empirical work on the relationship between financial development and economic growth. Although economists attach different degrees of importance to financial development, its role in contributing to long-term growth can be theoretically postulated, and this has been supported by the empirical findings. In terms of theory, the theoretical model stresses the mechanism by which financial system may affect growth showing that financial systems influence saving rates, investments decisions, technological innovation, and hence long-run growth rates. An extensive theoretical model focused on the relative merits of a bank-based financial system and a market based financial system in promoting economic growth. Finally, some new theoretical models stress the non-linear finance-growth relationship. To explore the mechanisms linking finance and growth, the empirical literature has included broad cross-country growth regressions, panel approach, times series analysis, and industry and a recent movement that uses microeconomic based methodologies. While the empirical studies are characterized by the adoption of different econometric methodologies and several arrangement of financial indicators, the most studies demonstrate a positive strong effect between the functioning of financial system and economic growth.

It is therefore widely accepted that well functioning financial system can positively affect economic growth in both developed and developing economies.

Recognizing the importance of financial development in promoting economic growth, MENA countries have embarked since mi-1980 in far reaching financial reforms. Therefore, in the following Chapter we will investigate empirically the effect of financial development on economic growth in MENA region.

Chapter 2

Financial Development and Economic Growth: Empirical Evidence From MENA Countries

2.1 Introduction

As shown in Chapter 1, while economists provide contradictory predictions about the impact of financial development on economic growth, most of these studies have stressed the importance of financial development in determining economic growth.
The importance of finance in promoting economic growth arise the importance of investment in more developed financial system. In this vein, MENA countries have undertaken several reforms. The evidence indicates that MENA countries witnessed great improvement in their financial system at different aspects[1] (Cherif *et al.* (2006-2007)).

The aim of this Chapter is therefore to empirically investigate the effect of financial development on economic growth in MENA region. Using financial data from 1984 to 2007 and applying GMM-System technique of estimation we test whether stock markets and banks have a positive or a negative impact on economic growth.
The rest of the chapter is organized as follows. We briefly describe the evolution of financial system and economic growth in MENA region over $1984-2007$ period in section 2. Then in a third section we describe the data collected and discuss the econometric methodology. Empirical results are presented in section 4. Section 5 concludes.

[1]For example, MENA countries, have experienced a wave of liberalization in the financial sector (Ben Naceur *et al.* (2008) and Kar *et al.* (2010))

2.2 Financial system evolution in MENA region and economic growth

The measure proposed in the literature for financial development has evolved overtime concentrating in the first stage on the banking system and then expanding to the capital markets. Thus to examine the evolution of financial system in MENA countries we based on the measures proposed by Beck *et al.* (2000a). In this section we examine the banking sector evolution in MENA region, then we examine the evolution of stock market and economic growth in this region. Thus, first of all we present the definition and the measures of financial development indicators used in this study.

2.2.1 Measurement of financial development

Financial development is usually defined as a process that marks improvements in quantity and quality in financial services. Well-functioning financial systems should offer a wide range of financial services and products from a diversified set of financial intermediaries and markets (Calari and Ingves (2005) handbook Chapter 2) Which involves the interaction of many activities and institutions. Consequently, it cannot be captured by a single measure. Thus, we consider indicators of both financial intermediaries and stock market development as indicator of financial sector development, which are the most widely used measures of financial development.

2.2.1.1 Banking Data Set

We consider four indicators of banking sector development. They cover 18 MENA countries[2] over 1984-2007 period:

- ***Private Credit*** (*PRIVCRE*): equals banking institution credits to the private sector as a percent of GDP[3]. Some authors (Levine et al.2000, Beck and Levine 2004) argue that is probably a better proxy for banking sector development since it only accounts for credit granted to the private sector, as opposed to credit issued to government and other non private institutions. It also excludes credit issued by the central bank, therefore, it is a more accurate measure of the savings that financial intermediaries channel to the private sector. Boyd *et al.* (2001a) also argue that "*private credit is not merely a measure of size. It isolates credits*

[2] Algeria, Bahrain, Djibouti, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabic, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen.

[3] The credit data are from IFS lines $22d + 42d$

to the private sector and excludes credits issued to the government, government agencies and public enterprises (Boyd et al. (2001a), p.227)". It is considered as indicator of financial intermediary's activity (Demirgüç-Kunt and Levine (1999)).

- ***Liquid liabilities*** (*LIABILITIES)*: is the ratio of liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP[4]. It is a general indicator of the size of financial intermediaries relative to the size of the economy. This commonly used measure of financial development has shortcomings. It is likely to measure the extent to which transactions are monetized rather than the functions of financial system such as saving mobilization and efficient allocation of investments as presented in the theoretical models (Ghirmay 2004). However, this indicator has been widely used (Goldsmith 1969, McKinnon 1973, King and Levine 1993a, 1993b) under the assumption that the size of financial intermediary sector is positively correlated with the provision and quality of financial services (Levine et al. (2000)). Also (*LIABILITIES*) is considered as complements to (*PRIVCRE*) variable because it measures the size of financial intermediaries and does not focus in the intermediation of credit to the private sector. Thus, we include it as another measure of bank development.

- ***Bank assets*** *(ASSETS)*: equals the ratio of the total assets of deposit money banks (commercial bank and other deposit taking banks) divided by GDP[5]. This variable measures the importance of deposit money banks, as reflected in their total assets, relative to the economy. It provides a measure of the overall size of banking sector. *LIABILITIES* and *ASSETS* are size measures and do not consider the allocation of capital between the private and public sector.

Thus, taken together, these three measures of bank development provide more information on banking sector than if ones use only a single.

Finally, we construct an index of banking sector development *(BANKINDEX)* that aggregate the information contained in the individual indicators. Thus, to do this, we use a formula[6], which is similar to the algorithm developed by Demirgüç-Kunt

[4]International Financial Statistics (IFS) line 551, or IFS lines $34 + 35$. GDP is obtained from IFS line 99b

[5]Total assets are from IFS lines $22a - d$

[6]This formula is also adopted by Ben Naceur and Ghazouani (2007) to construct a composite stock market and banking indexes.

and Levine (1996b). Specifically the construction of *BANKINDEX* follows a two-step procedure. First, for each country i and each time t, transformed variables of private credit, liquid liabilities and bank assets ratios are computed. We define the transformed value of each variable X[7] as follows:

$$X_{it}^{t} = (X_{it} - \overline{X})/|\overline{X}| \tag{2.1}$$

$\overline{X}$ is the average value of variable X across all countries in the panel over the period of observation for each one. Second, we take a simple average of the transformed value of private credit, liquid liabilities and bank assets ratios obtained by expression 2.1 in order to provide the overall bank index *BANKINDEX*.

2.2.1.2 Stock Market data set

The stock market data set focuses on measures of stock market development. Given that stock market in some MENA countries (e.g. Libya in 2006, Syrian Arab Republic in 2009, Algeria in 1999[8]) are launched recently, our stock market data set covers only 13 MENA countries[9] over 1984-2007 period:

- ***Market Capitalization***(*MCAP)*: to measure market size, we use the ratio of stock market capitalization to GDP. It is equals to the ratio of the value of domestic equities (that are traded on domestic exchanges) to GDP. Many observers use the market capitalization ratio as an indicator of market development (Yartey 2008, Garcia and Liu (1999)). Demirguç-Kunt and Levine (1996) argue that market capitalization is positively correlated with the ability to mobilize capital and diversify risk.

- ***Total value traded****(TRADED)*: equals the total value of domestic equities traded on each country's major stock exchanges as a percentage of GDP . The total value traded ratio measures the organized trading of equities as a share of national output, and should therefore positively reflect liquidity on an economy wide basis. This measure is also considered as indicator of stock market activity (Dermiguç- Kunt and Levine (1999)). The total value traded complements the market capitalization. Although market capitalization may be large, there may

[7] X indicates variables *PRIVCRE*, *LIABILITIES* or *ASSETS*

[8] To this day, the Algerian Stock Market still in its infancy.

[9] Bahrain, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia and UAE

be little trading.

- ***Turnover ratio****(TURNOVER)*: is also a measure of stock market liquidity. It is equals to the total value of domestic shares traded divided by market capitalization. The turnover ratio may be importantly different from the value traded ratio. While the turnover ratio measure captures trading relative to the size of market, value traded measures trading relative to the size of the economy. Thus, a small, liquid market will have a high turnover ratio but a small total value traded to GDP ratio.

We use the three indicators of stock market development to construct the overall stock market index *MARKETINDEX* based on a formula that is similar to the one developed to obtain a bank index (expression 2.1 above).

2.2.2 Evolution of the banking sector

Figure 2.1 illustrates the evolution of the size of the banking sector[10] in MENA region from 1984 to 2007 as a percentage of GDP.

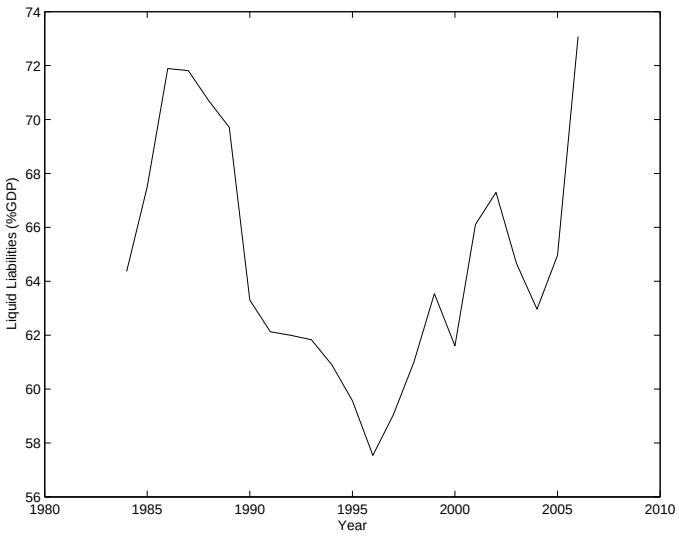

Figure 2.1: **Liquid Liabilities in MENA countries (1984-2007)**

In general, the more developed a financial system is the larger it is relative to GDP. The MENA financial system grew from 64,37% in 1984 to 72% in 1985 before shrinking

[10]The size of banking sector is measured by the liquid liabilities to GDP ratio

to about 58% in 1996. Since 1996 this aggregate has increased to about 73% in 2006. Table 2.1 indicates that Jordan has the largest financial system[11] followed by Egypt, Kuwait and Israel where the liquid liabilities to GDP ratio are around 84%, 80% and 75% respectively. Libya, Oman and Qatar have the lowest financial system where the aggregate is around 33%, 30% and 37% respectively.

Figure 2.2 presents the evolution of banking assets to GDP ratio, which provides measure of the overall size of banking sector. Similarly to liabilities ratio, the bank assets to GDP ratio has increased between 1984 and 1985 from 53% to 61% respectively. Since 1991, this aggregate has increased from 50% to 70% in 2006. Table 2.1 shows that there have been notable differences between MENA countries. In fact, in Kuwait which has relatively the largest banking sector, the ratio of bank assets to GDP is 10 times larger than in Yemen which was only around 9% over 1985 to 2007 period.

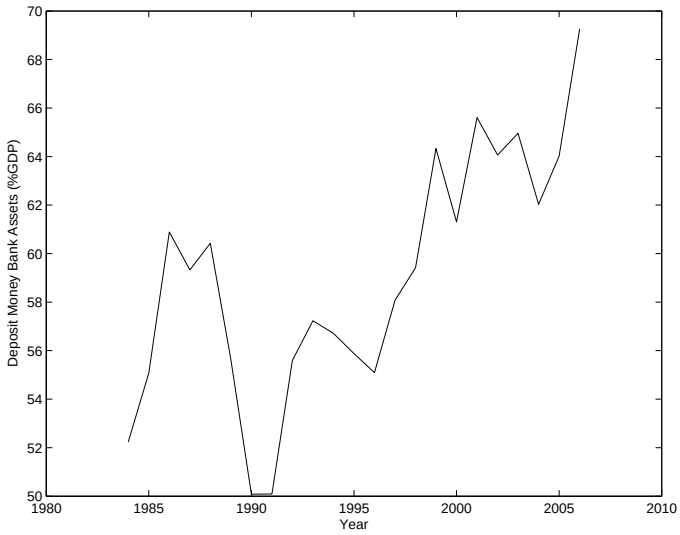

Figure 2.2: **Banking Assets in MENA countries (1984-2007)**

Looking to banking sector activity, Figure 2.3 shows that since 1986, banking sector activity in MENA region has fallen significantly from 51% in 1986 to 37,41% in 1992 before increasing to about 60% in 2006. Table 2.1 shows that Differences among MENA financial systems are important when comparing domestic credit to private sector to GDP. They range from level over 70% in Jordan to level below 10% in the least financially active group (Syrian Arab Republic and Yemen) Tunisia and Saudi Arabia have

[11]The liquid liabilities to GDP ratio is around 108% in Jordan

a moderate level of banking sector activity.
In general the aggregate shows that Jordan, Kuwait and Israel have relatively well developed banking sector, while Oman and Yemen have relatively weak financial system. Tunisia and Morocco and Qatar have a moderate level of financial systems development.

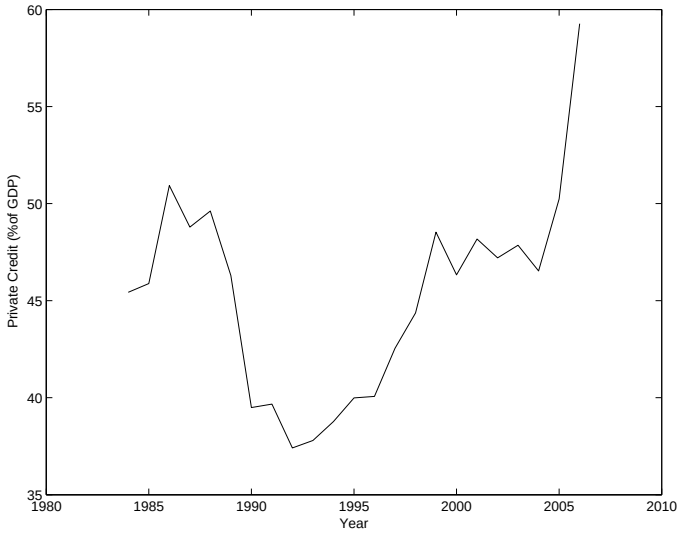

Figure 2.3: **Domestic Credit to private sector in MENA countries (1984-2007)**

Table 2.1: **Indicators of Banking sector development in MENA countries, (1984-2007)**

Country	LIABILITIES	ASSETS	CREDIT
Algeria	0.521	0.467	0.262
Bahrain	0.667	0.498	0.498
Djibouti	na	na	na
Egypt	0.837	0.6633	0.404
Iran	0.397	0.640	0.279
Israel	0.754	0.946	0.644
Jordan	1.080	0.792	0.698
Kuwait	0.797	0.952	0.614
Lebanon	na	na	na
Libya	0.335	0.255	0.178
Morocco	0.695	0.469	0.388
Oman	0.309	0.360	0.321
Qatar	0.374	0.490	0.248
SaudiArabia	0.455	0.334	0.571
Syrian Arab Republic	0.564	0.349	0.082
Tunisia	0.515	0.580	0.607
UAE	na	na	na
Yemen	0.364	0.089	0.046

Source: World Development Indicators (World Bank 2008), The November 2008 Beck et al.(2000) database, and author's calculations.

2.2.3 Evolution of the stock markets

Following conventions, the development of stock market over time can be examined using the size and the liquidity of stock markets.
The stock markets in our sample of MENA countries have seen considerable development since 1990s (Cherif and Gazdar (2010)).
To understand the economic importance of the stock market capitalization in our sample, we examine the capitalization ratio. This ratio is defined as the value of domestic equities traded on the market relative to GDP. As we can observe from Figure 2.4 while stock market capitalization as a percentage of GDP has fallen from 48% in 1984 to 13,7% in 1990, this aggregate has increased significantly since 1990 from 13,7% to about 104% in 2007.

Figure 2.4: **Stock Market Capitalization in MENA countries (1984-2007)**

The high growth of the capitalization ratio coincided also with an increase in the number of listed companies. The number of listed companies has more than doubled growing from less than 1080 companies in 1990 to about 2263 companies in 2007.

To examine the MENA region stock markets depth, we measure the activity of stock market using value traded as share of GDP, which gives the value of stock transactions relative to the size of the economy. Figure 2.5 shows that, value traded as a percentage of GDP increased from about 3% of GDP in 1984 to roughly 56% of GDP in 2007.

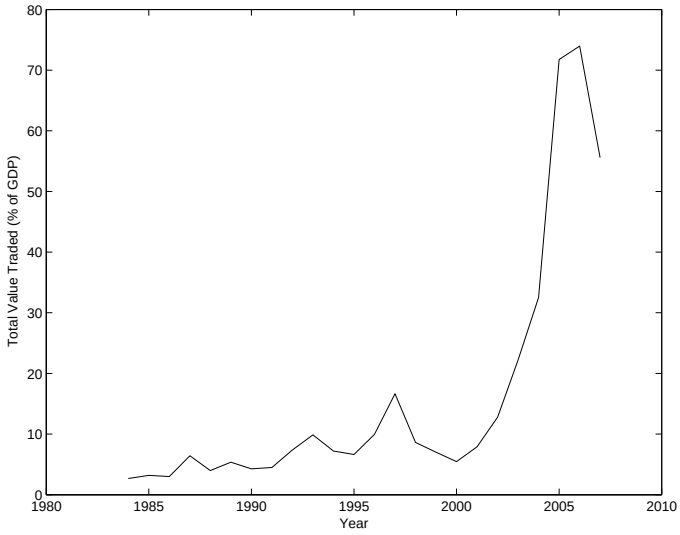

Figure 2.5: **Total Value Traded in MENA countries (1984-2007)**

To clearly understand the liquidity picture, we examine the turnover ratio. The turnover ratio is defined as the ratio of the value of total shares traded and market capitalization. It measures the activity of the stock market transactions relative to its size. Many analysts use the turnover ratio as measure of transactions costs. High turnover ratio implies high transaction and consequently high efficiency. In our sample of countries the turnover ratio has increased from under 33% in 1990 to about 49% in 2007 (Figure 2.6)which can be interpreted as an efficiency gain in MENA region stock markets.

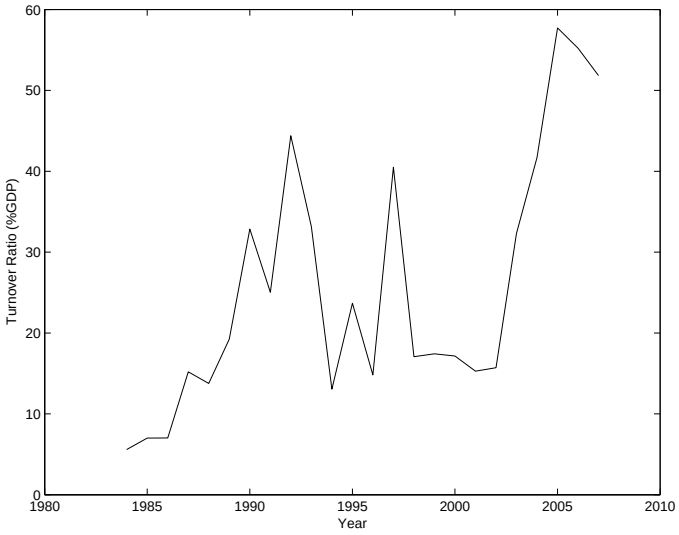

Figure 2.6: **Turnover Ratio in MENA countries (1984-2007)**

Within the MENA region, there is a substantial variation in the degree of financial development. Some countries have advanced financial sectors, while for others progress in this area has been limited. As we can observe from Table 2.2, stock market development indicators exhibit a considerable variability across countries, according to the market capitalization and market activity respectively. First, when we consider the market capitalization, Jordan, Qatar, and Israel seem to outperform other countries. On the other hand, Tunisia, Iran, and Lebanon come at the end of the list.

Second, in terms of activity[12] , Saudi Arabia and Kuwait have relatively the more active stock market, followed by Jordan. However, Tunisia, Bahrain and Lebanon have the less active stock markets. This is partly as a result of the limited number of companies listed on the exchanges in the latest countries. For example, in 2007 the number of listed companies was 50 and 11 in Tunisia and Lebanon respectively. Finally, looking to turnover ratio we find that Saudi Arabia also has relatively the more liquid stock market followed by Kuwait.

[12]Following Demirgüç-Kunt and Levine (1999) we consider the total value traded as a share of GDP as measure of stock market activity. This measure is also used to gauge market liquidity because it measures trading relative to economic activity (Levine and Zervos 1998).

Table 2.2: **Indicators of stock market development in MENA countries, (1984-2007)**

Country	Market Capitalization	Total Value Traded	Turnover Ratio	Listed Companies
Algeria	na	na	na	na
Bahrain	0.992	0.043	0.043	43
Djibouti	na	na	na	na
Egypt	0.323	0.087	0.275	435
Iran	0.143	0.022	0.162	329
Israel	0.561	0.270	0.473	654
Jordan	0.917	0.288	0.231	245
Kuwait	0.796	0.470	0.601	181
Lebanon	0.162	0.024	0.123	11
Libya	na	na	na	na
Morocco	0.297	0.050	0.165	74
Oman	0.239	0.060	0.250	124
Qatar	0.885	0.146	0.235	40
Saudi Arabia	0.616	0.749	1.012	111
Syrian Arab Republic	na	na	na	na
Tunisia	0.115	0.012	0.096	50
UAE	0.468	0.194	0.483	na
Yemen	na	na	na	90

*Source:*World Development Indicators (World Bank 2008); and author's calculations.

2.2.4 Growth Performance of the MENA countries

Despite apparent reforms starting in the mid-1980s, the growth performance of the region has often been disappointing. In fact economic growth in the MENA region is lagging behind those of the emerging region (Asia region, Latin America and Central and Eastern Europe). This weak performance can be traced to the large fall in international oil prices in the mid-1980s, which has generate a marked slowdown and/or macroeconomic crisis in most MENA countries (Nabli and Véganzonès-Varoudakis (2004), Bhattacharya and Wolde (2010).

Chart 2.7[13] shows that while growth performance in almost MENA countries improved during 2000s, GDP growth has been largely surpassed in South Asia and in least developed countries in general. The GDP growth rate reaching 5 percent and 3.7 for the period of 2000-2007 in South Asia and Least Developed Countries respectively, against 2.4 percent for the MENA countries.

Chart 2.8 shows the evolution of annual GDP growth rate in each countries of MENA region. The main findings are that Iran, Bahrain and Jordan achieved the best results of the group, with the GDP growth rate reaching respectively 4.2 percent 4 percent and 3.9 percent in the last decade (2000-2007). Followed by Tunisia with 3.8 points

[13](i) Blue color: data are averaged over 1984-1991 period (ii) Green color: data are averaged over 1984-1991 period and (iii) Red color: data are averaged over 2000-2007 period.

increases. Morocco and Oman follow, the GDP growth rate reaching 3.3 percent and 2.8 percent respectively. The GDP growth rate has fallen in Syrian Arab Republic, Yemen, Israel and Lebanon.

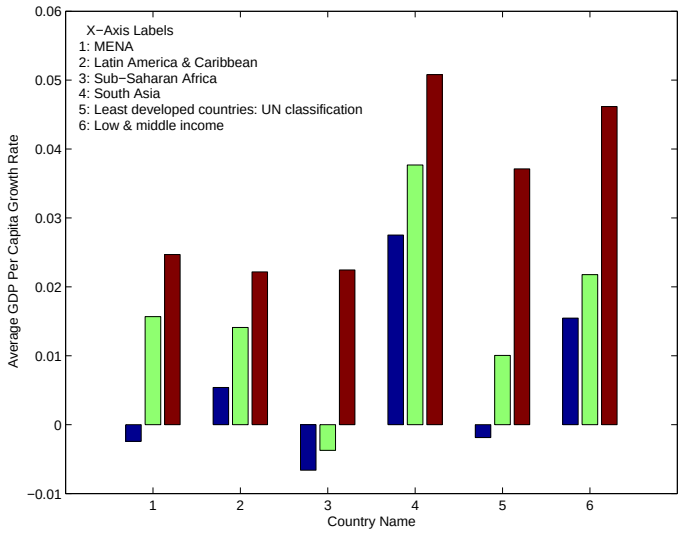

Figure 2.7: **GDP Per Capita Growth by Region**

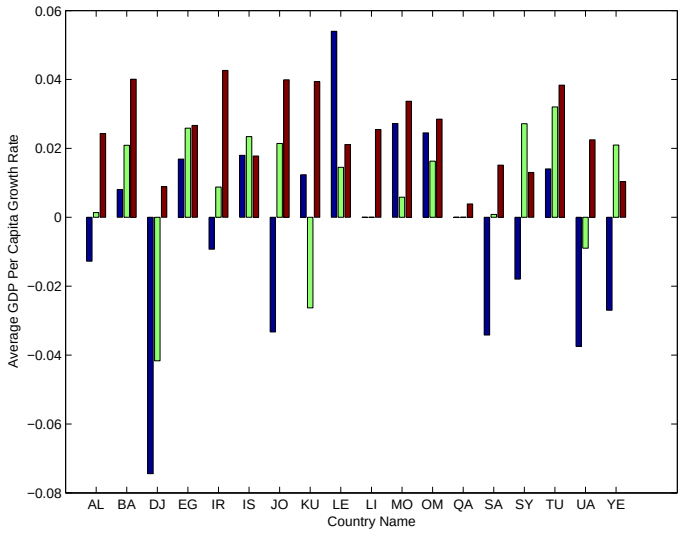

Figure 2.8: **GDP Per Capita Growth in Selected MENA Countries**

2.3 Data and Econometric Methodology

In this section we empirically assess the relationship between financial development and economic growth in MENA region over the period of 1984-2007.
Our econometric investigations with panel data is described in the next sub-section using a regression specification given by the following expression:

$$GROWTH_{it} = \alpha_i + \beta \mathrm{FD}_{it} + \gamma \mathrm{Z}_{it} + \varepsilon_{it} \tag{2.2}$$

$i = 1, ..., n$ and $t = 1, ..., T_i$

where, $GROWTH_{it}$ is the dependent variable, which equals to real per capita GDP growth in the ith country for some time-period. FD_{it} includes variables that measure stock markets and banking development, Z_{it} represents a matrix of control variables, α_{it} is an unobserved country specific effect, and ε_{it} is the error term of each observation.

As discussed in the first Chapter some theories suggest that the more developed financial system will be associated with more economic growth, i.e., these theories predict that β will be significantly greater than zero.

2.3.1 Data and Measurement

Employing the November 2008 Beck *et al.* (2000a) database on financial development indicators from 1984 to 2007 are extracted. Other information related to control variables such macroeconomic stability, trade openness... are collected from the World Development Indicators (World Bank 2007) database. However, the data are not available for a uniform period for each country. Therefore, the number of observations is expected to vary across countries leading to estimations over an unbalanced panel data.

2.3.1.1 Data on financial Development

We consider four indicators of banking sector development and four indictors of stock market development[14]. The banking data set are: (i) private credit (*PRIVCRE*); (ii) liquid liabilities (*LIABILITIES*), (iii) bank assets (*ASSETS*) and (iv) a bank index (*BANKINDEX*). Also, four indicators are considered to measure stock market development: (i) Market Capitalization (*MCAP*), (ii)Total Value Traded (*TRADED*) (iii)Turnover ratio (*TURNOVER*) and (iv) a market index (*MARKETINDEX*).

[14]The details and the description of all the indicators of financial development are reported in section (2.2).

2.3.1.2 Data on Other Variables

Existing theoretical framework provides no guidance as to the choice of controls variables to include in the growth regression. However, the empirical growth literature suggests a wide range of growth determinants, "*Over 50 variables have been found to be significantly correlated with growth in at least one regression*" (Levine and Renelt (1992) p.943). Therefore to assess the strength of the independent link between financial development and economic growth, we control for other potential determinants of economic growth in our regression. Specifically we consider the most used variables in the empirical growth theory defined as follows (Table B.1 (Appendix Chapter 2) shows the variables used in our study and the data sources):

- Initial Level of Development (IIC): Equals the logarithm of initial income par capita, which will provide evidence of any convergence effects. According to the neoclassical theory the sign of the coefficient associated to per-capita income should be negative.

- Trade Openness (TO): The empirical growth literature has shown that openness to international trade is an important determinant of economic growth (Grossman and Helpman (1992) and Harrison (1996)). In fact, it is argued that openness to international trade stimulates the growth of exports and increases the availability of imports of inputs and machinery, thereby accelerating the economy's technological development and hence fosters economic growth (Dollar (1992)). Our proxy for trade openness is the ratio of the sum of exports and imports over GDP. We expect a positive relationship between TO and economic growth.

- Government Consumption (GC): We control for the level of government consumption with the ratio of government consumption to GDP. The economic growth literature suggests that a measure of government consumption used as a proxy for the level of political corruption in the country as well as for the direct effects of non-productive public expenditures and taxation (Cook and Uchida (2003)). We expect a negative relationship between GC and economic growth.

- Inflation (INF): It is included as indicator of macroeconomic stability. Economic theory and empirical evidence suggest a negative relationship between macroeconomic instability and economic growth (Fischer (1993); Bruno and Easterly (1998)). Our proxy for inflation is the annual inflation rate (INF). The coefficient

of INF is expected to be negative

Table B.2 (Appendix B) provides descriptive statistics. The correlations are presented in Table B.3. Interestingly, the simple correlations of the indicators of both banks and stock market and GDP growth are all weak. We note that while market capitalization is correlated positively and significantly with economic growth, stock market index, total value traded and turnover ratio are not correlated significantly with economic growth. The four indicators of banking sector development are not correlated significantly with economic growth. In fact, financial indicators measuring both the size of the financial sector (*LIABILITIES*) and the activity level of the banking sector (*PRIVCRE*) are negatively correlated with economic growth.

2.3.2 Econometric Methodology

The purpose of this subsection is to empirically investigate the impact of financial development on economic growth using a dynamic panel setting. The majority of previous studies and specifically the early finance and growth literature [15] employed the standard cross-sectional OLS regressions where data for each country averaged over the sample period.

However, while cross-sectional estimation methods may, in principle, capture the long-run relationship between the variables concerned, they do not take advantage of the time-series variation in the data, which could increase the efficiency of estimation. Also, the OLS estimates are biased and inconsistent when there are dynamic effects and simultaneity in the specification. To overcome biased related to OLS researchers consider cross-sectional IV (Instrumental Variables) regressions which implies an identification of an instrument that helps isolate that part of the variation in the endogenous variable that is not associated with reverse causation, omitted variables and measurement error. Beck (2008) stress several shortcomings of the cross-sectional IV: First, cross-sectional IV regressions control only for the endogeneity and measurement error of financial development indicators, but not of other explanatory variables entering the growth regressions. Second, in the presence of country-specific omitted variables, the lagged dependent variable is correlated with the error term if it is not instrumented. Thus, to account for these effect and according to (Levine et al.(2000), Beck and Levine (2004)), we use a dynamic panel model which is designed to address the problem of correlation between the lagged dependant variable and the error term as well as between unobserved group specific effects and explanatory variables. Further, the use of a dynamic panel will allow us to incorporate both the time-series dimension and the

[15] King and Levine (1993), Atje and Jovanovic (1993) and Levine and Zervos (1998)

cross-sectional information in the data, thus gaining a higher degree of freedom and more precise estimates.

2.3.2.1 Detailed Presentation of the Econometric Methodology

To assess the relationship between financial development and economic growth in our dynamic panel, we use the System GMM estimator proposed by Arellano and Bover (1995). We can write the traditional cross-country growth regression as follows:

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta' X_{i,t} + \mu_i + \varepsilon_{i,t} \tag{2.3}$$

Where y_{it} is the logarithm of real per capita GDP, $y_{i,t-1}$ represents the log of the level of real per capita GDP at the beginning of each period, $X_{i,t}$ is the vector of the explanatory variables described in the previous section, other than lagged per capita GDP and including our indicators of financial development, μ is an unobserved country-specific effect, ε is the error term; i holds for the country ($i = 1, , N$); and t represents the time period.

To eliminate the country-specific effect, Arellano and Bond (1991) suggest first-differencing the regression equation 2.3:

$$\triangle(y_{i,t} - y_{i,t}) = \alpha \triangle y_{i,t-1} + \beta' \triangle X_{i,t} + \triangle \varepsilon_{i,t} \tag{2.4}$$

One result of the transformation is that it eliminate the country specific effect μ_i. However, first-differencing equation (2.3) induces a new bias by construction the new error term, $\triangle \varepsilon_{i,t}$ which is correlated with the lagged dependant variable $\triangle y_{i,t-1}$[16]. Hence Arellano and Bond (1991) propose the following moments conditions:

$$E[y_{i,t-s}(\triangle \varepsilon_{i,t})] = 0 \tag{2.5}$$

$$E[X_{i,t-s}(\triangle \varepsilon_{i,t})] = 0 \tag{2.6}$$

(For $s \geq 2; t = 3.....T$)

The moment conditions (2.5) and (2.6) imply that $\triangle \varepsilon_{i,t}$ have a null covariance with all $y_{i,t}$ and $X_{i,t}$ dated $t-2$ and earlier. Consequently, it is possible, starting from $t-2$, to go back through the panel to obtain appropriate instruments in order to eliminate the correlation between $\triangle y_{i,t-1}$ and $\triangle \varepsilon_{i,t}$.

[16] $\triangle$ denotes the difference operator

Using conditions (2.5) and (2.6), Arellano and Bond (1991) propose a two-step GMM estimator, commonly called difference GMM. In the first step the error terms are assumed to be independent and homoskedastic across countries and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thus relaxing the assumptions of independence and homoskedasticity. The two step estimator is thus asymptotically more efficient relative to the first-step estimator.

There are, however main shortcomings with this difference estimator. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998), show that in the case of persistent explanatory variables, lagged levels of these variables are weak instruments for the regression equation in *differences*. In small samples, Monte Carlo experiments show that the weakness of the instruments can produce biased coefficients. To reduce the potential biases and imprecision associated with the difference estimator, Blundell and Bond (1998), developed an augmented GMM procedure (called GMM in *system*) which combines the regression in *differences* with regression in *levels*. In the Blundell and Bond GMM estimator, the instruments for the regression in levels are the lagged differences of the corresponding variables, and the instruments for the regression in differences are the lagged levels. Thus Blundell and Bond (1998) and Arellano and Bover (1995) set the following additional moment conditions:

$$E[(y_{i,t-s} - y_{i,t-s-1}) * (\mu_i + \varepsilon_{i,t})] = 0 \quad (2.7)$$

$$E[(X_{i,t-s} - X_{i,t-s-1}) * (\mu_i + \varepsilon_{i,t})] = 0 \quad (2.8)$$

(For $s = 1$)

Thus, to generate consistent and efficient parameter estimates we use the system GMM estimator that combines both set of moment conditions presented in equations (2.5)-(2.8).

The appropriateness of the chosen instruments can be validate through two tests proposed by Arellano and Bond (1991). The first is either a Sargan or Hansen test of over-identifying restrictions, which test the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second tests the null hypothesis that the errors $\varepsilon_{i,t}$ in the first-difference regression exhibit no second-order serial correlation. The non-rejection of the null hypothesis gives support to our model.

2.4 Empirical Results

Using the econometric method outlined above, this section presents regression results concerning the relationship between economic growth and various measures of financial development.
Table 2.3 presents equations with annual data estimated with the Blundell and Bond dynamic panel-data estimation technique, i.e., two-step system GMM estimations. In addition, we use four-year data averaged to prevent any biased estimates and to abstract from business cycle phenomena. This transformation entails that for all countries mostly four-year periods exist (1984-1987, 1988-1991, 1992-1995, 1996-1999,2000-2003, 2004-2007), so there is six non-overlapping periods. We report the GMM estimates based on four-year average variables in Table 2.4.

The GMM system regressions satisfy both the *Sargan* test of over-identifying restrictions and the serial correlation test. In all our model specifications, the *Hansen* test cannot reject the null hypothesis that our instruments are valid. Moreover, the *AR2* test fails to reject the null hypothesis that there is no second order autocorrelation in the differentiated residuals. (Tables 2.3, 2.4, 2.5 and 2.6).

2.4.1 Bank and Economic Growth

Table 2.3 reports the empirical results of the regressions on the link between economic growth and banking sector development for our sample of 18 countries between 1984 and 2007. The first regression reports the results when *BANKINDEX* is considered as the indicator of financial development. In regressions (2)-(4), we have introduced the usual measures of banking sector development that is *LIABILITIES*, *ASSETS* and *PRIVCRE*.
The empirical results indicate that there is a negative association between economic growth and banking sector development with significance varying with the nature of measure introduced for banking development. Regression 1 (Table 2.3), show that the coefficient associated to *BANKINDEX* is significantly negative at 10%. The results also show that deeper banking sector (on forma of highest deposit money bank assets to GDP)has a significant negative effect on economic growth. In fact, the coefficient associated to *ASSETS* is negatively significant at 5% (column 3).

Considering the preferred financial development measure in the literature (Levine et al. 2000; Beck et al. 2000), private credit (*PRIVCRE*)(regression 4), the evidence shows that banking sector activity has a significant effect on economic growth in MENA countries. The significance level is 5%.

The evidence from regression (2) indicates that larger banking sector (on forma of higher liquid liabilities) does not appear significant determinant of economic growth in MENA countries. In fact, the coefficients associated to *LIABILITIES* appear negatively insignificant.

Our findings are consistent with Ben Naceur and Ghazouani (2007), and Shen and Lee (2006) results, that is banking sector development is trivial or even harmful for economic growth.

Table 2.3: **Dynamic panel-data estimations of the relationship between banks and economic growth (annual data), two step system GMM results**

Variable	*(1)* ***FD***= BANKINDEX	*(2)* ***FD***= Liquid Liabilities	*(3)* ***FD***= BANK ASSETS	*(4)* ***FD***= PRIVATE CREDIT
BANKINDEX	-.036***			
	(-1.94)			
LIABILITIES		-.0005		
		(-0.03)		
ASSETS			-.263**	
			(-2.30)	
PRIVCRE				-.157**
				(-2.19)
IIC	.178*	.108*	.204*	.195*
	(6.66)	(6.20)	(3.53)	(12.16)
INF	.027**	.042*	.117*	.007
	(2.03)	(5.62)	(2.70)	(0.49)
TO	-.039	-.027**	-.006	-.019
	(-1.13)	(-2.46)	(0.916)	(-0.50)
GC	-.927*	-.667*	-1.06*	-.840*
	(-7.26)	(-8.37)	(-3.47)	(-5.77)
cst	-.388	-.219	-.347*	-.414*
	(-8.38)	(-4.00)	(-2.71)	(-10.38)
AR(2)	0.940	0.834	0.711	0.966
Sargan	0.771	0.694	0.677	0.077
Hansen	0.237	0.728	0.809	0.252
N	222	222	222	222

*Notes:*The definitions of our variables appear in Table B.1(Appendix Chapter 2). *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments. For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

To check whether the results change across data over four years we use four-year average data . The results are reported in Table 2.4.

The first interesting results are that in term of significance the results are consistent with those of our findings with annual data set when *BANKINDEX* and *LIABILITIES* are used as proxies of banking sector development. In fact, while liquid liabilities *(LIABILITIES)* has no significant effect on economic growth, *BANKINDEX* remains to have a significantly negative effect on economic growth. *ASSETS* and *PRIVCRE* have no significant effect in economic growth.

Table 2.4: **Dynamic panel-data estimation of the relationship between banks and economic growth, (four year average), two-step system GMM results**

Variable	*(1)* ***FD***= BANKINDEX	*(2)* ***FD***= Liquid Liabilities	*(3)* ***FD***= BANK ASSETS	*(4)* ***FD***= PRIVATE CREDIT
BANKINDEX	-.0431***			
	(-1.76)			
LIABILITIES		.009		
		(0.24)		
ASSETS			.089	
			(0.95)	
PRIVCRE				.055
				(1.09)
IIC	.047	.109*	.060*	.086*
	(1.42)	(2.82)	(3.69)	(9.17)
INF	.011	.024	-.027	.053*
	(0.39)	(1.06)	(-1.10)	(2.85)
TO	-.006	-.017	-.008	-.010
	(-0.21)	(-1.05)	(-0.81)	(-0.72)
GC	-.464*	-.616*	-.448*	-.596*
	(-3.03)	(-4.90)	(-6.95)	(-9.48)
cst	-.054	-.235**	-.147*	-.191*
	(-0.67)	(-2.40)	(-3.28)	(-6.22)
AR(2)	0.437	0.935	0.513	0.621
Sargan	0.953	0.972	0.863	0.953
Hansen	0.883	0.925	0.898	0.161
N	65	64	64	64

Notes: The definitions of our variables appear in Table B.1(Appendix Chapter 2). *N* refers to number of observations included in the estimation. For Sargan test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (AR2), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

In summary, we find that there is an insignificant and negative association between banking sector development and economic growth in MENA countries. In fact, banking sector hampers economic growth in MENA countries instead of spuring it. This counter-intuitive result of the impact of banking sector development on economic growth can be explained by the fact that the banking sector in MENA region is dominated by public sector banks, which are characterized by government intervention in credit allocation, losses and liquidity problems, and wide interest rate spreads (Creane *et al.* (2004)). Also this may be linked to the weakness of banking supervision and regulation in this region, which is shown in the high non-performing loans (e.g. in 2008 the non performing loans are around 16 and 15 percent of total loans in Tunisia and Egypt respectively.)[17].

[17]Source: World Development Indicators (World Bank)

2.4.2 Stock Market and Economic Growth

Table 2.5 shows the empirical results of the regressions on the link between economic growth and stock market development using annual data set. The results with a four year average data are reported in Table 2.6.

Similar to banking sector regressions, the results from Table2.5 show that there is a negative association between economic growth and stock market development with significance varying with the nature of measure introduced for stock market development. The evidence from regression (1) shows that stock market index affects significantly and negatively economic growth in MENA countries. The coefficient for *MARKETINDEX* is significant at 10%.

The coefficient of the second proxy of stock market development (*MCAP*) shows that stock market size (in forma of stock market capitalization) has no significant effect on economic growth in MENA countries. Considering the stock market liquidities, we find that both indicators of stock market liquidities (*TRADED*) and (*TURNOVER*) affect negatively and significantly economic growth.

Table 2.5: **Dynamic panel-data estimations of the relationship between stock market and economic growth (annual data), two step system GMM results**

Variable	**(1) FD**= MARKET INDEX	**(2) FD** = MARKET CAPITALIZATION	**(3) FD** = TRADED RATIO	**(4) FD** = TURNOVER
MARKETINDEX	-.004***			
	(-1.79)			
MCAP		.004		
		(0.30)		
TRADED			-.013**	
			(-2.18)	
TURNOVER				-.015**
				(-2.00)
IIC	.117*	.054	.109*	.095**
	(2.78)	(1.25)	(3.44)	(2.57)
INF	-.066***	-.095	-.105	-.052**
	(-1.74)	(-1.16)	(-1.62)	(-2.01)
TO	-.014	.021	.025	-.011
	(-0.55)	(1.02)	(1.04)	(-0.48)
GC	-.711*	-.364**	-.828*	-.600*
	(-3.75)	(-2.55)	(-6.21	(-3.73)
cst	-.238**	-.089	-.210*	-.184**
	(-2.41)	(-0.73)	(-2.77)	(-2.05)
AR(2)	0.175	0.157	0.155	0.180
Sargan	0.105	0.186	0.109	0.115
Hansen	0.127	0.250	0.239	0.394
N	154	145	152	154

*Notes:*The definitions of our variables appear in Table B.1. *N* refers to number of observations included in the estimation. For Sargan test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (AR2), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Looking to the four-year average data set, the results of Table 2.6 are consistent with annual data set when we use market capitalization and turnover ratio as proxies of stock market development: GDP per capita growth rate has a weak relationship with market capitalization to GDP (*MCAP*), however, it shows a negative association with turnover ratio *(TURNOVER)*. The results displayed in Table 2.6 indicate that the coefficients of *MARKETINDEX* and *TRADED* are negative but no longer significant at the levels of significance.

These results can be explained by the fact that stock markets in MENA countries are relatively new and generally do not have a sufficient size to contribute to economic growth. These evidences are in line with the theoretical argument of Singh (1997) which argues that even in developed countries stock markets are not necessary institutions for achieving high levels of economic development. Developing countries are likely to do worse in these respects given that they do not possess a developed infrastructure for

well-functioning stock markets (Singh (1997), p.775). Another explanation is that the volatile nature of stock market in many developed countries can hamper economic growth (Singh (1997)). That is the volatility of stock market may reduce the ability of the public sector to supervise on a company's investment efficiency and the public may increase investment returns by speculating in the stock market(Bhide (1993)).

Turning to the four macro-economic variables (Tables 2.3 to 2.6) we find that The coefficients of the initial level of development (IIC) have an unexpected significant positive sign in most regressions. This result does not support Barro (1991)'s proposition that poor countries tend to grow more rapidly than rich countries. The positive effect of openness (TO) is not detected from these regressions. Rather a negative effect is obtained and is significant for the trade openness. When we consider macroeconomic stabiliy, the results show that while inflation (INF) has a significant and a positive effect on economic growth when we use banking development indicators as proxy of financial development, this effect is negative when stock market data are considered. The only control variable that has a strong statistical significance with the dependent variable which confirm the theoretical expectations is the government consumption (GC). One possible explanation for this result is that government consumption serves as an indicator of macroeconomic instability and therefore should be negatively related to economic growth.

Table 2.6: **Dynamic panel-data estimations of the relationship between stock markets and economic growth (four year average), two step system GMM results**

	(1) FD= MARKET INDEX	**(2) FD=** MARKET CAPITALIZATION	**(3) FD=** TRADED RATIO	**(4) FD=** TURNOVER
MARKETINDEX	-.001			
	(-0.37)			
MCAP		.016		
		(1.56)		
TRADED			-.024	
			(-0.97)	
TURNOVER				-.017*
				(-2.75)
IIC	.012	.092*	.283***	.206*
	(0.10)	(3.18)	(1.81)	(6.96)
INF	-.205	-.105	.053	-.090
	(-0.91)	(-1.13)	(0.19)	(-1.04)
TO	.028	-.035*	-.008	-.013
	(0.65)	(-3.34)	(-0.09)	(-0.34)
GC	-.857*	-.577*	-1.39**	-1.07*
	(-3.10)	(-4.09)	(-2.21)	(-11.66)
cst	.135	-.163**	-.689	-.462*
	(0.33)	(-2.07)	(-1.65)	(-6.04)
AR(2)	0.376	0.694	0.903	0.284
Sargan	0.075	0.678	0.395	0.952
Hansen	0.935	0.906	0.794	0.972
N	42	45	44	43

Notes: The definitions of our variables appear in Table B.1(Appendix Chapter 2). *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. *Hansen* tests statistic tests the validity of our instruments For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

2.5 Robustness check

Since both banking sector and stock market intermediate savings towards investment project, they can be either complements or substitutes. This issue has been addressed by many researchers. Using data for forty-four industrial and developing countries for the period 1986 to 1993, Demirgüç-Kunt and Levine (1996b) conclude that countries with well developed market also had more developed banking sector. The Demirgüç-Kunt and Levine (1996b) findings support the Boyd and Smith (1996) view that postulate that stock market and bank may act as complements rather than as substitute's sources of capital. Arestis *et al.* (2001) argue that at the aggregate level the development of the stock market goes hand in hand with the development of banking system. In fact, intermediaries may provide complementary services to issuers of new equity such as underwriting (Arestis *et al.* (2001) p.19). Thus, to check the robustness of our results,

the next exercise we conduct in this study is to assess whether stock market and banking sector are complementary or substitutes in contributing to economic growth in MENA countries. Therefore, both stock market and banking sector indicators are introduced simultaneously in our regressions.

The empirical results show that the impact of banking sector is always negative with significance varying with the nature of the measure introduced either for banking development or stock markets development. The coefficients associated to *BANKINDEX*, and *PRIVCRE* (Table 2.7) are significantly negative in the all regressions when we consider annual data. The results of four-year average data are robust for *BANKINDEX*, which remain significantly negative (Table 2.8). However, the latest coefficients appear no significant for LIABILITIES and ASSETS. Considering the stock market development results, we don't see an important change in the results. The GMM regression results (Table 2.7) show that only total value traded (*TRADED*) remains to has a significant and a negative effect on economic growth in MENA countries (Table 2.7). However, *MARKETINDEX*, *MCAP* and *TURNOVER* are not associated significantly with economic growth. The results of four-year average data shows none of the stock market indicator appear a significant determinant of economic growth. In summary, we find that stock market and economic growth have an independent effect on economic growth in MENA countries. In fact, they are neither complements nor substitutes.

Table 2.7: **Dynamic panel-data estimations of the relationship between bank, stock market and economic growth (annual data), two step system GMM results**

Variable	**(1) FD =** BANKINDEX	**(2) FD =** LIABILITIES			**(3) FD =** ASSETS			**(4) FD =** PRIVCRE		
BANKINDEX	-.116***									
	(-1.98)									
LIABILITIES		-.024	.290	.048						
		(-0.21)	(0.73)	(0.07)						
ASSETS					-.135	-.197	.429			
					(-1.14)	(-1.23)	(0.93)			
PRIVCRE								-.481***	-.105***	-.618**
								(-1.89)	(-2.06)	(-2.63)
MARKETINDEX	-.001									
	(-1.05)									
MCAP		.008			-.017			.027		
		(0.43)			(-0.27)			(0.51)		
TRADED			-.032***			-.008			-.004	
			(-1.99)			(-0.58)			(-0.53)	
TUROVER				-.084***			-.115***			.119
				(-1.84)			(-2.04)			(1.10)
IIC	-.012	.056	.198**	.289**	.188	.145**	.300**	.146	.109**	-.027
	(-0.14)	(0.91)	(2.34)	(2.48)	(1.19)	(2.68)	(3.10)	(1.42)	(2.31)	(-0.12)
INF	-.168**	-.073	.020	.199	-.019	-.023	.436	-.155	-.137	-.571**
	(-2.57)	(-0.59)	(0.12)	(0.21)	(-0.35)	(-0.20)	(1.36)	(-1.13)	(-1.40)	(-2.93)
TO	.057***	.016	-.064	.018	.049	.019	-.033	.088	.039	.231
	(1.91)	(0.48)	(-0.42)	(0.09)	(0.50)	(0.48)	(-0.42)	(1.43)	(0.64)	(1.67)
GG	.130	-.477	-1.46**	-1.51**	-1.00	-.651	-1.93**	-.395	-.651**	.225
	(0.25)	(-1.37)	(-2.76)	(-2.35)	(-1.43)	(-1.71)	(-2.31)	(-0.63)	(-2.38)	(0.27)
cst	.019	-.079	-.534	-.742	-.392	-.262	-.872**	-.259	-.200***	.232
	(0.09)	(-0.41)	(-1.67)	(-1.24)	(-0.95)	(-1.55)	(-2.48)	(-0.94)	(-1.89)	(0.38)
AR(2)	0.226	0.175	0.207	0.065	0.215	0.189	0.217	0.198	0.182	0.319
Sargan	0.129	0.195	0.165	0.737	0.145	0.068	0.085	0.423	0.052	0.251
HANSEN	0.795	0.767	0.823	0.917	0.958	0.941	0.785	0.940	0.996	0.973
N	149	140	147	149	140	147	149	140	147	149

Notes: The definitions of our variables appear in Table B.1(Appendix Chapter 2). *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. *Hansen* test statistic, tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 2.8: **Dynamic panel-data estimation of the relationship between banks, stock markets and economic growth, (four year average data), two-step system GMM results**

Variable	**(1) FD** = BANKINDEX	**(2) FD** = LIABILITIES			**(3) FD** = ASSETS			**(4) FD** = PRIVCRE		
BANKINDEX	-.118***									
	(-2.01)									
LIABILITIES		-.036	-.062	.110						
		(-0.59)	(-0.62)	(1.62)						
ASSETS					.039	.008	.0105			
					(0.44)	(0.12)	(0.13)			
PRIVCRE								-.143	.090	-.013
								(-0.69)	(0.93)	(-0.08)
MARKETINDEX	.017									
	(1.61)									
MCAP		.015			.014			.003		
		(1.04)			(1.10)			(0.23)		
TRADED			.089			.019			.068	
			(1.12)			(0.91)			(1.58)	
TUROVER				.005			.014			-.001
				(0.23)			(0.89)			(-0.11)
IIC	-.053	.068	.007	.166***	.111	.055	.071***	.181	-.165	.162**
	(-1.43)	(0.36)	(0.03)	(2.16)	(1.80)	(0.95)	(1.93)	(1.83)	(-1.16)	(2.45)
INF	-.280	-.080	-.187	-.110	-.175***	-.245***	-.135	-.245	-.226	-.123
	(-1.70)	(-0.36)	(-0.65)	(-0.73)	(-1.86)	(-2.12)	(-1.16)	(-1.43)	(-0.90)	(-0.72)
TO	.067	-.009	-.083	.082**	-.051	-.032	-.030	-.019	-.024	-.032
	(0.98)	(-0.12)	(-0.62)	(-2.27)	(-1.68)	(-1.75)	(-1.38)	(-0.78)	(-0.93)	(-0.90)
GG	-.241	-.680**	.591	-.958**	-.665**	-.447	-.536**	-.771**	.380	-.868*
	(-0.77)	(-3.09)	(0.54)	(-3.19)	(-2.91)	(-1.64)	(-3.19)	(-2.69)	(0.62)	(-3.96)
cst	.235	-.053	-.023	-.376	-.215	-.051	-.102	-.358	.502	-.335***
	(1.83)	(-0.08)	(-0.02)	(-1.61)	(-1.32)	(-0.30)	(-0.93)	(-1.65)	(1.23)	(-2.07)
AR(2)	0.895	0.585	0.322	0.759	0.617	0.645	0.685	0.839	0.302	0.269
Sargan	0.315	0.845	0.148	0.841	0.496	0.566	0.476	0.647	0.364	0.122
HANSEN	0.996	0.937	0.978	0.825	0.884	0.912	0.921	0.969	0.990	0.959
N	42	44	44	43	44	44	43	44	44	44

The definitions of our variables appear in Table B.1(Appendix Chapter 2). *N* refers to number of observations included in the estimation. For Sargan test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (AR2), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

In summary, we find that the results are not consistent with the models that predict that well-functioning financial systems ease information and transaction costs and thereby enhance resource allocation and economic growth. Moreover, financial development has either a detrimental effect or no effect at all on the growth rate. These counter-intuitive results are particularly surprising, since the most empirical work have typically found a positive nexus between financial development and economic growth. However, these counter-intuitive results may be reflecting the inadequacy of the linear finance-growth relationship (Khan and Senhadji (2000)).

Berthélemy and Varoudakis (1998) have been confronted to this paradox. They postulate that the relationship between growth and depth may involve a "threshold" effect. That is the financial development-growth relationship is characterized by a multiple equilibrium: (i)"low equilibrium" with weak growth performance and an underdeveloped financial sector and (ii) "high equilibrium" with a notable growth and a standard financial development. Between the two equilibriums, there is an unsteady equilibrium that defines a threshold of the financial development on the growth. That is countries may need a certain level of financial development "threshold" beyond it, the economy converges to the equilibrium with high growth (Berthélemy and Varoudakis 1998 p.199). From a similar perspective Shen and Lee (2006) argue that the relationship between financial development and growth may not be linear but rather simply be dependent on the conditions. The Shen and Lee (2006)'s results indicate that several conditions can affect the finance growth nexus, such financial liberalization and governance. In this vein, in our latest Chapter (Chapter 4), we investigate the institutional conditions in the finance-growth nexus in MENA countries .

2.6 Conclusion

This chapter describes the evolution of financial system in MENA region. We find that within the MENA region there is a substantial variation in the degree of financial development; some countries are fairly well advanced, whereas a few others have significant room for improvement.

The chapter also examines the effect of financial development on economic growth. We use GMM in system dynamic panel estimators, which is well designed to correct all the drawbacks of previous techniques of estimation (OLS): simultaneity and omitted bias.

To sum up, the results of all estimations show that financial development is unimportant or even harmful for economic growth in the MENA region, which do not confirm the

most theoretical and empirical expectations. One possible explanation may be that the relationship between financial development and growth may not be linear, but rather simply be dependant on the conditions. In fact, several studies investigate how the macroeconomics and institutional conditions affect the finance-growth nexus. Since the latest factors appear a significant determinant of financial development.

An important strand of literature has paid special attention to institutional environment. They highlight the questions of either the institutional determinants of financial development, or the effect of the institutions in finance-growth nexus. Against this background, in the following Chapter, we examine the importance of institutional quality on determining financial development in MENA countries.

Chapter 3

Institutions and Financial Development in MENA Countries

3.1 Introduction

Financial development is regarded as a major driving force of economic growth. This raises the more fundamental question on why some countries are more financially developed than others.

Addressing this question, an important strand of literature has paid special attention to a particular set of institutions, most notably the legal system. This Chapter aims at contributing to the literature on the institutional determinants of financial development. The first part of this Chapter is a review of the literature on this issue. We present the theoretical and empirical contributions to this question. The empirical research on the institutional determinants of financial development must deal with the endogeneity of institutions. Solving the problem of endogeneity implies the definition of the appropriate instrument for institutions. The quest of such an instrument, leads to a search of fundamental determinants of institutions (Fergusson (2006)). Therefore, we review the determinants of institutions for financial development defined in the theoretical studies.

In the second part of this Chapter we examine empirically the institutional determinants of financial development in 18 MENA countries over the 1984-2007 period. We employ data on institutional environment, banking sector size, banking sector activity, and equity market size and equity market liquidity. The results of panel data and IV techniques of estimation show that banking sector and stock market are affected differently by the institutional quality. In fact, institutional quality appears more relevant

for banking sector development, than for stock market. While some results present contradiction, our main results are confirmed by a host of robustness exercises. Specifically, we document robustness to the adoption of a four year average data set, and an alternative institutional data base.

The rest of this Chapter proceeds as follows: Section 2 reviews the literature exploring the connection between institutions and financial development and deals with the question of what determines the institutions that promote financial development. Section 3 describes the data, presents the empirical strategy, and reports the main results and the robustness tests. Section 4 concludes.

3.2 Institutions for financial development

In this section we present in the first part a summary of the literature linking institutions to financial development. This strand of the literature goes back to the seminal contribution of La Porta *et al.* (1997) and La Porta *et al.* (1998) La Porta *et al.* (2000), who examine the relation between the legal system and financial development. Therefore in the first part of this section we review the contribution to the law and finance literature and additional empirical studies showing the role played by other institutions in promoting financial development. Countervailing arguments to the law and finance view are also presented in the first part of this section.

Second, building on the Fergusson (2006) study we move to the relatively unexplored topic of the origin of 'good' institutions for financial development. We examine the theoretical and empirical evidence suggesting that legal origin play a crucial role in determining institutions. This subsection stresses also the importance of other factors that contribute to institutional development such as initial endowments (Acemoglu *et al.* (2001), Acemoglu *et al.* (2002)), and ethnic heterogeneity.

3.2.1 Institutions and Financial Development: Related Literature

3.2.1.1 Theoretical evidence

Over the last decade, a literature has begun to emerge that attempts to examine the relevance of institutional quality for financial development. La Porta *et al.* (1998) outlined the importance of the legal factors in determining financial development. Specifically, they define the *Law and Finance* theory which emphasizes the difference in legal origin in explaining the difference in financial development (La Porta *et al.* (1997), La Porta *et al.* (1998) and Beck and Levine (2003a)). Beck and Levine (2003a) also put that

there are two parts of the Law and Finance theory: (i) the first part holds that legal institutions influence corporate finance and financial development, (ii) the second part traces that the international differences in legal rules and in the quality of their enforcement to the differences of the legal traditions that have emerged in Europe over previous centuries. Recently, Fergusson (2006) conclude that laws and their enforcement are critical in determining the rights of security holder and the functioning of financial systems.

The theoretical model developed by Himmelberg *et al.* (2002) predict that higher effective investor protection reduces the cost of capital, improves its allocation and increases investment and growth. La Porta *et al.* (2000) show also that better investor protection is associated with valuable and broad financial markets, dispersed ownership of shares, and efficient allocation of capital across firms.

Galindo and Micco (2001) have also developed empirical model which captures the links between creditors' rights, credit market breadth and the credit cycle. The model suggest that an increase in creditor protection reduces the elasticity of credit supply to exogenous shocks, and hence the amplitude of the credit cycle. Johnson *et al.* (2000) present evidence of the importance of the legal protection afforded by creditors and minority shareholders. Their findings also show that the weakness of legal institutions plays an important role in explaining the extent of depreciation and stock market decline in the "Asian Crisis" (1997-1998).

The predictions of the theoretical model developed by Holder (2007) are consistent with the previous empirical evidences. His predictions are that better property rights institutions make financial repression more costly for the elite and tend therefore to increase financial development. His predictions also show that better contracting institutions lowers the costs of financial transactions, which has countervailing effects on equilibrium financial development.

Building on the definition of institutions proposed by North (1990)[1] Acemoglu *et al.* (2004) further distinguish between *economic* and *political* institutions. The *economic institutions* shapes the rule of the economic game such as the structure of property rights and the presence and perfection of markets. Similarly to *economics* institutions the *political institutions*[2] determine the constraints on and the incentives of the key actors by this time in the political sphere. Moreover, higher institutional quality is associated with those economic and political institutions that allow for particularly strong

[1] *Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction* (North (1990) p.3)

[2] Example of political institutions the form of government (e.g., democracy vs. dictatorship or autocracy).

economic performance and thus high levels of economic development (Gries and Meierrieks (2010)).

While the most theoretical study cited above have supported the important role of the protections of creditor rights for financial development, countervailing arguments are reviewed in Padilla and Requejo (2000). They argue that the strict protection of creditor rights may lead to underinvestment expost. The argument is that if creditors are strongly protected in case of default, they will have no incentive to allow their debtors to restructure financially and continue their investment projects. Franks *et al.* (2003) also challenge the law and finance view from their examination of the history of investor protection laws and corporate ownership in the United Kingdom (U.K). They argue that according to the law and finance view U.K should have had comparatively inactive equity market and concentrated ownership in the 19^{th} and early 20^{th}[3] and then had more dispersed ownership and greater equity market activity after 1948 where Parliament begin to enact strong legislation to protect minority shareholders. The evidence shows that ownership concentration was similar in 1900 and 1960. Tracing the history of investor protection laws and corporate governance in Italy, Aganin and Paolo F (2003) do not also provide support for the law and finance theory. They argue that according to law and finance view corporate ownership concentration must fall after 1974 given the improvement in the investor protection laws in this period. However, the evidence show that ownership concentration rose.

3.2.1.2 Empirical evidence

In the LLSV series of papers (in particular La Porta *et al.* (1997) and La Porta *et al.* (1998)), the authors examine the question of the legal determinants of financial development from an empirical view point. To this end, they have assembled a data set covering legal rules pertaining to the rights of investors, and to the quality of enforcement of these rules, in 49 countries that have publicly traded companies.

In the case of shareholders, the authors consider seven rights. The first one is whether companies in a country are subject to one-share-one vote rules. The next five rights are combined into an aggregate anti-director rights measure[4] The index is formed by adding 1 when: (i) the country allows shareholders to mail their proxy vote; (ii) shareholders are not required to deposit their shares prior to the general shareholders meeting, (iii) cumulative voting is allowed, (iv) an oppressed minorities mechanism in the place or (v) the minimum percentage of share capital that entitles a shareholder to

[3]Given that in this period the notion of monitory investor protection is rejected in the U.K.
[4]The aggregate anti-director rights range from 0 to 5

call for an extraordinary shareholders 'Meeting is less than or equal to 10% (the sample median). The last shareholder rights measure is the right to mandatory dividend, which equals to the percentage of net income that that the Company Law or Commercial Code requires firms to distribute as dividends among ordinary stockholders. It takes a value of 0 for countries without such restriction. The results of regressions of La Porta *et al.* (1998) show that civil law countries, and especially French civil law countries have inferior protections of shareholders to those of the common law countries.

Next, considering creditors rights, La Porta *et al.* (1998) argue that creditor rights are more complex than shareholders' rights. The reason is that creditors exercise their power in several ways. Perhaps the most basic creditor right is the right to repossess, and then liquidate or keep-collateral when a loaner is in default. La Porta *et al.* (1998) use four creditor rights variables in this analysis. First, the reorganization procedure does not impose an automatic story on the assets; second, creditors are assured the right to collateral in reorganization: third, management cannot seek protection from creditors without creditor consent and, fourth, during reorganization, management is replaced by a party appointed by the court or the creditors. As with shareholders' rights, they use one remedial creditor rights measure, namely the existence of a legal reserve requirement. This requirement forces firms to maintain a certain level of capital to avoid automatic liquidation. The regression results show that Common law countries offers creditors better legal protections against managers. The results of creditors' rights also resemble those of shareholders rights in that the French civil law countries offer creditors the weakest legal protections. The German civil law and Scandinavian countries generally fall between the two other.

Taking into account the quality of enforcement, La Porta *et al.* (1998) argue that a strong system of legal enforcement could even substitute for weak rules since active and well functioning courts can step in and rescue investors. They examine proxies for the quality of enforcement of these rights, namely estimates of "law and order" in different countries compiled by credit risk agencies. They consider five of these measures: (i) efficiency of the judicial system, (ii) rule of law,(iii) corruption (iv) risk of expropriation and (v) likelihood of contract repudiation by the government. Instead these rule of law variables, La Porta *et al.* (1998) use an estimate of the quality of a country's accounting standards.

As reviewed in Beck and Levine (2003a) , and Fergusson (2006) substantial evidence shows that the legal environment has an impact on financial market development. Using a sample of 49 countries around the world, La Porta *et al.* (1997) find that good law enforcement has a large effect on the valuation and breadth of both debt and equity markets. Their finding provides evidence that large systematic differences between

countries from different legal origins in the size and breadth of both debt and equity markets. In fact, Common law countries have larger equity markets than Civil law, and particularly French civil law countries and at least part of the differences is captured by the differences in shareholder protection that they measure. Common law countries also have larger aggregate liabilities than the French civil law and Scandinavian, though not German countries. Their findings also show that the quality of the legal environment has a significant effect on the ability of firms in different countries to raise external finance.

Beck and Levine (2003b) argue that legal theories emphasize two inter-related mechanisms through which legal origin influences finance. These mechanisms are the *'political mechanism'* and the *'adaptability mechanism'*.

The political mechanism which refers to the difference between legal traditions in terms of the protection of the private property rights relative to the rights of the state. However, the adaptability mechanism refers to (i) the difference in the ability of the legal system to adjust to changing circumstances and (ii) the *"legal system's capability to minimize gap between the contracting needs of the economy and the normative status quo"* (Graff (2008) p.62).

Beck and Levine (2003b) argue that according to the political channel, the common law's comparative emphasis on private property rights relative to the state tends to support financial development to a greater degree than the civil law. They also show that according to adaptability mechanism the common law countries have notably more adaptable legal tradition than the French civil law. Thus the common law has the superior ranking in term of promoting financial development.

Pistor *et al.* (2000) apply the propositions of La Porta *et al.* (1997) La Porta *et al.* (1998) to the transitions economies. To this end, they based on the following empirical model:

$$EF = Const. + a * Law + b * Legality + c * Controls + \mu \tag{3.1}$$

Where EF is the external finance which is measured by stock market capitalization and private sector credit.
Law is represented by the legal indices, it presents the quality of the law on the books (shareholder and creditor rights). Besides the shareholder rights and creditor rights index developed by LLSV, they construct additional index.
$Legality$ describe the effectiveness of legal institutions. Three variables are considered to

measure the effectiveness of legal institutions in transition economies: (i) *rule of law*[5] (ii) *index of the effectiveness of corporate and bankruptcy law* and (iii) *enforcement index*[6].

Controls comprises a vector of other exogenous variables and μ is an error term.

The results of OLS and IV techniques of estimations show that the effectiveness of legal institutions (Legality) tends to dominate the impact of the protection of both creditor and shareholder rights in determining financial development.

In an extension, Beck *et al.* (2003) evaluate empirically both the law and endowments theories of financial development. They argue that while the *law and finance* theory focuses on the origin of a country's legal tradition, the *endowment theory*, on the other hand, emphasizes the roles of geography and the disease environment in shaping institutional development. They refer to three different indicators of financial development: (i) *financial intermediary development*; (ii) *equity market development*; and, (iii) *private property rights protection.* To measure legal tradition they use the La Porta *et al.* (1999) indicators specifying whether the country has a British or French legal tradition, as determined by the origin of each country's Company/Commercial law. Using cross-country regressions on a sample of 70 former colonies they have provided evidence for the law and finance theory. That is legal systems is an important determinant of financial development. In fact, their finding show that French Civil law countries tend to have lower levels of financial development than British Common law countries.

An important strand of literature has stressed the importance of legal institutions in determining capital allocation. Using firm-level data from 38 countries, Himmelberg *et al.* (2002) provide evidence in support of their theoretical model, showing that higher effective investor protection reduces the cost of capital, improves it allocation and increases investment and growth.

Examining the bank-based, market-based financial services and law and finance theories of financial structure, the results of Beck and Levine (2002) support the law and finance views. Industries which are heavy users of external finance grow faster in countries with higher overall levels of financial development and in countries with efficient legal systems. Moreover, the findings show that the overall level of financial development along with effective contract enforcement mechanisms foster new establishment

[5]This variable is based on several variables that measure the extent to which state power is transferred in an orderly manner, and law rather than violence is used for contract enforcement (Pistor et al.(2000) p.10).

[6]Is defined as the ability of the legal system to protect private property rights and enforce contracts (Pistor et al.(2000) p.10.)

formation and more efficient capital allocation.
In this vein Wurgle (2000) uses a basic data set for a 65 countries, 28 industries over the 1963-1993 period and the OLS estimates, also founds that the efficiency of capital allocation is positively correlated with the legal protection of minority investors. In particular, strong minority investor rights appear to court overinvestment in declining industries.

Galindo and Micco (2001)'s study emphasizes the role of institutions for credit cycles. In the first part of their study they develop a model suggesting that "*credit market depth depends on the stance of the legal environment surrounding the credit market*" (Galindo and Micco (2001)p.10). Using both parametric panel data and non parametric spline regressions they find that an improvement in effective creditor rights reduces the volatility of the credit cycle. Their findings have also showed that an improvement in effective creditor rights protection has a positive effect on the size of the credit market.

Using a new sample of 125 countries over 25 years, Djankov *et al.* (2007) find that both creditor protection through the legal system and information sharing institutions are associated with higher ratios of private credit to GDP. Their results show also that improvement in creditor rights or the introduction of credit registries leads to an increase in the private credit to GDP ratio. Finally they have found that legal origins are important determinants of both creditors' rights and information sharing institutions.

In more recent study Baltagi *et al.* (2009) investigate the effect of openness and economic institutions on financial development across countries and over times. To measure financial development they consider two data set: (i) first set of financial development indicators contains three banking sector development indicators, which are *liquid liabilities*, *private credit* and *domestic credit provided by the banking sector* . The second, set consists of three capital market development indicators, namely *stock value traded* , *turnover ratio* and *number of companies listed.* Institutional quality is measures using an index of institutional quality from International Country Risk Guide (ICRG). The subcomponents of this index are (i) *Corruption* (ii) *Rule of Law* (iii) *Bureaucratic Quality* (iv) *Government Repudiation of Contracts* and (v) *Risk of Expropriation.* Applying the Arellano and Bond Dynamic Panel GMM estimations and several data sets over 1980-2003 periods, Baltagi *et al.* (2009) find that institutions can explain a large part of the variation in financial development across countries and over time.

Law and Habibullah (2009) also examines the effect of openness and institutional quality in financial development for 27 economies (the G-7, Europe, East Asia and Latin America) during 1980-2001. They consider *private sector credit provided by banking sector* as indicator of banking sector development and *stock market capitalization* as

indicator of stock market development. The measure of institutional quality is obtained by summing five PRS indicators (from ICRG) which are: (i) *corruption*; (ii) *rule of law*; (iii) *bureaucratic quality*; (iv) *government repudiation of contracts*; and (v) *risk of expropriation*. The dynamic panel data analysis results demonstrate that institutional quality play an important role in determining financial development. In fact, the coefficients of institutional quality enter significantly with the expect positive sign in both banking and stock market regressions.

Yartey (2008) examines the macroeconomic and institutional determinants of stock market development. The indicators of stock market development is the market capitalization GDP which is the dependant variable. To measure institutional quality he uses a composite index from the ICRG as a measure of institutional quality. The composite political risk index is 100 point scale. The highest overall rating (theoretically, 100) indicates the lowest risk, and the lowest score (theoretically, 0) indicates the highest risk. Also, he investigates the impact of four of the components of political risk on stock market development: law and order, bureaucratic quality, democratic accountability, and corruption. Using a panel data of 42 countries over 1990 to 2004 he provides empirical evidence that institutional factors such as law and order, political risk, and bureaucracy quality are important determinants of stock market development.

Law and Azman-Saini (2008) have extended the literature by examining the linear and the nonlinear institutional quality and financial development relationship. Two sets of financial development are considered, (i) private credit as indicator of banking sector and; (ii) stock market capitalization as indicator of stock market development. The indicators of institutional quality are from Kaufmann *et al.*(1999) which are:(i) V*oice and accountability*, (ii) P*olitical Stability and Lack of violence*,(iii)*Government effectiveness*,(iv)R*egulatory quality*, (v)*Rule of Law* and (vi)*Control of Corruption*. Applying a Dynamic panel system GMM estimators to a sample of 63 developed and developing countries over the 1996-2004, they find that while institutional quality appears relevant for banking sector development it has no effect on stock market development. Among six institutional quality indicators, the regulatory quality indicator depicts the U-shaped relationship with both banking sector and stock market development.

Anayiotos and Toroyan (2009) analyze the impact of institutional factors on financial sector development in Sub-Saharan Africa (SSA). Using a non-parametric empirical tool they find that institutional factors affect financial depth. In more recent study, Gries and Meierrieks (2010) have also examined the institutional determinants of financial development for 19 sub-Saharan African countries for the period of 1984 to 2007 period. The proxy of financial development is private credit. They employ a number of institutional indicators from the ICRG (2009).Their findings show that institutions are

important determinants of financial development. Moreover, the low levels of financial development in SSA are a consequence of their institutions.

Girma and Shortland (2008), contribute to the strand of literature by evaluating the influence of the political system and legal origin in financial development. They look at three indicators of financial development which are (i)Private sector credit /GDP (ii) Stock market capitalization / GDP and (iii) total stock market value traded / GDP. The political variables are from the Polity IV database (Marshall *et al.* (2003)). Using panel data on developed and developing countries from 1975-2000, their results show that the degree of democracy and political stability are significant explanatory factors in determining the speed of financial development. These results are supported by Roe and Siegel (2009) findings. In fact, using four different indicators of political stability from different sources and different indicators of financial development they provide evidence that financial backwardness is significantly rooted in severe political instability, their findings also show that current political instability explains the level of financial development more than historical legal origin.

Other Institutions: Besides the legal framework discussed above, in recent year's informal institutions begin to gain some attention among economists. Galindo *et al.* (2001) exploit the link between trust and both the structure and development of financial system. Examining the simple correlation analysis for a sample of 48 countries during 1980-1995, Galindo *et al.* (2001) find that trust is positively linked with both financial development and efficient financial structure. When they use the ordinary least squares regressions they have found that trust and rule of law are strongly related to financial system indicators. They have also found that trust appears to have an impact on the financial system on several grounds; it may positively affect financial deepening in the economy as well as generate more activity (in the form of credit). Additionally, they have found that trust may enhance the competitiveness and efficiency of the system (by reducing overhead costs, interest spreads and deregulating system) and may help develop stock and equity markets. Thus higher trust might generate higher efficiency in the financial system (in the form of smaller overhead costs and lower interest margins).

Using microeconomic data on Italian households and firms in 1989, 1991, 1993, and 1995, Guiso *et al.* (2004) find evidence that supports the hypothesis that social capital[7] and financial development measures are highly correlated. In particular, higher levels of social capital are correlated with lower levels of shareholder investment in cash, higher investments in stocks, more use of checks, higher investment in cash, higher investments

[7]The level of social capital of a community enhances the level of interpersonal trust.

in stocks, more use of checks, higher access to institutional credit and less informal credit. Their findings show also that the effect of capital social is more important where legal enforcement is weaker and among less educated people.

3.2.2 Determinants of Institutions

As noted in the previous subsection, many theoretical and empirical studies support ideas that institutional development is beneficial to financial development. However, institutions themselves are endogenous. Aghion *et al.* (2004) argue that institutions themselves are chosen by individuals and they evolve in response to changing in the politico-economic conditions. Acemoglu *et al.* (2004) have also supported the Aghion *et al.* (2004) 'view, on the endogeneity of institutions. They argue that institutions are endogenous , *"they are at least in part, determined by society, or a segment of it"* (Acemoglu *et al.* (2004) p.28). Consequently we need a source of exogenous variation in institutions. One frequent solution to this problem is searching for a variable that, while influencing institutions, is not directly caused by financial development (Fergusson 2006). Thus the question of what determine institutions emerges.

Literature has defined several determinants of institutions:

3.2.2.1 Legal Origin

The first contribution to this strand of literature goes back to the seminal contributions of La Porta *et al.* (1997), La Porta *et al.* (1998) on how the legal origin has an effect on current institutions. They examine the law governing investor protection, the enforcement of the law, and the extent of concentration of firm ownership across countries. They find that laws in different countries are largely transplanted either through colonialism, conquest, or outright imitation, from a few legal families or traditions. La Porta *et al.* (1997) argue that commercial laws come from two broad traditions: Common law and Civil law tradition. Legal rules of Civil law countries are derived from Roman law. Legal scholars typically identify three currently common families of laws within the Civil law traditions: French, German and Scandinavian. The family referred to as the common law tradition includes the law of England and those laws modeled on English law (La Porta *et al.* (1998)).

The La Porta *et al.* (1997) results show that countries where legal rules originate in the Common-law tradition tend to protect investors, considerably better than the Civil law countries, and especially the French civil law tradition. Law enforcement is also strong in Common law countries, whereas it is the weakest in the French Civil law countries. German and Scandinavian Civil law countries are located in the middle. These legal origin variables have been increasingly adopted as exogenous determinants

of institutional quality in the economic growth literature.

Using the La Porta *et al.* (1998)′s data, Levine *et al.* (2000) examine the link between the legal, regulatory environment and measures of bond market and equity market development. As in La Porta *et al.* (1997) and La Porta *et al.* (1998) they have also studied the ties between the legal environment and measures of financial intermediary development. They use legal origin dummy variables as instrumental variables for the legal enforcement and accounting environment. Their findings are (i) laws that give a high priority to secured creditors (ii) legal systems that rigorously enforce contrast, and (iii) accounting standards that provide comprehensive and comparable corporate financial intermediaries. These findings are consistent with the view that countries with particular legal origins tend to create particular types of laws, regulations and enforcement mechanisms. These laws, regulations and enforcement mechanisms directly influence the functioning of financial intermediaries.

3.2.2.2 Legal transplantation process

Several studies have paid attention to the fact that legal origin is not the more important determinant of institutional development. In this vein Berkowitz *et al.* (2003a) and Berkowitz *et al.* (2003b) has developed and analyzed the proposition that the way in which a country received its formal law is a much more important determinant of the current effectiveness of its legal institutions than the particular legal family that it adopted. Their argument is that:

"Countries that have developed their formal legal order internally have a comparative advantage in developing legal institutions over countries on which a foreign formally legal order was imposed externally. Internal development can take advantage of news solutions economic agents develop in response to new challenges and existing constraints. However, countries that receive their formal legal order from another country have to come to grips to with what was often a substantial mismatch between the preexisting and the imported legal order". (Berkowitz *et al.* (2003b) p.170)

Using data from 49 countries Berkowitz *et al.* (2003a) find that the way the law was transplanted and received is a more determinant than the supply of law from a particular legal family[8] . Their findings show that the legal transplantation process has a large, albeit indirect, effect on economic development via its impact on legality. Their findings provide also evidence that legal families by themselves cannot explain cross-country variance in legality, while the transplantation process is a more important

[8] They employ the well-known classification of legal systems into four legal families: English common law, French, German and Scandinavian civil law.

determinant of legality, and its impact on economic development.

Berkowitz and Clay (2004) contribute to the analysis of determinants of good institutions. Using state-level data from the United States they find that state that had been settled by civil law countries and adopted common law after the American revolution had significantly lower median household income as well as higher share of population living under the poverty in 2001. Although this could imply that legal origin is an important determinant of economic performance, the author emphasizes that it could also be the case that what matters in the transplantation of common law into civil law states rather than (or in addition to) legal origin itself.

3.2.2.3 Initial Endowments

This theory of initial endowments is developed by Acemoglu *et al.* (2001) which holds that institutional quality varies across countries because of varying initial endowments. Their theory is related to the work of La Porta *et al.* (1997) and La Porta *et al.* (1998) on the influence of colonial experience on institutions. However, in contrast to this approach which focuses on the "*identity*" of the colonizers, Acemoglu *et al.* (2001) emphasize the *conditions* in the colonies. Moreover, they claim that the legal origin is poor instruments of institutional quality. In fact, they argue that "*it is not the identity of the colonizer or legal origin that matters, but whether European colonialists could safety settle in a particular location: where they could not settle, they created worse institutions*" (Acemoglu *et al.* (2001) p 1373).

Acemoglu *et al.* (2001) are based on three premises in their theory:

- First, they note that Europeans adopted different types of colonization strategies which created different set of institutions. At one extreme, the main aim of colonization strategy was to transfer as much the resources of the colony to colonizer. In fact, Europeans did not aim to settle but rather to extract as much from the colony as possible[9] In the other extreme, the Europeans migrated, settled and created institutions to support private property and check against government power.

- Second, Acemoglu *et al.* (2001) hold that the colonization strategy was influenced by the feasibility of settlements. In areas where endowments favored settlement, Europeans tended to form settler colonies "Neo-Europe". However, in places when

[9] In these "extractive states" Europeans did not create institutions to support private property rights; instead, they established institutions that empowered the elite to extract gold, silver, etc. (Beck *et al.* (2003))

the disease environment was not favorable to European settlement (for example in inhospitable environment when Europeans faced high mortality rates), the formation of extractive state was more likely.

- The final piece of theory emphasizes that the colonial state and institutions persisted even after independence.

Acemoglu *et al.* (2001) theory can be schematically summarized as follow:

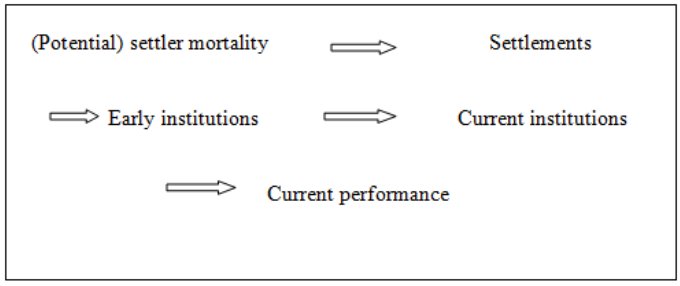

Figure 3.1: **Acemoglu *et al.* (2001) Theory**
Source: Acemoglu *et al.* (2001) p.1370

This figure shows that settler mortality rate is a major determinant of settlements; settlements is a major determinant of early institutions (in practice, institutions in 1900); and there is a strong correlation between early institutions and institutions today (Acemoglu *et al.* (2001) p. 1371).

The rate of settler mortality is considered as measure of initial endowments (Beck *et al.* (2003). In fact, given that in environments where Europeans faced high mortality rates[10], they could not settle and were more likely to set up extractive institutions.

The empirical evidences presented in Acemoglu *et al.* (2001) are consistent with their theory. The regressions results show that mortality rates faced by settlers more than 100 years ago explain over 25 *percent* of the variation in current institutions. Thus, settler mortality during the period of colonization can be considered as valid instruments for current institutions. Building in Acemoglu *et al.* (2001) and Acemoglu *et al.* (2002) theory, Alfaro *et al.* (2008) and Papaionnou (2009) have used the European settler mortality rates as instrument of institutions.

[10]The great majority of European deaths in the colonies were caused by malaria and yellow fever.

3.2.2.4 Ethnic heterogeneity

Several authors have stressed the importance of ethnic heterogeneity in explanation of growth, investment, the efficiency of growth or civil wars. La Porta *et al.* (1999) point out that ethnic diversity leads to corruption and low efficiency in governments that expropriate the ethnic losers. Several authors have interpreted the findings of a positive relationship between ethnic diversity and poor economic performance to be a consequence of the high probability of conflict associate with a highly fractionalized society[11].

In more recent study, Aghion *et al.* (2004) argue that racial fragmentation and institutions are not independent from each other. Their interpretation is that in more fragmented systems, political systems are chosen to insulate certain groups and prevent other to have a voice. For this reason many papers use the ethno-linguistic fractionalization index as indicator of ethnic heterogeneity[12].

However, Fearon (2003) points out that the index of ethnic fractionalization[13] cannot capture important differences in ethnic structures. Similarly, Montalvo and Reynal-Querol (2005) argue that the measure of ethnic heterogeneity appropriate to capture potential conflict should be a polarization measure. In fact, in accordance to Horowitz (1985), Montalvo and Reynal-Querol (2005) show that the most severe conflicts arise in societies where a large ethnic minority faces on ethnic majority. The index of ethnic fractionalization is not able to capture this idea appropriately.

3.3 Data and Econometric Methodology

The approach taken in this Chapter is to model the impact of institutional environment on financial development in MENA region.

[11] Easterly and Levine (1997) find empirical evidence to support their claim that the very high level of ethnic diversity of countries in Africa is an important contributor to their poor economic performance.

[12] Easterly and Levine (1997)

[13] The index of ethnic fractionalization is the probability that two randomly selected individuals from a given country will not belong to the same ethnic group. To instrument corruption Mauro (1995) has used this variable, Daude and Stein (2007) have also used this instrument to instrument voice and accountability as well as political stability.

3.3.1 The Data

3.3.1.1 Financial Development Data

We consider two data set to measure financial development[14]:(i) Banking data set and (ii) stock market data set.
Four indicators are considered to measure banking sector development which are bank index *BANKINDEX*, Private Credit (*PRIVCRE*), Liquid liabilities (*LIABILITIES*) and Bank assets (*ASSETS*).
To measure stock market we take also four indicators on this chapter which are:*(MARKETINDEX)*, Market Capitalization (*MCAP*), Value Traded (*TRADED*), and Turnover Ratio (*TURNOVER*).

3.3.1.2 Institutional indicators

The institutional indicators are collected from the International Country Risk Guide (ICRG) compiled by the Political Risk Services (PRS Group). These indicators rely exclusively on polls of experts. The main advantages of these data sets are that they are available for a considerable time span; thus allowing to test the dynamics and relevance of institutions in affecting financial development (Daude and Stein (2007)).

As argued by Alfaro *et al.* (2008) the measurement of institutional quality is a challenge task. Acemoglu *et al.* (2001) (p. $1370-1371$) argue that "*There is a cluster of institutions, including constraints on government expropriation, independent judiciary, property rights enforcement and institutions providing equal rights and ensuring civil liberties, that are important to encourage investment and growth*". Thus we construct a yearly composite index (INST) using the International Country Risk Guide's (ICRG) variables from PRS group. The measure of INST is an average of five PRS indicators.

Following Knack and Keefer (1995) and Law and Habibullah (2009) we consider (i) quality of bureaucracy , (ii) Law and Order, (iii) Corruption and (iv) investment profile[15] to measure overall institutional quality. Building on Yartey (2007/2008[16]) and Girma and Shortland (2008)[17]studies we introduce also democratic accountability in our

[14]The details and the definitions of the measures of financial development are presented in Chapter 2 Section (2)

[15]The previous ICRG classification ($1982-1995$) included risk of repudiation of contracts and risk of expropriation. After 1995 these variables are reported under ICRG′s investment profile category (Alfaro *et al.* (2008)).

[16]This measure is chosen because of its importance in past results. In fact, Yartey (2008) show that besides law and order, quality of bureaucracy and corruption, democratic accountability plays an important role in determining financial development.

[17]Girma and Shortland (2008) stress the importance of democratic accountability in promoting banking sector development

composite index of institutional quality (INST). To enable comparability we standardize all sub-indicator of our institutional index to range between $0-1$[18] values where higher indicate higher quality:

- Quality of bureaucracy ($BURO$): A $0-4$ index where "*high scores are given to countries where the bureaucracy the strength and expertise to govern without drastic changes in policy or interruptions in government services when governments change*".
- Law and order (LAW): A $0-6$ index where "*high scores indicate sound political institutions, a strong count system, and provisions for an orderly succession of power. Lower scores indicate a tradition of depending on physical forces or illegal means to settle claims*".
- Corruption ($CORR$): A $0-6$ index where lower scores indicate that "*high government officials are likely to demand special payments and that illegal payments are generally expected throughout lower levels of government in the form of bribes connected with import and export licenses, exchange controls, tax assessment, police protection, or loans*".
- Democratic accountability ($DEMOC$): A $0-6$ index. This is a measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violence in a non democratic one.
- Investment profile ($INVEST$): A $0-12$ index. This is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. It is the sum of three factors (namely contract viability/ expropriation, profit repartition and payment delays) affecting the risk to investment, otherwise not captured by other political, economic and financial risk components. Higher values corresponding to "*low risk levels*".

In our robustness analysis we construct a composite index of institutional quality (WGI) using an alternative set of institutional quality from Kaufmann *et al.* (1999). Like those of ICRG, these indicators rely exclusively on poll of experts.

3.3.1.3 Macroeconomic factors

Our macroeconomic controls include two variables that are frequently used to control for the level of development: the logarithm of the real per capita GDP ($INCOME$) and

[18] To make them comparable, the score of bureaucracy quality is multiplied by 1/4, those of law and order, corruption, and democratic accountability are multiplied by 1/6, and this of investment profile is multiplied by 1/12 .

the ratio of secondary school enrollments (*SSCE*) (percent gross[19]). We use the rate of current inflation (*INF*) as indicator of macroeconomic stability. To relate our results to one of the propositions put forward by Rajan and Zingales (2003)[20] we consider also control variables for both trade and financial openness. We use the ratio of exports plus imports to GDP (*TO*) to capture the degree of openness of an economy and the ratio of capital inflows (FDI and FPI) to GDP to measure capital account openness (*KO*) (Chinn and Ito (2008)). Studies found that current and capital account openness have a positive effect on financial sector development. These data are collected from the World Development Indicators (2008)[21].

3.3.1.4 Descriptive Statistics

Table C.5 (Appendix C) presents correlations matrix banking set for 18 countries over the period 1984-2007. Our institutional index (INST) is positively and significantly correlated with each indicator of banking sector development as well as the composite indicator *BANKINDEX* at the 5% confidence level. The highest coefficient of correlation is between the institutional index and deposit money bank assets (48%). These coefficients are 46%, 45% and 22% for bank index, private credit and liquid liabilities respectively. All the financial variables are positively and significantly correlated with each other at high confidence levels. When we look to macroeconomic controls variables we find that both trade and financial openness are positively and significantly correlated with all indicators of banking sector development. The two indicators of development (income and secondary school enrollment) are positively and significantly correlated with the composite bank index, private credit and deposit money bank assets. Macroeconomic stability which is proxy by inflation is negatively and significantly correlated with private credit and deposit money bank assets.

Table C.6 (Appendix C) presents means and median on 18 MENA countries from 1984-2007 period. Private credit has a mean of 42% with a standard deviation of 23%. Deposit money bank has a mean 53% with a standard deviation of 25% and liquid liabilities has a mean of 63% with a standard deviation of 23%. *BANKINDEX* has a mean of 5.5% with a standard deviation of 40%.

Table C.7 (Appendix C) presents correlations matrix among the stock markets variables, institutions and macroeconomic control variables for 13 MENA countries over

[19] Boyd *et al.* (2001b) have used these variables to control for the level of development.

[20] They test the hypothesis: "*For any given level of demand for financing, a country's domestic financial development should be positively correlated with trade openness at a time when the world is open to cross-border capital flows*". Rajan and Zingales (2003) (p.26)

[21] World Bank.

1984 – 2007. Among the indicator of stock market development only market capitalization and total value traded are correlated significantly and positively correlated with composite institutional index at 10% level. The latest coefficients of correlation are 24% and 14% respectively. Although the composite stock market index *MARKETINDEX*, and turnover ratio are positively correlated with the institutional composite index the simple correlation are weak and are not significant at 10%. The income level and capital openness are positively and significantly correlated with all indicators of stock market development.

Table C.8 (Appendix C) presents means and medians for stock market variables. Market capitalization has a mean of 43% with a standard deviation of 41%. Value traded has the mean of 18% with a standard deviation 40%. Turnover ratio has the mean of 25% and 25% as standard deviation. The composite stock market index has -5.5% as mean and 119% as standard deviation. Tables C.6 and C.8 show that cross country institutional performance differs enormously among MENA countries. For example the composite institutional index ranges from 11% (in Lebanon in 1990[22]) to 83% (in Israel at various years). Moreover, the institutional quality ranges in average between the high level exceeding 75% in Israel and the low levels in Lebanon, Syrian Arab Republic and Libya (These levels are around 43%, 41% and 41%). The levels of institutional quality are between 50% and 55% in Tunisia, UAE, Kuwait Morocco and Oman (Table C.9 Appendix C).

3.3.2 Empirical Methodology

In this section we empirically assess the relationships between institutional quality and the development of financial system in MENA countries over 1984 – 2007 period. In order to perform this analysis we employ the following relationship:

$$FD_{it} = \alpha_{it} + \beta INST_{it} + \theta X_{it} + \mu_i \tag{3.2}$$

For $i = 1, 2.....N$ and $t = 1, 2.....N$

Where FD_{it} is defined as the dependant variable refers either to the indicators of banking sector development (*BANKINDEX*, *PRIVCRE*, *ASSETS* and *LIABILITIES*) and stock market development (*MARKETINDEX*, *MCAP*, *TRADED* and *TURNOVER*).

$INST_{it}$ is the indicator of institutional quality and X_{it} is a set of macroeconomic controls variables (Log of the real GDP per capita, secondary school enrolment, the current inflation rate, trade openness and capital openness). α_{it} it is the unobserved

[22] World Bank Indicators (2008) and author's calculations.

country specific fixed effects, μ_i is the error term for each observation.

Fixed effects (FE) as well as random (RE) effects models are considered in this study. We use the Hausman test to select the appropriate estimator. If the Hausman test reject the null hypothesis[23] that the individual effects are not correlated with the explanatory variables, the most suitable estimation would then be the fixed-effects model[24]

While the panel data techniques (fixed effects and random effects specifications) account for time-invariant country characteristics and time trends that may influence financial system development, fixed and random effects models are not a panacea, since the endogeneity and measurement error might still plague the estimates. Thus, to account reverse causality, we build on the institutions and development literature (La Porta *et al.* (1998) , Acemoglu *et al.* (2001) Acemoglu *et al.* (2002)) and applied the instrumental variable estimates which besides endogeneity[25], accounts for measurement error in the institutional quality proxies. Doing so, we avoid the shortcoming of the existing literature in this area. Following these literature we adopt two different instrumentation strategies: Legal Origin and Ethnic heterogeneity.

Legal Origin: This variable is from the Law and Finance literature (La Porta *et al.* (1997), La Porta *et al.* (1998) and La Porta *et al.* (1999)) which emphasizes the importance of the legal origin in determining a series of current institutions. Chong and Zanforlin (2000) find that countries with law tradition have lower levels of bureaucratic development, lower levels of credibility of the government and higher levels of corruption, while countries with English Common Law show a higher level of institutional quality. Thus, we consider a dummy variable legal origin as instrument of our institutional composite index *(INST)* which equals to 1 if the countries have the civil law tradition and 0 if the countries have the common law tradition.

Ethnic heterogeneity: Montalvo and Reynal-Querol (2005) argue that ethnic polarization is the most appropriate measure to capture ethnic heterogeneity . Thus in our study we consider the measure of ethnic polarization from Montalvo and Reynal-Querol (2005) as indicator of ethnic heterogeneity[26].

[23]The null hypothesis is rejected when the P-value of Hausman test is lower than the conventional 5% significance level.

[24]Fixed effects model indicates that the individual effects are correlated with the explanatory variables.

[25]Aghion *et al.* (2004) argue that political institutions influence economic policy, but they are themselves endogenous since they are chosen, in some way, by members of the polity.

[26]For more details see subsection $3-2-2$

3.4 Empirical Results

The results are grouped and presented in three sub-sections: (i) panel data regressions results, (ii) instrumental variable results, and (iii) unbundling.

3.4.1 Panel data regression results

Table 3.1 summarizes the results of the fixed and random effects models for the sample of the MENA countries from 1984 to 2007. In Models 1-4 banking data set are considered as proxies for financial development, where in Models 5-8 we use stock market data set as proxies for financial development. To start with it is important to note that the sign of estimated coefficients on institutional index (*INST*) are consistent with theory. As shown in Table 3.1, there is a significant and positive relationship between the institutional quality (*INSTINDEX*) and banking sector development in MENA countries. Institutional index (*INST*) has a significant and a positive effect in bank index at 1% level. A one -digit[27] improvement in the institutional quality index is associated with a (0.82) points increases in bank index (*BANKINDEX*). The usual measures of banking sector development are also affected positively and significantly by institutional quality. In fact, higher institutional quality is associated with a larger and deeper banking system (on form of higher liquid liabilities and higher deposit money bank assets to GDP ratios): A one-digit improvement in the institutional quality index is associated with a (0.54) and (0.16) points increases in bank assets (*ASSETS*) and liquid liabilities (*LIABILITIES*) respectively. Institutional quality is also strongly and positively associated with a more active banking system (where activity is approximated by the higher ratio of private credit to GDP): A one standard deviation of institutional quality would increase private credit by (0.40) points controlling for economic development, trade and capital openness and macroeconomic stability. The results seem to demonstrate that institutional quality matters for financial development, a result which in line with previous findings by Chinn and Ito (2002) and Law and Habibullah (2009). Looking to stock market data set, the main findings are that while the positive sign of estimated coefficients on institutional index (*INST*) are consistent with theory, the latest index appears a significant determinant only of stock market size (*MCAP*) at 5% level. A one digit-improvement in the institutional index is associated with (1.17) points increases in stock market capitalization to GDP ratio (MCAP). When we look to macroeconomic control variables, we find that banking sector in MENA countries is not affected by income level (*INCOME*). Among the stock market variables only market capitalization is affected significantly by income level with the positive expected theoretical sign. Inflation does not appear a significant determinant of financial development

[27] As defined by (Faria and Mauro (2009) p.375) "in the institutional quality scale, one digit is approximately equal to one standard deviation within the full countries sample".

in MENA countries. Banking sector activity ($PRIVCRE$) and stock market liquidity ($TURNOVER$) are affected positively by secondary school enrollment ($SSCE$). While all stock market variables are affected positively and significantly by trade openness, the latest has a positive and a significant effect only on liquid liabilities. This finding suggests that the impact of trade openness (TO) on financial development is more apparent in the capital market. The results reveal also that capital account liberalization is not significant in delivering the development of financial market. However, it is a significant determinant of banking sector development.

Table 3.1: **Results of panel data estimations, the dependant variable: Financial Development (FD)(Annual data)**

	Bank Development				**Stock Market**			
	(1) FD= BANKINDEX	(2) FD= LIABLITIES	(3) FD= ASSETS	(4) FD= PRIVCRE	(5) FD= MARKETINDEX	(6) FD= MCAP	(7) FD= TRADED	(8) FD= TURNOVER
INCOME	.019	.086	-.039	-.007	.146	1.59*	.072	-.734
	(0.24)	(0.91)	(-0.71)	(-0.15)	(0.25)	(3.30)	(0.33)	(-1.44)
INF	.243	.471**	.041	-.175	-1.197	-.543	-.555	.278
	(0.67)	(2.62)	(0.17)	(-0.68)	(-0.20)	(-0.47)	(-0.24)	(0.20)
TO	-.052	-.161**	.180**	-.0689	2.97**	1.37*	1.08***	.687***
	(-0.41)	(-2.46)	(2.04)	(-0.76)	(2.28)	(4.64)	(2.16)	(1.94)
KO	.073*	.062*	.010	.034**	-.202	.028	-.104	.027
	(3.42)	(5.20)	(0.73)	(2.27)	(-0.89)	(0.56)	(-1.18)	(0.45)
SSCE	.430**	.101	.267**	.326*	4.27**	-2.26*	1.34***	1.81*
	(2.54)	(1.12)	(2.30)	(2.72)	(2.28)	(-3.37)	(1.85)	(3.55)
INST	.820*	.574*	.169***	.400**	2.20	1.17**	.497	.989
	(2.85)	(3.88)	(1.98)	(1.97)	(0.77)	(2.14)	(0.45)	(1.49)
CST	-.975	-.55	.481	.155	-7.98***	-12.83*	-2.47	3.77
	(-1.59)	(-0.78)	(1.14)	(0.40)	(-1.78)	(-3.68)	(-1.4)	(1.00)
R^2	0.45	0.47	0.20	0.42	0.32	0.42	0.28	0.26
H-Statistic (Hausman Specification)	0.13 (RE)	0.000 (FE)	0.37 (RE)	0,27 (RE)	0.06 (RE)	0.004 (FE)	0.06 (RE)	0.0008 (FE)

Notes: The dependant variables are: index of banking sector (*BANKINDEX*), Private credit to GDP ratio (*PRIVCRE*), liquid liabilities as a percentage of GDP (*LIABILITIES*), total assets of deposit money bank as a percentage of GDP (*ASSETS*), index of stock market (*MARKETINDEX*), market capitalization to GDP ratio (MCAP), TRADED = value of domestic equities traded on domestic exchanges as a percentage of GDP, TURNOVER= the total value of domestic shares traded divided by market capitalization. The explicative variables are: INCOME= Log of real GDP per capita, *SSCE* = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate), INST = the composite index of institutional quality (ICRG group), with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively. H- statistics corresponds to Hausman test for comparison between fixed (FE) or random (RE) effects specification.

3.4.2 Instrumental Variable Regressions

Table 3.2 reports results of IV estimations using the two instruments defined above (legal origin and ethnic polarization) as instruments for institutional development. This approach is the most efficient since it helps obtain a stronger first stage fit and more properly isolate the exogenous components of institutions. It is also helpful, since having more than one instrument; one can test for instrument validity performing. We use Hansen's over identification test (J-test) to check the null hypothesis of whether the instruments for institutions we choose are valid. For the banking data the results are robust to panel data estimations. Indeed, the composite index of institutional quality is associated positively and significantly with the composite bank index *BANKINDEX* and both size (liquid liabilities and deposit money bank assets to GDP ratios) and activity (private credit to GDP ratio) indicators of banking sector in MENA countries. A one standard increase in the institutional quality would increase composite bank index (*BANKINDEX*), private credit (*PRIVCRE*), deposit money bank (*ASSETS*) and liquid liabilities (*LIABILITIES*) by (1.36), (0.24), (1.08) and (0.82) points respectively when we control the economic development, trade and financial openness and macroeconomic stability. Looking to stock market development, the results (Table 3.2) are not consistent with those of panel data estimations. In fact, while institutional index appear only a significant determinant of market size in the panel data regressions results, it has a positive significant effect on both the market composite index and the three usual measures of stock market development. Indeed, a one standard deviation in institutional index would increase stock market index of development, market capitalization, total value traded and turnover ratios by (4.79), (1.86), (1.29) and (0.81) points respectively.

Taking a look to p-values of the Hansen J-test over-identifying restrictions (22%, 26%, 25% and 17% in composite bank index, private credit, deposit money bank and liquid liabilities regressions respectively and 66%, 38%, 52% and 35% in stock market index, market capitalization, trade and turnover ratio regressions respectively) significance level, we find that we cannot reject the null hypothesis of instrument validity since all the p-values far exceed the conventional 5% significance level .

Table 3.2: **Results of IV estimations, the dependant variable: Financial Development (FD)**

	Bank Development				**Stock Market**			
	(1) FD= BANKINDEX	(2) FD= LIABLITIES	(3) FD= ASSETS	(4) FD= PRIVCRE	(5) FD= MARKETINDEX	(6) FD= MCAP	(7) FD= TRADED	(8) FD= TURNOVER
INCOME	-.090**	-.0005	-.134*	-.030	.346	-.014	.131	.138*
	(-2.09)	(-0.03)	(-4.45)	(-0.90)	(1.57)	(-0.22)	(1.60)	(3.38)
INF	-1.65**	-.151	-1.13**	-1.48*	1.37	1.53	.530	-.327
	(-2.15)	(-0.45)	(-2.31)	(-2.63)	(0.40)	(1.55)	(0.43)	(-0.49)
TO	.299**	.212*	.158	.078	1.02	.684**	.400	-.115
	(2.09)	(2.79)	(1.52)	(0.83)	(1.02)	(2.33)	(1.08)	(-0.79)
KO	.076**	.034	.042***	.042***	.059	.115*	.001	-.011
	(2.01)	(1.84)	(1.85)	(1.85)	(0.46)	(2.88)	(0.04)	(-0.50)
SSCE	.540***	.206	.240	.401***	1.24	-.071	.302	.453**
	(1.84)	(1.30)	(1.51)	(1.83)	(1.37)	(-0.21)	(1.01)	(2.16)
INST	1.36**	.822*	1.08**	.240***	4.79**	1.86*	1.29***	.815**
	(2.07)	(2.96)	(2.43)	(1.80)	(2.29)	(2.78)	(1.77)	(2.03)
CST	-.557	-.321**	.862	.375***	-7.35*	-1.141**	-2.13*	-1.55*
	(-1.62)	(-2.11)	(4.09)	(1.75)	(-3.72)	(-2.58)	(-2.87)	(-3.82)
R^2	0.65	0.69	0.45	0.50	0.18	0.32	0.29	0.33
P-Value (J-Test)	0.22	0.17	0,25	0.26	0,66	0,38	0,52	0,35

Notes: The dependant variables are: index of banking sector (*BANKINDEX*), Private credit to GDP ratio (*PRIVCRE*), liquid liabilities as a percentage of GDP (*LIABILITIES*), total assets of deposit money bank as a percentage of GDP (*ASSETS*), index of stock market (*MARKETINDEX*), market capitalization to GDP ratio (MCAP), TRADED = value of domestic equities traded on domestic exchanges as a percentage of GDP, TURNOVER= the total value of domestic shares traded divided by market capitalization. The explicative variables are: INCOME= Log of real GDP per capita, SSCE = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate), TO= traded openness , KO = Capital Openness , INST = the composite index of institutional quality (ICRG group), with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively. We use ethnic polarization and legal origin to instrument institutional quality . J-test correspond to Hansen's overidentification test.

3.4.3 Unbundling

The composite institutional index has a problem that it gives us very little on which aspects of institutions should policy be directed towards (Yartey 2008). Thus we study the impact of five sub-indicators of the composite ICRG index on financial sector development. The results are reported in Tables 3.3 and 3.4.

In model (1) Tables (3.3 and 3.4) we use the quality of bureaucracy ($BURO$). Good quality of bureaucracy enhances the regulatory capacity of countries and therefore should be positively associated with financial development. The results show that bureaucracy has insignificant effect on banking variables. However, it appears to influence negatively both stock market index and stock market liquidity. These results do not confirm the expected theoretical sign. The coefficient on corruption ($CORR$) is statistically significant determinant of both banking sector activity ($PRIVCRE$) and stock market size ($MCAP$) which confirm the theoretical expectation. In fact, corruption may deter doing business and may increase uncertainty (Daude and Stein 2007). Model (3) Tables (3.3 and 3.4) adds a law and order index (LAW). Law and Order enhances efficiency and restores credibility and confidence in the financial system, more specifically the banking sector development. In support of this evidence is the positive and significant effect of law and order index in all banking variables. However, only capital market size ($MCAP$) is affected positively and significantly by law and order. Democratic accountability ($DEMOC$) does not appear to be an important determinant of financial development (Model 4 Tables 3.3 and 3.4). In model (5) we examine the investment profile index ($INVEST$). The results show that investment profile index appear more relevant to stock market development, compared to banking development indicators. Indeed investment profile index has a positive and a significant effect on market index ($MARKETINDEX$) and stock market liquidity ($TRADED$). However, only banking sector activity is affected positively ($PRIVCRE$) by the latter index. The main findings of this subsection are that law and order are the most relevant determinant of banking sector development. The quality of institutions and transactions is improved with law and order, attracting more financial inflows and boosting confidence to increase deposits in the banking system. Corruption and investment profile are of secondary importance for banking sector development. In fact, these two latest indicators have a significant effect only in banking sector activity (PRIVCRE). However, investment profile is the most relevant determinant of stock market development. It has a positive significant effect on market index and stock market liquidity.

Table 3.3: **Unbundling Institutional performance: Results of panel estimations of banking sector data set**

	BANKINDEX					**LIABILITIES**				
INCOME	.087	.084	.026	.063	.073	-.024	-.030	-.038	-.032	-.017
	(0.95)	(0.86)	(0.28)	(0.66)	(0.67)	(-0.41)	(-0.50)	(-0.61)	(-0.55)	(-0.26)
INF	.195	.12	.805**	-.02	.208	.033	.050	.25	-.067	.004
	(0.51)	(0.35)	(2.23)	(-0.06)	(0.54)	(0.13)	(0.21)	(0.98)	(-0.25)	(0.02)
TO	-.049	-.07	-.017	-.112	-.073	.182**	.171**	.199**	.160***	.170***
	(-0.36)	(-0.58)	(-0.15)	(-0.84)	(-0.54)	(1.99)	(1.97)	(2.34)	(1.80)	(1.90)
KO	-0.36*	.068*	.073*	.071*	.065*	.009	.006	.010	.011	.008
	(3.03)	(3.07)	(3.69)	(3.19)	(2.96)	(0.65)	(0.42)	(0.76)	(0.77)	(0.55)
SSCE	.379**	.461*	.127	.491*	.417**	.253***	.236**	.155	.295**	.270**
	(1.95)	(2.60)	(0.75)	(2.74)	(2.38)	(1.98)	(2.02)	(1.26)	(2.47)	(2.31)
BURO	-.218					-.05				
	(-0.64)					(-0.24)				
CORR		.11					-.112			
		(0.80)					(-1.14)			
LAW			.501*					.181**		
			(4.11)					(2.06)		
DEMOC				.135					.066	
				(1.20)					(0.88)	
INVEST					.039					-.016
					(0.34)					(-0.22)
cst	-.925	-1.10	-.749	-.929	-.964	.482	.573	.497	.480	.410
	(-1.36)	(-1.43)	(-1.01)	(-1.26)	(-1.14)	(1.10)	(1.20)	(1.03)	(1.06)	(0.79)
R^2	0.20	0.25	0.30	0.33	0.26	0.10	0.10	0.15	0.20	0.10
H-Statistic	0.13	0.85	90	0.95	0.95	0.56	0.96	0.97	0.88	0.67
	(RE)	(RE)	(RE)	(RE)	(RE)	(RE)	(RE)	(RE)	(RE)	(RE)
	ASSETS					**PRIVCRE**				
INCOME	.031	.012	-.016	.001	.019	.171	.116**	.084***	.102**	.088***
	(0.53)	(0.21)	(-0.27)	(0.03)	(0.29)	(1.64)	(2.42)	(1.82)	(2.06)	(1.65)
INF	-.15	-.235	.171	-.375	-.302	.413**	.312***	.716*	.289	.50**
	(-0.61)	(-0.92)	(0.66)	(-1.37)	(-1.13)	(2.04)	(1.66)	(3.80)	(1.39)	(2.55)
TO	-.051	-.077	-.041	-.106	-.104	-.157***	-.149**	-.122**	-.16**	-.122***
	(-0.55)	(-0.85)	(-0.49)	(-1.16)	(-1.11)	(-1.94)	(-2.22)	(-1.98)	(	(-1.77)
KO	.034**	.032**	.035**	.035**	.031**	.054*	.057*	.058*	.056*	.053*
	(2.22)	(2.12)	(2.48)	(2.31)	(2.09)	(3.98)	(5.08)	(5.63)	(4.73)	(4.71)
SSCE	.269**	.351*	.150	.380*	.357*	.047	.149***	-.06	.126	.063
	(2.03)	(2.85)	(1.22)	(3.07)	(2.93)	(0.43)	(1.66)	(-0.72)	(1.33)	(0.71)
BURO	-.254					-.152				
	(-1.11)					(-0.68)				
CORR		.077					.172**			
		(0.75)					(2.27)			
LAW			.300*					.279*		
			(3.42)					(4.39)		
DEMOC				.117					.048	
				(1.50)					(0.81)	
INVEST					-.075					.124**
					(-0.95)					(2.12)
cst	.211	.163	.335	.238	.212	-.802	-.644***	-.377	-.444	-.385
	(0.49)	(0.34)	(0.72)	(0.54)	(0.42)	(-0.96)	(-1.69)	(-1.05)	(-1.16)	(-0.95)
R^2	0.14	0.28	0.29	0.38	0.25	0.25	0.35	0.35	0.34	0.34
H-Statistic	0.14	0.89	0.82	0.92	0.89	0.00	0.92	0.98	0.85	0.98
	(RE)	(RE)	(RE)	(RE)	(RE)	(FE)	(RE)	(RE)	(RE)	(RE)

Notes: The dependant variables are: index of banking sector (*BANKINDEX*), Private credit to GDP ratio (*PRIVCRE*), liquid liabilities as a percentage of GDP (LIABILITIES), total assets of deposit money bank as a percentage of GDP (ASSETS). The explicative variables are: INCOME= Log of real GDP per capita, SSCE = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate). The institutional variables are: quality of bureaucracy, corruption, rule of law, democratic accountability and investment profile, with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively. H- statistics corresponds to Hausman test for comparison between fixed (FE) or random (RE) effects specifications.

Table 3.4: **Unbundling Institutional performance: Results of panel data estimations of Stock Market data set**

	MARKETINDEX					MCAP				
INCOME	1.11	1.83	.23	.279	-.023	1.86*	3.07*	1.92*	2.00*	.11
	(1.46)	(0.70)	(0.10)	(0.48)	(-0.04)	(3.86)	(6.86)	(4.17)	(3.96)	(0.70)
INF	-.85	-3.46	-3.98	-1.03	4.68	-1.21	-.825	.156	-.98	.73
	(-0.15)	(-0.53)	(-0.54)	(-0.17)	(0.80)	(-1.06)	(-.825)	(0.13)	(-0.83)	(0.61)
TO	3.12**	5.59*	5.38*	3.13**	3.42*	1.31*	1.39*	1.30*	1.32*	1.40*
	(2.33)	(3.26)	(3.10)	(2.37)	(2.73)	(4.30)	(5.67)	(4.50)	(4.33)	(5.22)
KO	-.097	-.211	-.23	-.257	-.224	.059	.011	.014	-.023	.055
	(-0.44)	(-0.77)	(-0.82)	(-1.14)	(-1.07)	(1.22)	(0.30)	(0.31)	(-0.46)	(1.19)
SSCE	1.51	4.28***	4.64***	-0.17**	3.79**	-2.32*	-3.13*	-3.07*	-2.46*	-.52
	(0.69)	(1.73)	(1.71)	(2.17)	(2.14)	(-3.35)	(-5.42)	(-4.21)	(-3.46)	(-1.00)
BURO	-10.63*					-.25				
	(-2.57)					(-0.22)				
CORR		2.9					1.77*			
		(1.32)					(5.37)			
LAW			.072					.681**		
			(0.04)					(2.45)		
DEMOC				-.692					-.17	
				(-0.75)					(-0.94)	
INVEST					3.51*					.565**
					(3.13)					(2.51)
cst	-6.99	-24.2	-9.7	-7.41***	-8.02***	-1.74	-24.51*	-14.6*	-15.1*	-1.68
	(-1.34)	(-1.16)	(-0.53)	(-1.65)	(-1.76)	(-1.42)	(-7.15)	(-4.34)	(-4.11)	(-1.44)
R^2	0.10	0.15	0.08	0.10	0.10	0.26	0.26	0.25	0.28	0.44
H-Statistic	0.15	0.009	0.000	0.17	0.13	0.00	0.00	0.00	0.00	0.25
	(RE)	(FE)	(FE)	(RE)	(RE)	(FE)	(FE)	(FE)	(FE)	(FE)
	TRADED					TURNOVER				
INCOME	2.63*	.834	.231	.107	-.747	.825***	.07	-.481	.090	-1.31*
	(3.06)	(0.81)	(0.25)	(0.49)	(-0.81)	(1.82)	(0.64)	(-0.98)	(0.75)	(-3.10)
INF	-1.69	-1.45	-1.91	-.314	.94	-.284	-.46	-.27	-.105	1.99***
	(-0.83)	(-0.57)	(-0.66)	(-0.14)	(0.37)	(-0.26)	(-0.39)	(-0.18)	(-0.08)	(1.69)
TO	1.62*	2.14*	2.06*	1.16**	2.36*	.391	.132	.630***	.168	.887*
	(2.99)	(3.21)	(3.05)	(2.29)	(3.72)	(1.37)	(0.48)	(1.75)	(0.61)	(3.04)
KO	-.07	-.113	-.126	-.119	-.074	.025	-.045	-.003	-.051	.038
	(-0.81)	(-1.05)	(-1.14)	(-1.37)	(-0.72)	(0.54)	(-0.94)	(-0.05)	(-1.11)	(0.82)
SSCE	-3.82*	1.24	1.46	1.27***	1.57***	-1.1***	1.20*	1.70*	1.14*	1.86*
	(-3.09)	(1.29)	(1.39)	(1.74)	(1.75)	(-1.71)	(3.06)	(3.03)	(2.92)	(4.49)
BURO	-13.7*					-7.44*				
	(-5.39)					(-5.52)				
		1.15					.021			
		(1.30)					(0.05)			
LAW			-.102					.004		
			(-0.16)					(0.01)		
DEMOC				-.271					-.198	
				(-0.76)					(-1.04)	
INVEST					1.34*					1.15*
					(2.84)					(5.32)
cst	-12.2**	-9.83	-4.31	-2.35	2.31	-1.90	-1.36	2.43	-1.36	-1.31
	(-2.11)	(-1.20)	(-0.61)	(-1.40)	(0.33)	(-0.62)	(-1.39)	(0.65)	(-1.46)	(-1.33)
R^2	0.10	0.10	0.15	0.11	0.10	0.12	0.13	0.16	0.13	0.21
H-Statistic	0.00	0.011	0.000	0.13	0.038	0.000	0.21	0.00	0.32	.000
	(FE)	(FE)	(FE)	(RE)	(FE)	(FE)	(RE)		(RE)	

Notes: The dependant variables are: index of stock market (*MARKETINDEX*), Market capitalization to GDP ratio (*MCAP*), TRADED = value of domestic equities traded on domestic exchanges as a percentage of GDP, TURNOVER= the total value of domestic shares traded divided by market capitalization. The explicative variables are: INCOME= Log of real GDP per capita, SSCE = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate). The institutional variables are: bureaucracy quality, corruption, rule of law, democracy and investment profile, with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively. H-statistics corresponds to Hausman test for comparison between fixed (FE) or random (RE) effects specifications.

3.5 Robustness Test

In this subsection, we outline a number of potential concerns regarding our main estimates, explain our approach in seeking to address them, and report the related findings.

3.5.1 Four-year average data

While the ICRG data are available at all years of our period of analysis, however, we do not see an important time-variation. Wei (2000) [28] argue that this relative shortness of the times series of ICRG may entail some possibility of biasedness. Thus, to adress these shortcomings and following Ito (2006) we use the period average[29].

Table 3.5 shows that the results hold when we consider a four-year average data. In fact, while institutional index appear relevant for all indicators of banking sector development, among the stock market indicators only $MCAP$ is affected positively and significantly by institutional index ($INST$).

[28] He considers the corruption index in his study.

[29] In our study we consider a four-year average data set

Table 3.5: **Results of panel data estimations, the dependant variable: Financial Development (FD) (four-year average data)**

	Bank Development				**Stock Market**			
	(1) FD= BANKINDEX	(2) FD= LIABLITIES	(3) FD= ASSETS	(4) FD= PRIVCRE	(5) FD= MARKETINDEX	(6) FD= MCAP	(7) FD= TRADED	(8) FD= TURNOVER
INCOME	.094	-.0362	.0154	.104***	.217	-.0451	.079	-.739
	(0.91)	(-0.56)	(0.24)	(1.89)	(0.35)	(-0.05)	(0.46)	(-0.72)
INF	.838	.3972	.518	.564	8.587	4.785	.615	3.008
	(0.97)	(0.81)	(0.80)	(1.10)	(0.92)	(1.33)	(0.20)	(0.86)
TO	.166	.227***	.0349	-.027	2.416	1.958**	.526	1.410
	(0.76)	(1.79)	(0.22)	(-0.21)	(1.42)	(2.85)	(1.00)	(1.91)
KO	.097**	.0429**	.0482***	.0671**	.2309	.1458	-.0378	.109
	(2.66)	(2.03)	(1.76)	(3.06)	(0.72)	(1.23)	(-0.37)	(0.95)
SSCE	-.294	-.0405	.0176	-.3707**	1.321	1.00	.9587	1.368
	(-1.12)	(-0.26)	(0.09)	(-2.28)	(0.54)	(1.22)	(1.38)	(1.15)
INST	1.139**	.5378***	.622***	.727**	3.656	2.377***	-.1139	1.625
	(2.33)	(1.89)	(1.69)	(2.47)	(0.88)	(1.83)	(-0.08)	(1.24)
cst	-1.430***	.416	.0095	-.5810	-7.410	-3.194	-1.532	3.029
	(-1.83)	(0.84)	(0.02)	(-1.38)	(-1.53)	(-0.50)	(-1.07)	(0.41)
R^2	0.33	0.29	0.25	0.42	0.13	0.50	0.09	0.10
H-Statistic	0.828	0.989	0ă.54	0.591	0.213	0.003	0.303	0.091
	(RE)	(RE)	(RE)	(RE)	(RE)	(FE)	(RE)	(RE)

Notes: The dependant variables are: index of banking sector (*BANKINDEX*), Private credit to GDP ratio (*PRIVCRE*), liquid liabilities as a percentage of GDP (*LIABILITIES*), total assets of deposit money bank as a percentage of GDP (*ASSETS*), index of stock market (*MARKETINDEX*), market capitalization to GDP ratio (MCAP), TRADED = value of domestic equities traded on domestic exchanges as a percentage of GDP, TURNOVER= the total value of domestic shares traded divided by market capitalization. The explicative variables are: INCOME= Log of real GDP per capita, *SSCE* = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate), INST = the composite index of institutional quality (ICRG group), with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively. H- statistics corresponds to Hausman test for comparison between fixed (FE) or random (RE) effects specification.

3.5.2 An alternative Data Base

As cited above the measurement of institutional quality is a challenge task. In fact, besides endogeneity it accounts for measurement error in the institutional quality proxies. Therefore, to avoid these shortcomings and for the robustness of our results we refers our analysis adopting another set of institutional variables developed by Kaufmann *et al.* (1999). They construct six different indicators, each representing a different dimension of governance: Voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption.

- Voice and accountability: The extent, to which a country′s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and a free media.

- Political stability and absence of violence/ Terrorism: The likelihood that the government will be destabilized by unconstitutional or violent means, including terrorism.

- Government effectiveness: The quality of public service, the capacity of the civil service and its independence from political pressures, and the quality of policy formulation.

- Regulatory quality: The ability of the government to provide sound policies and regulations that enables and promotes private sector development.

- Rule of Law: The extent to which agents have confidence in and abide by the rules of society, including the quality of contract enforcement and property rights, the police and the course, as well as the likelihood of crime and violence.

- Control of corruption: The extent to which public power is exercised for private again, including both petty and grand forms of corruptions, as well as "capture" of the state by elites and private interests.

These variables have been resealed to assume values between 0 and 1. In all cases, larger values indicate better institutions. We expect a positive relationship between financial development and the indicators of institutional quality.

To measure institutional quality, we construct an index of institutional quality (WGI)[30]. This variable is the simple average of the six institutional indicators described above.

[30]Worldwide Governance indicators index (WGI)

In this part of our study we consider only the $1996-2007$ period, given the availability of Kaufmann *et al.* (1999) institutional data base. Given also that these indicators are not available for all periods we use the OLS technique of estimation.

The results of OLS regressions are reported in Table 3.6. Our main findings are that in terms of significance the results are consistent with those when we consider the ICRG index for banking sector variables. The WGI index has a significant and positive effect on the composite bank index and on the usual measures of banking sector development. A one standard deviation in the WGI index would increase composite bank index, private credit, liquid liabilities and assets by 3.23, 2.01, 1.57, and 1.53 points respectively. For stock market development, the results are far from those observed when the ICRG index is considered. In fact, the WGI index does not appear a significant determinant of all indicators of stock market development.

In summary we can conclude that institutional quality is more relevant for banking sector than for stock market. Moreover, banking sectors are more vulnerable to institutional quality reflecting the more complex role they play in financial intermediation. In contrast, stock market activity is more dependent on market forces.

Table 3.6: **Alternative Institutional data base: Results of OLS estimations, the dependant variable: Financial Development (FD)**

	Bank Development				**Stock Market**			
	(1) FD= BANKINDEX	(2) FD= LIABLITIES	(3) FD= ASSETS	(4) FD= PRIVCRE	(5) FD= MARKETINDEX	(6) FD= MCAP	(7) FD= TRADED	(8) FD= TURNOVER
INCOME	-.274***	-.077	-.202***	-.172**	.431	.039	.144	.157
	(-2.20)	(-1.24)	(-2.19)	(-2.79)	(0.61)	(0.28)	(0.63)	(1.01)
INF	-.669	.457	-1.04	-.799	-16.8	.427	-6.44	-5.33
	(-0.49)	(0.63)	(-1.11)	(-0.94)	(-1.23)	(0.11)	(-1.46)	(-1.81)
TO	-.515	-.104	-.255	-.468**	-.603	.561	-.172	-.454
	(-1.75)	(-0.84)	(-1.23)	(-3.06)	(-0.23)	(1.35)	(-0.20)	(-0.74)
KO	.035	-.004	.037	.030	.028	.154	-.023	-.038
	(0.66)	(-0.19)	(0.78)	(1.01)	(0.07)	(0.93)	(-0.17)	(-0.47)
SSCE	1.31***	.531***	.730	.816**	1.77	-.571	.709	.751
	(2.22)	(2.02)	(1.55)	(3.04)	(0.49)	(-0.39)	(0.63)	(1.07)
WGI	3.32*	1.57*	1.53**	2.01*	-5.28	-.293	-2.16	-1.49
	(4.97)	(4.67)	(3.01)	(5.62)	(-0.79)	(-0.18)	(-0.98)	(-0.99)
cst	.191	.044	1.24**	.814**	-1.13	.199	-.051	-.270
	(0.30)	(0.15)	(2.70)	(2.46)	(-0.29)	(0.23)	(-0.04)	(-0.31)
R^2	0.73	0.76	0.57	0.77	0.51	0.61	0.52	0.71

Notes: The dependant variables are: index of banking sector (BANKINDEX), Private credit to GDP ratio (PRIVCRE), liquid liabilities as a percentage of GDP (LIABILITIES), total assets of deposit money bank as a percentage of GDP (ASSETS), index of stock market (MARKETINDEX), market capitalization to GDP ratio (MCAP), TRADED = value of domestic equities traded on domestic exchanges as a percentage of GDP, TURNOVER= the total value of domestic shares traded divided by market capitalization. The explicative variables are: INCOME= Log of real GDP per capita, SSCE = the percentage of secondary school enrollment, INF= Log (1+ current inflation rate), INST is the average of voice and accountability, political stability and lack of violence, rule of law, control of corruption, government effectiveness, and regulatory quality (Worldwide governance indicators) with higher values indicating higher quality of institutional structure. T-statistics for coefficient in parentheses.*, **, *** denote significance at the 1%, 5% and 10% level respectively.

3.6 Conclusion

Financial development is regarded as a major driving force of economic growth. In this Chapter we have highlighted the role of institutional quality in determining financial development in MENA countries over 1984-2007. According to previous studies, institutional factors as political risk, law and order, democratic accountability and quality of bureaucracy are important determinants of financial development in emerging markets. Hence, the resolution of political risk can increase investor confidence and propel the growth of the financial development in emerging economies. In the first part, we have examined the theoretical and empirical contributions to the question. A growing strands of these contributions have stressed a broad variety of institutions, ranging from the legal framework to trust has been found to determine financial development. In the second part of this Chapter, we have examined empirically the institutional determinants of financial development. We have employed data on institutional environment, banking sector size, banking sector activity, and equity market size and equity market liquidity. The results of, panel data and IV techniques of estimation show that banking sector and stock market are affected differently by institutional quality. Indeed institutional quality appears more relevant for banking sector than for stock market. Examining the impact of the five sub-indicators of the composite ICRG index on financial sector development, we find that some institutional aspects matter more than others do. Indeed, while law and order are the most relevant determinant of banking sector development, corruption and investment profile are of secondary importance for banking sector development. We also find that, investment profile is the most relevant determinant of stock market development. It has a positive significant effect on market index and stock market liquidity. Overall, the results send strong signals regarding the role of institutional quality in promoting financial sector development. Therefore, MENA countries should improve their institutional framework because good institutions reduce political risk which is an important factor in investment decision.

Given the importance of institutional quality in determining financial development, in the following and Last Chapter we examine how the impact of financial development on economic growth is affected by institutional quality.

Chapter 4

Institutions and the Finance-Growth Nexus

4.1 Introduction

The results of Chapter 2 provide an interesting evidence that financial development in MENA countries has no effect on economic growth, if not unfavorable effect. One possible reason for these results, that is the relationship between financial development and economic growth may not be linear, but rather simply be dependant on the conditions. Moreover, the results of Chapter 3 have shown the importance of institutional environment in determining financial development, specifically banking sector. Therefore, the impact of financial development on economic growth can depend on institutional quality.

Along the same line, this Chapter investigates whether the finance growth relationship differs along with the level of institutional development. In fact, we aim to examine how the institutional conditions affect a positive (or negative) finance-growth nexus in MENA region.

In the first section, we summarize the related literatures that have examined the conditional finance-growth relationship. The second Section, examines empirically the linear effect of institutional index on the finance-growth nexus in MENA countries. Section 3 investigates the non-linear effect of institutional quality in the finance growth-nexus. Section 4 concludes.

4.2 The conditional finance-growth relationship: related literature

An important strand of literature suggests that the finance-growth relationship is very likely to be nonlinear in the sense that the growth effect of finance may vary with alternative macro-economic and institutional conditions. Moreover, the existing evidence suggests that there are thresholds in the finance-growth relationship.

4.2.1 Macro-economic conditions

Applying a threshold regression model to King and Levine′s (1993b) data set which covers 119 countries over the period of 1960−1989 Deiddaa and Fattouh (2002) examine empirically the non-linear relationship between financial and economic development. The model estimated takes the following form:

$$y_i = \theta_1' x_i + e_i \tag{4.1}$$

for $q_i \leq \gamma$

$$y_i = \theta_2' x_i + e_i \tag{4.2}$$

for $q_i > \gamma$

Where q_i is the threshold variable used to split the sample into different regimes or groups; y_i is the dependent variable; x_i is an m-vector of regressors and e_i is an error term. Next, Deiddaa and Fattouh (2002) represent the two equations above by a single equation by defining a dummy variable $d_i(\gamma) = q_i \leq \gamma$ and setting $x_i(\gamma) = x_i d_i(\gamma)$. Therefore the single equation is written as follows:

$$y_i = \theta' x_i + \delta' x_i(\gamma) + e_i \tag{4.3}$$

Where $\theta' = \theta_2'$, and δ and γ are the regression parameters.

Deiddaa and Fattouh (2002) consider only the ratio of liquid liabilities to GDP as an indicator of financial depth. Using the initial income per capita as the threshold variable and applying the OLS technique of estimation, the Deiddaa and Fattouh (2002) $'$ s empirical results provide evidence consistent with the non-monotonic relationship implied by their empirical model. In fact, the results show that higher levels of financial development are positively related to higher growth rates in the model without threshold effects. However, the latest results hold only for high-income countries. However, for low-income countries, there is no significant relationship between financial depth and economic growth.

In this vein, Rioja and Valev (2004) present an empirical analysis that explicitly tests for structural breaks in terms of the level of financial development. To this end, Rioja and Valev (2004) first create the dummy variables low region (LR) and high region (HR) such that (LR) is equal to 1 if financial development is below a certain lower threshold and zero otherwise. Similarly, (HR) equals 1 if financial development is greater than a certain upper threshold, and zero otherwise. Next they interact the two dummy variables with the indicators of financial development (FD_{it}) as follows:

$$\beta_0 \times FD_{it} + \beta_1 FD_{it} \times LR_{it} + \beta_2 FD_{it} \times HR_{it}. \tag{4.4}$$

Using a broad sample of 74 countries during the 1960 to 1995 period, and applying the generalized method of moments (GMM) dynamic panel data techniques they provide empirical evidence to the non-linearity relationship between financial development and economic growth. Their findings show that the effect of finance on growth is not uniformly. In fact, while financial development exerts a strong positive effect on economic growth in the middle and high regions, this effect is ambiguous in countries in the low region.

While the studies cited above stress the importance of economic development in determining the finance-growth relationship, another strand of literature investigate whether the finance-growth nexus is affected by inflation rates. For example, to characterize more precisely how inflation affects the influence of finance on growth, Rousseau and Wachtel (2002) apply the rolling panel data regression technique to a sample of 84 countries from 1960-1995. The latest study provide evidence that there is an inflation threshold for the finance-growth relationship. In fact, when inflation exceeds the 13% to 25% range, financial deepening ceases to increase economic growth.

In more recent study, Huang *et al.* (2009) explore whether there exists an inflation threshold in the finance growth nexus. To this end, they employ the threshold regression with instrumental variables of Caner and Hansen (2004) instrumental-variable method. This last method not only allows to test for the existence of a nonlinear threshold and to estimate the inflation threshold but also to control for endogeneity in the finance-growth relationship simultaneously. Four alternative financial intermediary development indicators are considered by Huang *et al.* (2009) which are: Private Credit, Commercial-Central Bank, Bank Assets, and Liquid Liabilities. Using the Levine *et al.* (2000) data set, they find strong evidence of a nonlinear inflation threshold in the finance-growth, below which financial development exerts a significantly positive effect on economic growth, while, above which the growth effect of finance appears to be no significant.

Shen and Lee (2006) re-investigate the nexus between financial development and

growth. More specifically, they examine whether the relationship between financial development and growth may not be linear, but rather simply be dependent on the conditions. Thus, Shen and Lee (2006) consider four conditions that can affect the nexus between financial development and growth which are: (i) financial liberalization, (ii) the degree of a country's level of development, (iii) twin crises (banking crises and currency crises), and (iv) governance. Given these conditions, the econometric model considered by Shen and Lee (2006) has the following presentation:

$$\begin{aligned} GROWTH_{it} &= \beta_0 + \beta_1 BANK_{it} + \beta_2 STOCK_{it} \\ &+ \beta_3 INVESTMENT_{it} + \beta_4 INFLA_{it} + \beta_5 GCONSUMP_{it} \\ &+ \beta_6 Y76_i + \beta_7 SCHOOL76_i \\ &+ \beta_8 (BANK_{it} \times Z_{it}) + \beta_9 (STOCK_{it} \times Z_{it}) \\ &+ \varepsilon_{it} \end{aligned} \tag{4.5}$$

Where, $GROWTH_{it}$ is the dependant variable which is proxied by real per capita GDP growth, $BANK$ and $STOCK$ are the indicators of financial development. $BANK$ is proxied by claims on the private sector by banks/GDP (LENDING), liquid liabilities of financial intermediaries/GDP (LIABILITIES) and spread of borrowing and lending interest rates (SPREAD), and (STOCK) is proxied by the ratio of market capitalization/GDP (MKTCAP), the ratio of total stock traded value/GDP (STOCKTRA), and the stock turnover ratio (TURNOVER). The investment ratio (INVESTMENT), the inflation rate (INFLA), government consumption expenditure/GDP (GCONSUMP), and the initial amount of human capital as proxied by secondary school enrollment rates in 1976 (SCHOOL76) and log (initial real GDP per capita) (Y76) are considered as controlled variables. Z_{it} present a set of conditions variables which are:

- Financial liberalization.
- The economic development variables which contain two sets of variables: the first set include two dummy variables which referred to high and middle-income country. The second set includes three regional variables which are also dummy variables:'Latin American' 'Sub-Saharan African' and 'East Asian'.
- Twin crisis: Two variables are considered which denote the dates of banking and currency crises.
- Governance: Two governance variables are also taken into account: (i) the creditor protection and the anti-direction index and (ii) corruption.

Applying the OLS to a sample of 48 countries for the period ranging from 1976 to 2001 their findings are consistent with the hypothesis of the nonlinear relationship

between financial development and economic growth. In fact, the main results can be summarized as following: (i) the conditional variables of financial liberalization, high-income level, and good shareholder protection mitigate the negative impacts of banking development on growth, (ii) the conditional variables of middle-income level, Latin American, Sub-Saharan African, and East Asian dummies strengthen the positive impacts of stock market development on growth, whereas the conditional variables of financial liberalization mitigate the positive impacts of stock market development on growth. In the final step, Shen and Lee (2006) introduce the squares of the financial development variables. Their findings show that the relationship between growth and bank development is better described as a weak inverse '*U-shape*'.

4.2.2 Institutional conditions

While an important strand of literature have stressed the importance of macro-economic conditions in the finance growth nexus, in our best knowledge, there are a few studies that have considered the institutional conditions in the finance growth-nexus. In fact, besides the study of Shen and Lee (2006)[1] described above, Demetriades and Law (2006) is the first and only study that has paid a special attention to the institutional conditions in determining the finance-growth nexus. Thus, to investigate the effect of institution in the finance-growth nexus, they consider the following interactive empirical model:

$$lny_{it} = b_{0i} + b_{1i}t + b_{2i}FD_{1it} + b_{3i}INST_i + b_{4i}lnK_{it} + b_{5i}FD_{it}INST_i + \eta_{it} \qquad (4.6)$$

Where:

- lny_{it} is the ln of real GDP per capita.
- lnK_{it} is the ln of capital stock per capita, which is measured as the ratio of the total capital stock to total population.
- the $b's$ are parameters to be estimated
- FD denotes financial development. Three alternative financial development indicators are considered in this study, which are, (i) Liquid liabilities, (ii)private sector credit and (iii) domestic credit provided by the banking sector.
- $INST$ is the institutional quality which is obtained by summing five indicators from ICRG data base, which are (i) *Corruption*, (ii) *Rule of Law*,(iii) *Bureaucratic Quality,* (iv) *Government Repudiation of Contracts* and (v) *Risk of Expropriation*.

[1]The study of Shen and Lee (2006) has considered several conditions.

- η_{it} is the error terms.

Applying both a Cross-sectional estimation and a Panel data estimation to a sample of 72 countries for the period 1978-2000, Demetriades and Law (2006) find that financial development has larger effect on long-run economic development when the financial system is embedded within a sound institutional framework. However, if institutional quality is low, more finance may not generate significant benefit in economic growth. Our study is related to the last on the objective of examining the effect of institutional quality on the finance-growth nexus and the adoption of the empirical model with interaction variables. However, our work differs from theirs in two ways: First, we calculate an institutional threshold, beyond which financial development can accelerate economic growth. Second besides the linear interaction model between financial development and institutional quality, we consider a quadratic interaction that allows to examine the *non-linear* effect of institutional quality on the finance-growth nexus. Moreover, it allows for the possibility that beyond a certain level, the institutional quality becomes more or less important in determining the marginal effect of financial development in economic growth.

4.3 Institutions and the finance-growth relationship: Empirical evidence from MENA countries

This section presents an empirical analysis in which the responsiveness of economic growth to financial development depends up on indicator of institutional quality. This analysis considers the performance of MENA countries over the period of 1984-2007.

4.3.1 Empirical Model

An empirical specification that allows one to test that the responsiveness of economic growth to financial development depends up on indicator of institutional quality is a slight variant of equation 2.2 (Chapter 2) in which we introduce interaction terms between the institutional quality and financial development indicators ($FD * INST$):

$$GROWTH_{it} = \alpha_i + \beta_0 \mathrm{FD}_{it} + \beta_1(\mathrm{FD{*}INST}_{it}) + \varphi \mathrm{INST}_{it} + \gamma \mathrm{Z}_{it} + \varepsilon_{it} \tag{4.7}$$

$i = 1, ..., n$ and $t = 1, ..., T_i$

where $INST$ is our conditional variable which is an indicator of institutional development. Equation (4.7) permits us to assess whether financial development has a

different influence on growth in countries with high values of institutional quality, than in countries with low values.

In this specification, the responsiveness of the steady state level of economic growth to financial development is δ. Specifically, differentiate equation (4.7) with respect to financial development to obtain the marginal effect of financial development on economic growth:

$$\delta = \partial GROWTH/\partial FD = \beta_0 + \beta_1 * INST \tag{4.8}$$

Our conditional hypotheses center around the coefficients β_0 and β_1. Four possibilities are created. They are:

- (i) If $\beta_0 > 0$ and $\beta_1 > 0$, financial development has a positive impact on economic growth, and institutional condition favorably affect that positive impact.
- (ii) If $\beta_0 > 0$ and $\beta_1 < 0$, financial development has a positive impact on economic growth, and institutional conditions adversely affects that positive impact. (Institutional quality lessened this positive effect).
- (iii) If $\beta_0 < 0$ and $\beta_1 > 0$, financial development has a negative impact on economic growth, and institutional conditions mitigates the negative effect of financial development.
- (iv) If $\beta_0 < 0$ and $\beta_1 < 0$, financial development has a negative impact on economic growth, and institutional conditions aggravates the negative effect of financial development.

Equation 4.8 allows us to calculate the threshold level of institutional quality beyond which financial development can accelerate economic growth. Thus, the positive effect of financial development on economic growth is observed when:

$$\delta > 0 \tag{4.9}$$

$\Longleftrightarrow$

$$\beta_0 + \beta_1 * INST > 0 \tag{4.10}$$

Therefore the threshold level of institutional quality is given by the following expression:

$$INST > (-\beta_0/\beta_1) \tag{4.11}$$

Given Equation 4.7 we can also calculate the overall effect of financial development on economic growth (ϑ) which can be show as:

$$\vartheta = (\beta_0 + \beta_1 * INST_{it})FD_{it} \tag{4.12}$$

4.3.2 Empirical results

We use the generalized-method-of-moments estimators developed for dynamic panel data (*GMM-system*)[2] for a sample of 18[3] MENA countries over 1984 - 2007.

4.3.2.1 Institutional quality and the bank-growth relationship

Tables 4.1, 4.2 report the results of regressions analyzing the influence of institutions on the role of banking sector development in economic growth using an annual data and four-year average data respectively.

In column (1) the composite index *BANKINDEX* is included as indicator of banking sector development with the interaction term *(BANKINDEX*INST)*. The estimated results show that while *BANKINDEX* remains significantly negative, the additional interaction variable *(BANKINDEX*INST)* is significantly positive suggesting that institutional development may very well mitigate the negative effect of *BANKINDEX*. That is, while an increase in the *BANKINDEX* decreases growth, the negative effect is reduced in countries with more developed institutional environment. Our results are similar either when the equation are estimated using an annual data or a four-year average data. The results illustrate that, in order for banking sector development to contribute to economic growth, countries must possess a level of institutional development greater than the threshold level of 0.55 ($0.581/1.06 = 0.55$ Table 4.1 Column 1), when we based on estimates with annual data. Based on estimates with a four-year average data, the corresponding threshold is 0.66 ($0.129/0.194 = 0.66$ Table 4.1 Column 1).

The negative effect of banking sector development on economic growth in the MENA countries is significant because of the low level of institutional development in this region (the average value of institutional quality in MENA countries is 0.52 *(Table C.9 Appendix C) which is lower than* 0.55 *and* 0.66 *threshold levels seen from the estimations with annual and four-year average data respectively.*

As specific example, Tunisia has increased the level of banking sector development from -0.007 to 0.10 between 1989 and 2007. Given its institutional level of 0.52, much lower than the threshold of $0,66$, the increase in banking sector development would reduce the growth rate by 0.003% ($0.003\% = \{[-0.129 + (0.194 \times 0.52)](0,10 + 0,007)\}$)[4]

[2] For more explanations see Chapter 2

[3] When stock market data is considered, the sample contains only 13 MENA countries.

[4] Calculations are based in expression 4.12 of overall effect of financial development, except to simplify calculations, we consider here the mean of a measure of institutional quality $\bar{INST}$. Coefficients are from Table 4.2.

annually. In the other hand Israel (where the average value of institutional quality (0.76) is greater than the threshold level of 0.66) will on average benefit from banking sector development. In fact, experienced an increase of 0.53 in its *BANKINDEX* variable (from 0.38 to 0.91), its economic growth is predicted to increase at an additional 0.01% annually.

Figures 4.1 and 4.2 present a visual picture of the marginal effect of an one-unit increase in *BANKINDEX* on economic growth based on each country's value of *INST*. The countries are placed in the order of magnitude of the total effect of an one-unit increase in *BANKINDEX*. Only in Israel banking sector development has a positive effect on economic growth because it has attained a threshold level of institutional development, whereas all the rest of MENA countries with underdeveloped institutional infrastructure may hamper economic growth (Figure 4.2). When we base on annual data, Figure 4.1 shows that besides in Israel, the banking sector in Bahrain and Jordan can accelerate economic growth, given that the threshold level of institutional quality is lower than this with annual data.

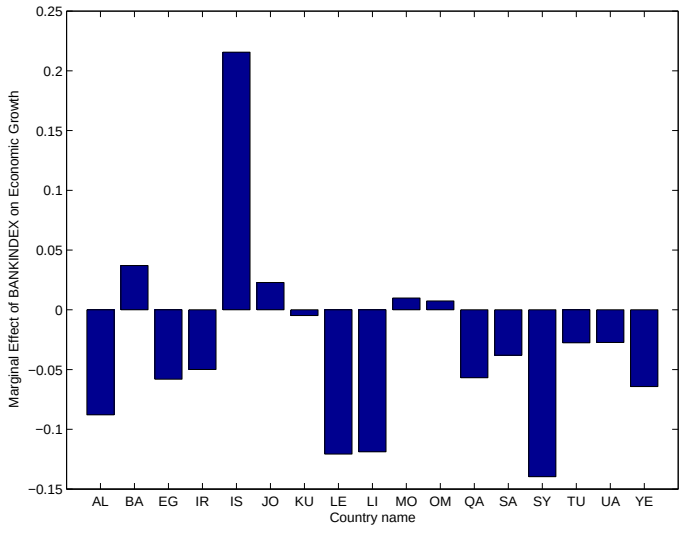

Figure 4.1: **Marginal Effect of *BANKINDEX* on Economic Growth (Annual data)**

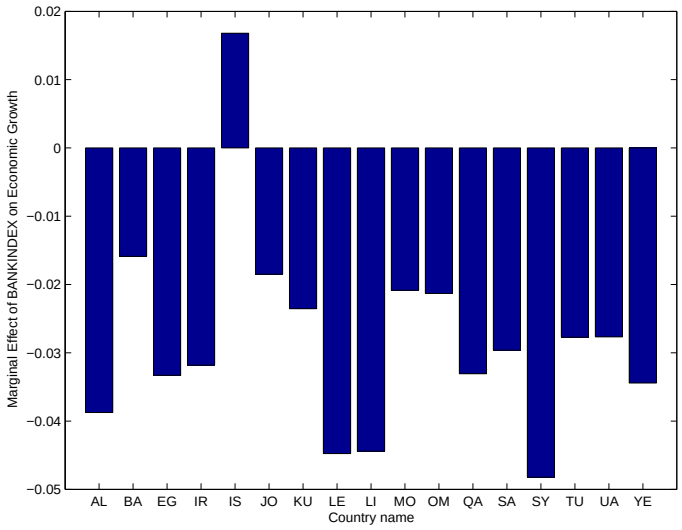

Figure 4.2: **Marginal Effect of *BANKINDEX* on Economic Growth (Four-year average data)**

Looking to the usual measures of banking sector development, *LIABILITIES*, *ASSETS* and *PRIVCRE*, in most regressions, the institutional variable displays similar results to those when banking development is proxies by *BANKINDEX*. In fact, the three interaction terms *(LIABILITIES*INST, ASSETS*INST* and *PRIVCRE*INST*) are significantly positive when we consider an annual data (Table4.1). The coefficients for *LIABILITIES* and *ASSETS* are significantly negative suggesting that while a larger and deeper banking system (on forma of higher liquid liabilities and highest deposit money bank assets to GDP) decreases growth, this negative effect is reduced in a country with more developed institutional environment. The latest results are seen when we consider the annual data Table 4.1. Based on the estimates with four-year average data, we find that while the results are consistent to those of annual data for *LIABILITIES*, the coefficients for both *ASSETS* and the interactive term *ASSETS*INST* does not appear statistically significants. The latest Lines from Tables 4.1 and 4.2 illustrate that when *LIABILITIES* are considered, the threshold levels are 0.53 and 0.42 for the annual and average data respectively.

Considering the proxies of banking sector activity (*PRIVCRE*), the results displayed in Tables 4.1 and 4.2 (columns 4) indicate that the coefficients of *PRIVCRE* are negative but no longer significant. On the other hand, the coefficients of (*PRIVCRE*INST*) are positive and significant at the 1% and 10% level (1.52 and 0.73) when we use an annual and four- year average data respectively. The consistent threshold levels of institutional quality are 0.56 for annual data and 0.55 in the regressions with averaged data.

Table 4.1: **The effect of institutional quality on the bank-growth relationship (annual data): *Linear Specification***

Variable	***(1) FD***= BANKINDEX	***(2) FD***= Liquid Liabilities	***(3) FD***= BANK ASSETS	***(4) FD***= PRIVATE CREDIT
BANKINDEX	-.581*			
	(-4.09)			
LIABILITIES		-.456*		
		(-3.01)		
ASSETS			-.708**	
			(-2.19)	
PRIVCRE				-.851
				(-0.63)
INST	-.019	-.554*	-.990**	-.992*
	(-0.34)	(-3.3)	(-2.32)	(-3.41)
BANKINDEX*INST	1.06*			
	(5.11)			
LIABILITIES*INST		.863*		
		(3.31)		
ASSETS*INST			1.49**	
			(2.32)	
PRIVCRE*INST				1.52*
				(3.29)
IIC	.035	.0401	.084***	-.0049
	(1.01)	(1.49)	(1.92)	(-0.08)
INF	.0006	.023**	-.023	.187*
	(0.04)	(2.09)	(-0.55)	(2.91)
TO	.024	.010	-.0013	-.0361***
	(1.00)	(0.57)	(-0.04)	(-1.70)
GC	-.565*	-.471*	.836*	-1.17*
	(-2.86)	(-3.73)	(-3.76)	(-5.58)
cst	-.023	.246**	.344	.490***
	(-0.41)	(2.06)	(1.26)	(1.84)
AR(2)	0.664	0.703	0.719	0.645
Sargan	0.245	0.591	0.692	0.075
Hansen	0.516	0.691	0.901	0.399
N	222	220	222	222
Threshold level of INST	.55	.53	.48	.56

Notes: The definitions of our variables appear in Table B.1 (Appendix B). The additional interaction terms are: (i)(*BANKINDEX*INST*) which is an interaction term between institutional quality and bank index, (ii)(*LIABILITIES*INST*) is an interaction term between liquid liabilities and institutional quality, (iii)(*ASSETS*INST*) is an interaction term between bank assets and institutional quality and (iv) (*PRIVCRE*INST*) is an interaction term between private credit and institutional quality. *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen Statistic tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.2: **The effect of institutional quality on the bank-growth relationship (four-year average data): *Linear Specification***

Variable	***FD***= BANKINDEX	***FD***= Liquid Liabilities	***FD***= BANK ASSETS	***FD***= PRIVATE CREDIT
BANKINDEX	-.129**			
	(-2.03)			
LIABILITIES		-.547**		
		(-2.48)		
ASSETS			.051	
			(1.41)	
PRIVCRE				-.401
				(-1.11)
INST	.188**	-.967*	.242	-.348*
	(2.07)	(-2.62)	(1.31)	(-2.61)
BANKINDEX*INST	.194***			
	(1.65)			
LIABILITIES*INST		1.31*		
		(2.68)		
ASSETS*INST			-.024	
			(-0.27)	
PRIVCRE*INST				.739***
				(1.85)
IIC	.001	.053	.053	.068*
	(0.04)	(0.93)	(1.37)	(3.20)
INF	-.0084	.046*	-.0081	.016
	(-0.37)	(3.25)	(-0.38)	(0.27)
	.016	-.008	-.008	.0032
	(0.73)	(-0.35)	(-0.35)	(0.13)
GC	-.211***	-.558*	-.555*	-.456**
	(-1.72)	(-3.97)	(-4.82)	(-2.46)
cst	-.066	.355	-.199	.0495
	(-0.68)	(1.13)	(-1.27)	(0.42)
AR(2)	0.169	0.240	0.550	0.370
Sargan	0.713	0.889	0.887	0.649
Hansen	0.599	0.994	0.316	0.761
N	64	63	64	64
Threshold Level of INST	.66	.42	na	.55

Notes: The definitions of our variables appear in Table B.1 (Appendix B). The additional interaction terms are: (i)(*BANKINDEX*INST*) which is an interaction term between institutional quality and bank index, (ii)(*LIABILITIES*INST*) is an interaction term between liquid liabilities and institutional quality, (iii)(*ASSETS*INST*) is an interaction term between bank assets and institutional quality and (iv) (*PRIVCRE*INST*) is an interaction term between private credit and institutional quality. *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen statistic tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Figures (4.3, 4.4, 4.5, 4.6 and 4.7) illustrate the marginal effect of banking sector development on economic growth based on the usual measures of banking sector development (*LIABILITIES, ASSETS, PRIVCRE*). The main findings are that Israel can benefit in the high level from banking sector given it has the most developed institutional environment. Jordan and Bahrain can also accelerate their economic growth. In

the other hand, to promote economic growth, Tunisia, Syrian Arab Republic, Algeria, Egypt, Saudi Arabia, Oman, Qatar, Yemen, Libya, Iran, Lebanon, UAE, banking sector development must be accompanied with institutional development.

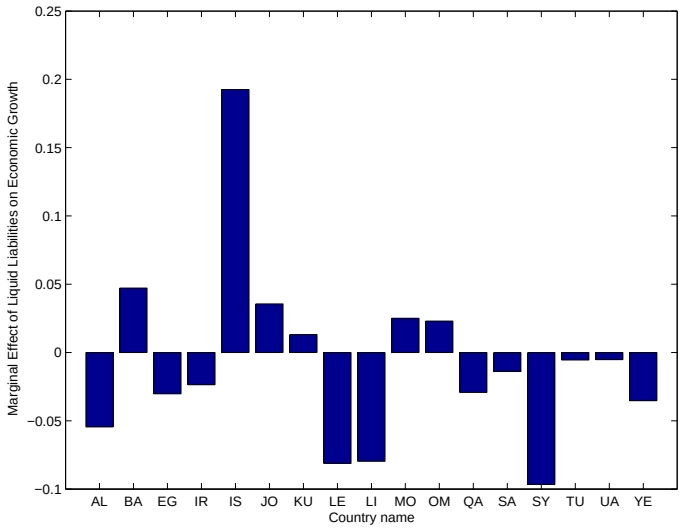

Figure 4.3: **Marginal Effect of *Liquid liabilities* on Economic Growth (Annual data)**

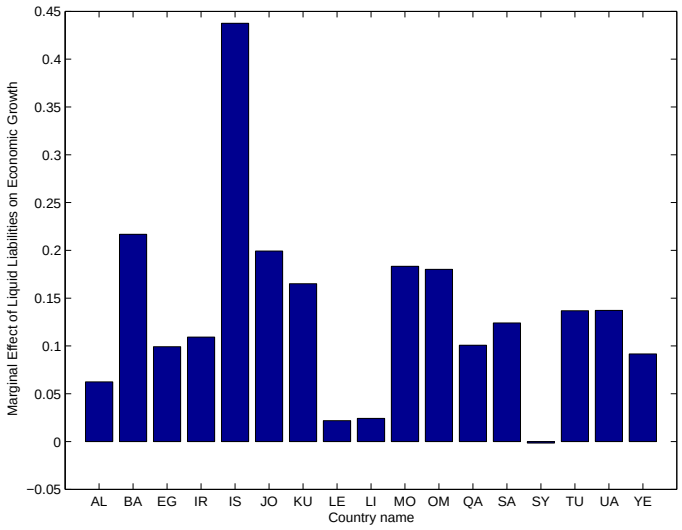

Figure 4.4: **Marginal Effect of *Liquid liabilities* on Economic Growth (Four-year average data)**

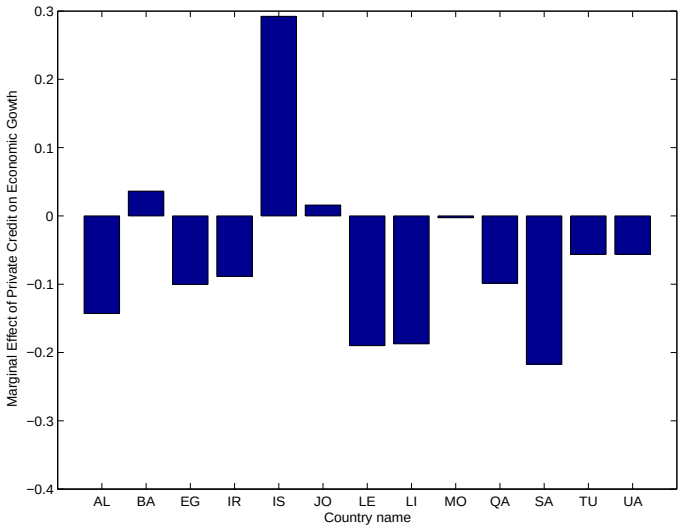

Figure 4.5: **Marginal Effect of *Private Credit* on Economic Growth (Annual data)**

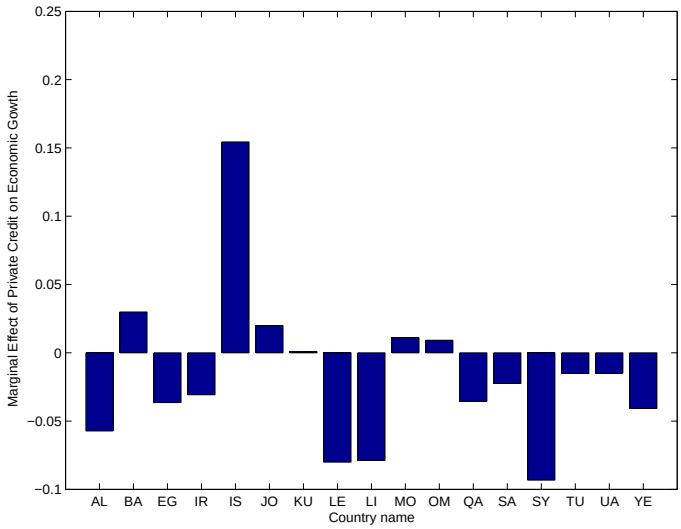

Figure 4.6: **Marginal Effect of *Private Credit* on Economic Growth (Four-year average data)**

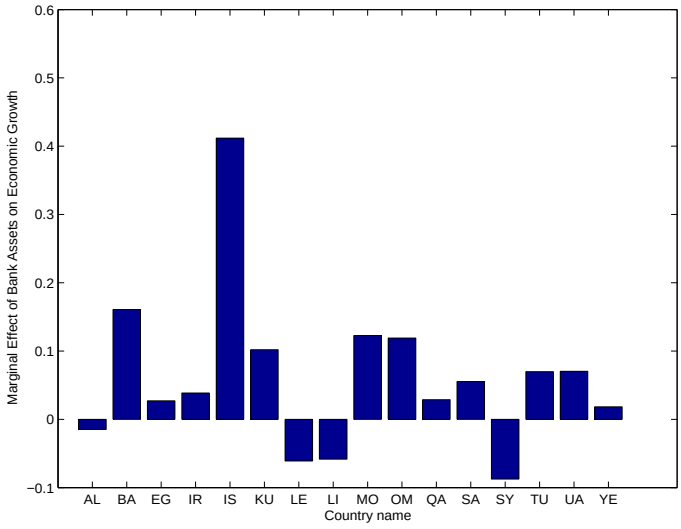

Figure 4.7: **Marginal Effect of *Bank Assets* on Economic Growth (Annual data)**

Tables (4.3, 4.4, 4.5, 4.7and 4.6) summarize the results from the regression that are run with each of the components of the institutional index (i.e, *BURO*, *CORR*, *DEMOC*, *LAW* and *INVEST*) included individually and interactively (i.e, *FD*BURO*,

*FD*CORR*, *FD*DEMOC*,*FD*LAW* and *FD*INVEST*). The main findings are that not all dimensions of the institutional framework have the same direct importance for bank-growth relationship. In fact, while *BURO*, *LAW* and *INVEST* display qualitatively the same results as those of regressions with *INST* (Tables 4.1 4.2) in most regressions with all indicators of banking sector development, *CORR* does not matter in the banking sector growth nexus[5].

Generally, when we refer to *BANKINDEX*, banking sector development lead to economic growth only when the measures of *BURO*, *LAW* and *INVEST* are higher than the threshold levels (0.60, 0.68, 0.54 respectively) when we base on the annual data. The consistent thresholds are 0.60, 0.57 and 0.59 respectively when the four-year average data set is considered.

Democratic accountability (*DEMOC*) seems to matter only when *BANKINDEX* is considered. That is, to benefit from financial intermediaries development, MENA countries must attain a score of *DEMOC* higher than the threshold levels (0.49 and 0.55 when we consider annual and averaged data respectively).

[5] We do not check an important significance in the interaction terms of banking sector indicators and *CORR*

Table 4.3: **The effect of bureaucracy quality on the bank-growth relationship: *Linear Specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.367* (-3.29)	-.104* (-3.10)						
LIABI-LITIES			-.708 (-0.85)	-.013** (-2.14)				
ASSETS					.339 (0.63)	.042 (1.12)		
PRIVCRE							-.699** (-2.39)	-.122 (-1.54)
BURO	.090 (1.50)	.0059 (0.49)	-.650 (-0.93)	.007 (0.64)	.452 (1.12)	-.009 (-0.33)	-.271** (-2.69)	-.135*** (-1.94)
BANK-INDEX* BURO	.613* (2.47)	.174* (4.48)						
LIABI-LITIES* BURO			1.22 (0.98)	.037* (38.36)				
ASSETS* BURO					-.735 (-0.95)	-.001 (-0.04)		
PRIVCRE* BURO							.751** (3.01)	.310*** (1.86)
IIC	-.054 (-0.94)	.043 (1.13)	-.227 (-0.99)	.003 (1.11)	.147 (1.26)	.050* (4.79)	.115* (2.71)	.024 (1.57)
INF	-.022 (-0.72)	-.161 (-3.65)	-.074 (-0.90)	-.104* (-5.92)	.097*** (1.81)	-.141* (-3.82)	-.075 (-1.49)	-.178* (-3.46)
TO	.043** (2.80)	.004 (0.55)	.067 (0.93)	-.005 (-1.47)	-.025 (-0.32)	-.0054 (-0.71)	.058 (1.33)	-.004 (-0.43)
GC	-.206 (-1.09)	-.346** (-2.51)	.646 (0.61)	-.028 (-0.49)	-.850*** (-1.93)	-.384* (-9.66)	-.573** (-2.70)	-.360* (-3.46)
cst	.145 (0.99)	-.068 (-0.65)	1.012 (1.00)	.015*** (1.89)	-.527 (-1.01)	-.086* (-3.09)	-.037 (-0.33)	.067 (1.52)
AR(2)	0.887	0.653	0.753	0.362	0.843	0.845	0.978	0.580
Sargan	0.262	0.885	0.834	0.694	0.531	0.920	0.374	0.911
Hansan	0.577	0.184	0.808	0.460	0.392	0.783	0.694	0.272
N	210	60	208	54	210	59	210	0.59
Threshold Level of INST	.60	.60	na	.35	na	na	.93	.39

Notes: The definitions of our variables appear in Table B.1 (Appendix B). The additional interaction terms are: (i)($BANKINDEX*BURO$) which is an interaction term between bank-index and bureaucracy quality, (ii)($LIABILITIES*BURO$) is an interaction term between liquid liabilities and bureaucracy quality, (iii)($ASSETS*BURO$) is an interactive term between bank assets and bureaucracy quality and (iv) ($PRIVCRE*BURO$) is an interactive term between private credit and bureaucracy quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen Statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.4: **The effect of corruption on the bank-growth relationship: *Linear Specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.042	.046						
	(-0.79)	(1.66)						
LIABI-LITIES			.632	.185				
			(0.68)	(1.45)				
ASSETS					.001	.152		
					(0.02)	(1.01)		
PRIVCRE							-.135	.135
							(-0.28)	(1.22)
CORR	.0044	-.029	.673	.155	-.099	.236	-.089	.117
	(0.08)	(-1.38)	(0.60)	(0.93)	(-1.42)	(1.05)	(-0.26)	(1.27)
BANK-INDEX*	.182**	-.034						
CORR	(2.72)	(-0.52)						
LIABI-LITIES*			-.699	-.253				
CORR			(-0.41)	(-0.84)				
ASSETS*					.186***	-.414		
CORR					(1.81)	(-1.15)		
PRIVCRE*							.243	-.273
CORR							(0.30)	(-1.26)
IIC	-.0040	.052*	.235	.0312	-.034	.113**	.044	.065*
	(-0.10)	(4.01)	(1.29)	(1.76)	(-0.95)	(2.63)	(0.56)	(3.15)
INF	.002	.051	-.116	.010	-.014	.077***	.0041	.029
	(0.16)	(1.58)	(-0.93)	(0.24)	(-0.74)	(1.93)	(0.13)	(1.19)
TO	.022	.004	-.275	.009	.018	-.010	.013	-.002
	(0.80)	(0.30)	(-1.54)	(0.46)	(1.27)	(-1.14)	(0.87)	(-0.29)
GC	-.348	-.408*	-1.15	-.254**	-.367***	-.407*	-.335	-.419*
	(-1.60)	(-6.65)	(-1.10)	(-2.91)	(-1.85)	(-5.26)	(-1.60)	(-8.18)
cst	.073	-.080***	-.843	-.166	.194***	-.389***	-.031	-.187**
	(0.66)	(-1.94)	(-1.61)	(-1.50)	(2.11)	(-1.99)	(-0.24)	(-2.24)
AR(2)	0.672	0.892	0.796	0.857	0.674	0.108	0.760	0.904
Sargan	0.074	0.060	0.804	0.378	0.573	0.389	0.217	0.671
Hansan	0.770	0.629	0.429	0.435	0.498	0.526	0.719	0.620
N	210	64	208	63	210	63	210	63
Threshold Level of INST	.23	na	na	na	na	na	na	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*CORR$) which is an interaction term between bank-index and corruption, (ii)($LIABILITIES*CORR$) is an interaction term between liquid liabilities and corruption, (iii)($ASSETS*CORR$) is an interactive term between bank assets and corruption and (iv) ($PRIVCRE*CORR$) is an interactive term between private credit and corruption. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen Statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.5: **The effect of democratic accountability on the bank-growth relationship: *Linear Specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.288** (-2.68)	-.164* (-3.10)						
LIABI-LITIES			-.145 (-0.56)	-.002 (-0.02)				
ASSETS					.0410 (-0.23)	.037 (1.01)		
PRIVCRE							-.110 (-0.42)	-.136** (-2.24)
DEMOC	-.027 (-0.88)	-.0057 (-0.24)	.021 (0.11)	-.094 (-1.32)	.0150 (0.06)	.0113 (0.14)	-.058 (-0.30)	-.167** (-2.45)
BANK-INDEX* DEMOC	.595* (4.55)	.299* (4.21)						
LIABI-LITIES* DEMOC			.039 (0.12)	.126 (1.00)				
ASSETS* DEMOC					.019 (0.06)	-.0132 (-0.11)		
PRIVCRE* DEMOC							.164 (0.44)	.307** (2.39)
IIC	.070 (0.99)	.027 (1.01)	-.009 (-0.20)	.066** (2.56)	.025 (0.59)	.0250 (0.79)	.016 (0.28)	.090* (4.00)
INF	.029 (0.81)	-.027 (-0.68)	-.031 (-1.18)	.0236 (0.91)	-.005 (-0.30)	-.025 (-0.88)	-.0008 (-0.02)	.076* (3.56)
TO	.00007 (0.00)	.007 (0.38)	.047 (1.38)	-.0135 (-1.10)	.0119 (0.56)	.010** (2.43)	.027 (0.91)	.002 (0.28)
GC	-.889*** (-1.98)	-.365* (-3.09)	-.130 (-0.70)	-.422** (-4.30)	-.313 (-1.30)	-.280* (-6.31)	-.290*** (-1.99)	-.531* (-12.57)
cst	-.061 (-0.41)	-.019 (-0.33)	.110 (0.43)	-.118 (-1.37)	-.015 (-0.10)	-.047 (-0.38)	.0317 (0.19)	-.131** (-2.82)
AR(2)	0.929	0.320	0.834	0.856	0.805	0.340	0.765	0.370
Sargan	0.172	0.177	0.863	0.350	0.572	0.074	0.591	0.739
Hansan	0.568	0.258	0.839	0.481	0.839	0.313	0.771	0.536
N	210	65	208	63	210	64	210	65
Threshold Level of INST	.49	.55	na	na	na	na	na	.45

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*DEMOC$) which is an interactive term between bank-index and democratic accountability, (ii)($LIABILITIES*DEMOC$) is an interaction term between liquid liabilities and democratic accountability, (iii)($ASSETS*DEMOC$) is an interaction term between bank assets and democratic accountability and (iv) ($PRIVCRE*DEMOC$) is an interaction term between private credit and democratic accountability. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.6: **The effect of law and order on the bank-growth relationship: *Linear Specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.159** (-2.48)	-.200* (-8.08)						
LIABI-LITIES			-.243*** (-1.78)	-.335* (-3.27)				
ASSETS					-.441*** (-1.96)	.022 (0.73)		
PRIVCRE							-.341* (-4.07)	-.168 (-1.09)
LAW	.075 (1.20)	.008 (0.49)	-.291*** (-2.00)	-.347* (-3.84)	-.753*** (-2.09)	.006 (0.44)	-.170** (-2.78)	-.202** (-2.30)
BANK-INDEX* LAW	.233* (3.92)	.349* (11.08)						
LIABI-LITIES* LAW			.416*** (1.99)	.566* (4.42)				
ASSETS* LAW					1.33** (2.26)	.0207 (0.70)		
PRIVCRE* LAW							.427* (3.31)	.451*** (1.94)
IIC	-.080 (-0.68)	.045** (2.84)	.115** (2.60)	.086* (3.56)	.187* (3.84)	.0183 (1.72)	.067** (2.80)	.042* (4.31)
INF	.015 (0.90)	.019 (0.78)	.031** (2.96)	.032 (1.04)	.044 (1.32)	-.023 (-0.84)	.014 (0.58)	.036 (0.211)
TO	.010 (0.39)	.0061 (0.56)	.004 (0.64)	-.011 (-1.12)	-.074 (-1.34)	.0051 (0.81)	.011 (0.38)	-.005 (-1.26)
GC	.177 (0.36)	-.332* (-5.24)	-.767* (-3.17)	-.505* (-4.47)	-.980** (-2.21)	-.265* (-9.01)	-.449* (-4.71)	-.458* (-8.18)
cst	.195 (0.74)	-.097** (-2.37)	-.069 (-0.57)	.028 (0.43)	-.130 (-1.02)	-.0233 (-0.60)	-.010 (-0.14)	.026 (0.40)
AR(2)	0.703	0.194	0.938	0.272	0.691	0.313	0.829	0.384
Sargan	0.218	0.062	0.843	0.397	0.740	0.247	0.655	0.930
Hansan	0.285	0.305	0.834	0.341	0.791	0.551	0.726	0.910
N	210	65	208	63	210	64	210	64
Threshold Level of INST	.68	.57	.58	.60	.34	na	.80	.40

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*LAW$) which is an interaction term between bank-index and law and order, (ii)($LIABILITIES*LAW$) is an interaction term between liquid liabilities and law and order, (iii)($ASSETS*LAW$) is an interaction term between bank assets and law and order and (iv) ($PRIVCRE*LAW$) is an interaction term between private credit and law and order. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.7: **The effect of investment profile on the bank-growth relationship: *Linear Specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.179***	-.089*						
	(-1.84)	(-3.45)						
LIABI-LITIES			-.258**	-.106				
			(-2.79)	(-1.30)				
ASSETS					-.504*	-.027		
					(-3.39)	(-0.91)		
PRIVCRE							-1.07*	-.151**
							(-3.28)	(-2.66)
INVEST	.079	.056**	-.453*	-.117	-.561*	.068	-.802**	-.065
	(1.04)	(2.70)	(-3.56)	(-1.59)	(-5.34)	(1.77)	(-2.64)	(-0.95)
BANK-INDEX* INVEST	.336***	.152**						
	(2.07)	(2.83)						
LIABI-LITIES* INVEST			.640*	.230**				
			(4.27)	(2.59)				
ASSETS* INVEST					.941*	.032		
					(4.68)	(0.63)		
PRIVCRE* INVEST							1.68*	.265**
							(2.80)	(2.38)
IIC	-.107	.0018	.176*	.044	.123*	-.025	.115	.0229
	(-0.92)	(0.09)	(3.19)	(0.78)	(3.25)	(-1.72)	(1.33)	(0.74)
INF	.015	-.0011	.052*	.028	.035	-.0008	-.015	.005
	(1.13)	(-0.05)	(3.68)	(1.50)	(1.67)	(-0.06)	(-0.48)	(0.19)
TO	.050*	.0183*	-.016	.001	.014	.0207**	.052	.010
	(3.13)	(3.28)	(-0.61)	(0.06)	(0.57)	(2.86)	(1.65)	(1.07)
GC	.227	-.143	-1.09*	-.352	-.804*	-.0413	-.695**	-.219
	(0.46)	(-1.51)	(-3.93)	(-1.53)	(-3.82)	(-0.72)	(-2.41)	(-1.30)
cst	.252	-.012	-.190	-.0214	.021	.0611	.199	.002
	(0.95)	(-0.26)	(-1.55)	(-0.14)	(0.15)	(1.35)	(0.64)	(0.04)
AR(2)	0.849	0.063	0.704	0.955	0.615	0.114	0.462	0.052
Sargan	0.397	0.088	0.880	0.390	0.874	0.205	0.688	0.485
Hansan	0.428	0.601	0.594	0.585	0.664	0.232	0.604	0.388
N	210	65	208	63	210	64	210	64
Threshold Level of INST	.54	.59	.41	.47	.53	.84	.64	.57

Notes: The definitions of our variables appear in Table B.1. The additional interaction term are: (i)(*BANKINDEX*INVES*) which is an interaction term between bank-index and investment profile, (ii)(*LIABILITIES*INVEST*) is an interaction term between liquid liabilities and and investment profile, (iii)(*ASSETS*INVEST*) is an interaction term between bank assets and and investment profile and (iv) (*PRIVCRE*INVEST*) is an interaction term between private credit and and investment profile. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

4.3.2.2 Institutional quality and the stock market-growth relationship

The results of GMM estimators of economic growth on the four indicators of stock market development and the interaction terms between institutional indicator and the four indicators of stock market development are reported in Tables (4.8 and 4.9) using annual and four-year average data respectively.

Similar to banking sector regressions, the evidence from Table 4.8 shows that while the four proxies of stock markets development (*MARKETINDEX*, *MCAP*, *TRADED*, *TURNOVER*) remain significantly negative, the interaction terms (*MARKETINDEX*INST*, *MCAP*INST*,*TRADED*INST*, and *TURNOVER*INST*) have a significantly positive effect on economic growth. The latest evidence confirm the third possibility (described above) suggesting the importance of institutional quality in mitigating the negative effect of financial development on economic growth.

The results from Table 4.9 are consistent with those of Table 4.8 when we use *MARKETINDEX* and *TRADED* as proxies of stock market development. In fact, the significantly positive coefficients of the interaction variables (*MARKET*INST* and *TRADED*INST*) outlined the importance of institutional quality in mitigating the negative effect of stock market on economic growth. However, the coefficients of *MCAP* and *TRNOVER* and both the interaction terms (*MCAP*INST* and (*TURNOVER*INST*) are statistically insignificant.

Considering *MARKETINDEX*, results from Tables (4.8 and 4.9) illustrate that in order for stock market to promote economic growth in MENA region, countries must have a level of institutional development greater than the threshold level of 0.56 and 0.53 based on estimates with annual and four-year averages data respectively. Building on the latest results, the significantly negative effect of stock market development in economic growth on the MENA countries can be explained by the low level of institutional quality in this region, which is lower than the threshold levels (0.56 and 0.53 for estimates with annual and four-year average data respectively).

When we refer to *TRADED*, the corresponding thresholds are 0.59, 0.52 based on annual and averaged data respectively.

Table 4.8: **The effect of institutional quality on the stock market-growth relationship (annual data): *Linear Specification***

Variable	**(1) FD=** MARKET INDEX	**(2) FD =** MARKET CAPITALIZATION	**(3) FD =** TRADED RATIO	**(4) FD =** TURNOVER
MARKETINDEX	-.425*			
	(-2.73)			
MCAP		-1.14***		
		(-1.86)		
TRADED			-.426**	
			(-3.54)	
TURNOVER				-1.57**
				(-2.41)
INST	.088	-.119	-.128	-.449
	(1.13)	(-0.91)	(-1.41)	(-1.11)
MARKETINDEX*INST	.761*			
	(2.77)			
MCAP*INST		1.855***		
		(1.89)		
TRADED*INST			.747*	
			(3.15)	
TURNOVER*INST				2.77**
				(2.37)
IIC	-.025	-.508***	.133***	.174
	(-0.42)	(-1.80)	(1.88)	(0.93)
INF	-.171	-.701**	-.081	-.026
	(-1.50)	(-1.96)	(-0.59)	(-0.10)
TO	-.0075	.101***	-.036	.038
	(-0.18)	(1.91)	(-0.78)	(1.23)
GC	-.567**	.519	-.783**	-1.44***
	(-2.18)	(1.13)	(-2.45)	(-1.85)
cst	.182	1.747***	-.190	-.084
	(1.02)	(1.86)	(-1.16)	(-0.15)
AR(2)	0.488	0.458	0.220	0.548
Sargan	0.740	0.533	0.104	0.263
Hansen	0.748	0.890	0.837	0.798
N	222	145	152	222
Threshold level of INST	.56	.62	.59	.57

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*INST$) which is an interaction term between institutional quality and market-index, (ii)($MCAP*INST$) is an interaction term between market capitalization and institutional quality, (iii)($TRADED*INST$) is an interactive term between total value traded and institutional quality and (iv) ($TURNOVER*INST$) is an interaction term between turnover ratio and institutional quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.9: **The effect of institutional quality on the stock market-growth relationship (four-year average data): *Linear Specification***

Variable	**(1) FD=** MARKET INDEX	**(2) FD =** MARKET CAPITALIZATION	**(3) FD =** TRADED RATIO	**(4) FD =** TURNOVER
MARKETINDEX	-.037			
	(-1.40)			
MCAP		.1002		
		(0.82)		
TRADED			-.215***	
			(-1.87)	
TURNOVER				-.099
				(-0.49)
INST	.092*	.073	-.061	-.002
	(3.57)	(0.77)	(-0.44)	(-0.03)
MARKETINDEX*INST	.072***			
	(1.77)			
MCAP*INST		-.147		
		(-0.68)		
TRADED*INST			.415***	
			(2.01)	
TURNOVER*INST				.299
				(0.84)
IIC	.0065	.066**	.016	-.016
	(0.13)	(2.30)	(0.78)	(-0.42)
INF	-.228**	-.130	-.150	-.278**
	(-2.12)	(-1.22)	(-0.55)	(-2.09)
TO	-.022	-.030**	-.023	-.007
	(-1.12)	(-2.54)	(-0.75)	(-0.45)
GC	-.343	-.502**	-.262*	-.365
	(-1.26)	(-3.26)	(-6.16)	(-2.89)
cst	.0434	-.128***	.072	.157
	(0.36)	(-1.75)	(1.28)	(1.11)
AR(2)	0.533	0.695	0.495	0.274
Sargan	0.292	0.497	0.597	0.625
Hansen	0.251	0.863	0.503	0.755
N	42	45	44	43
Threshold Level of INST	.53	na	.52	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)(*MARKETINDEX*INST*) which is an interaction term between institutional quality and market-index, (ii)(*MCAP*INST*) is an interaction term between market capitalization and institutional quality, (iii)(*TRADED*INST*) is an interaction term between total value traded and institutional quality and (iv) (*TURNOVER*INST*) is an interaction term between turnover ratio and institutional quality. *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

The visual picture of the marginal effect of an one-unit increase in *MARKETINDEX* and in the usual measures of stock market development (*MCAP*, *TRADED* and *TURNOVER*), based on each countries are presented in Figures (4.8, 4.9, 4.10, 4.11, 4.12 and 4.13). As seen with *BANKINDEX*, the countries that have positive effects

of stock market development are those which attained a threshold level of institutional development such as Israel. Whereas countries with underdeveloped institutional infrastructure may hamper economic growth, which is the case of the most MENA countries (for example, Syrian Arab Republic, Tunisia, Qatar).

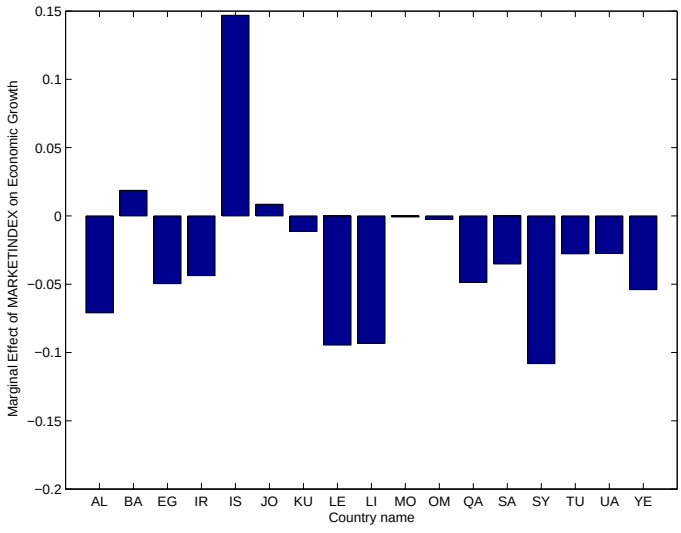

Figure 4.8: **Marginal Effect of *MARKETINDEX* on Economic Growth (Annual data)**

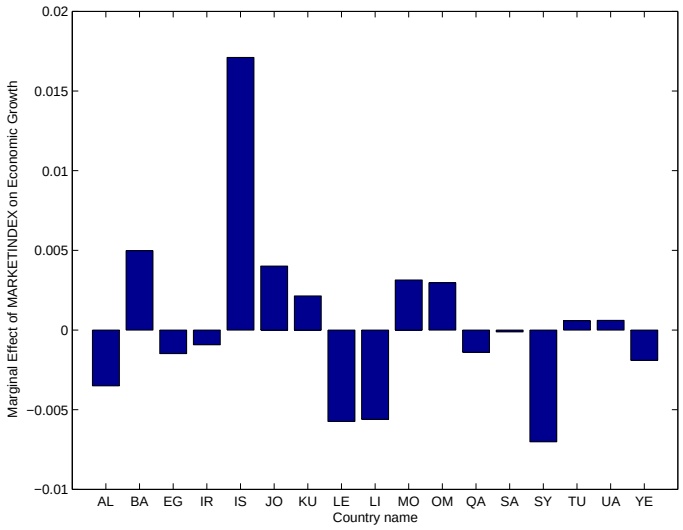

Figure 4.9: **Marginal Effect of *MARKETINDEX* on Economic Growth (Four-year average data)**

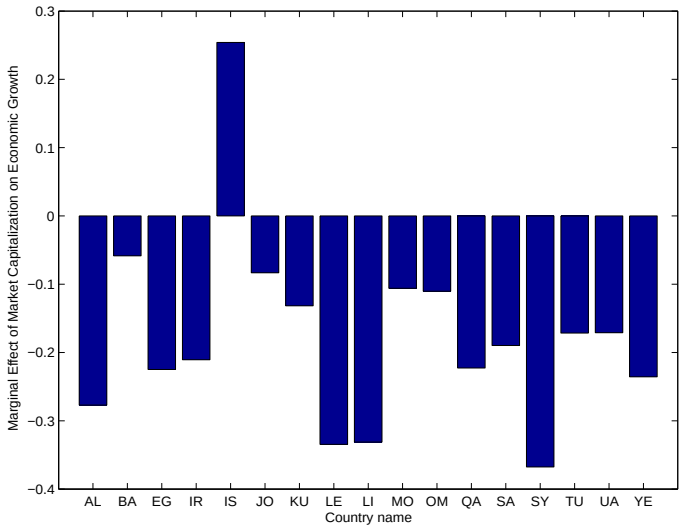

Figure 4.10: **Marginal Effect of *Market Capitalization* on Economic Growth (Annual data)**

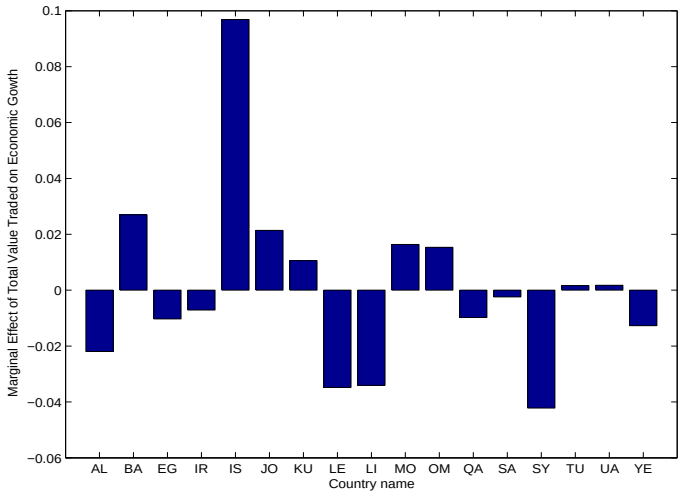

Figure 4.11: **Marginal Effect of *Total Value Traded* on Economic Growth (Annual data)**

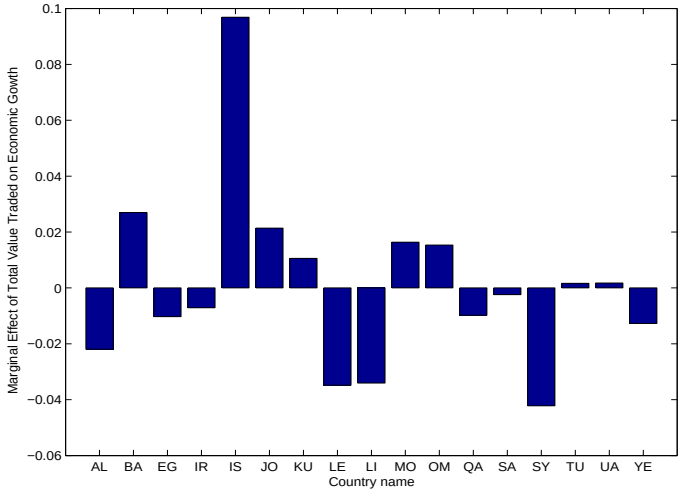

Figure 4.12: **Marginal Effect of *Total Value Traded* on Economic Growth (Four-year average data)**

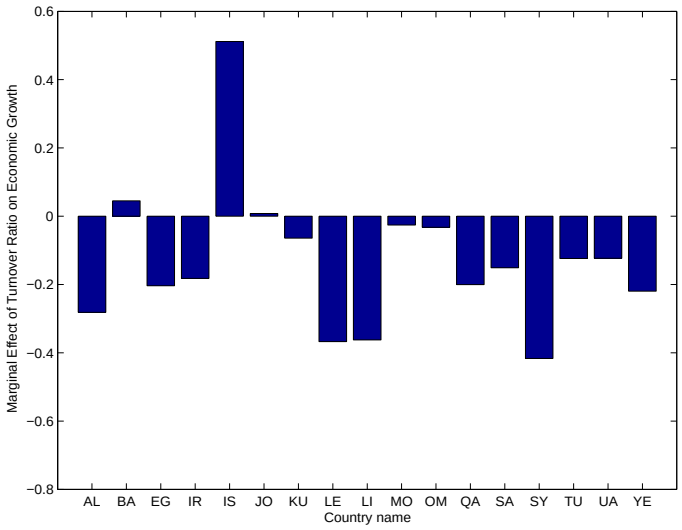

Figure 4.13: **Marginal Effect of *Turnover Ratio* on Economic Growth (Annual data)**

We do not find statistical support to the view that a well-developed institutional environment promotes economic growth[6]. When we consider both the banking and stock markets development indicators, institutional indicator (*INST*) enters with a sign that runs counter the theoretical predictions in most regressions.

Looking to the regressions running with each of the components of the institutional index (*INST*), our results (Tables 4.10, 4.11, 4.12,4.13 and 4.14) show that only the coefficients of *INVEST* appears to be qualitatively the same as those of the regressions with *INST* (see Table 4.14). Thus, stock market development can promote economic growth only when the *INVEST* measure is higher than the threshold levels 0.85 based on the regression with *MARKETINDEX*. When we consider *MCAP*, *TRADED* and *TURNOVER* the corresponding thresholds are 0.77, 0.57, 0.91 respectively (when based on annual data). Based on four-year average data, the threshold levels are 0.47 and 0.78 for *MCAP* and *TRADED* respectively (Table 4.14)[7].

While they appear relevant in the Bank-growth nexus, *BURO*, *DEMOC* and *LAW* do not matter in the stock market-growth nexus. Generally, *INVEST* is the most rele-

[6]La Porta et al.(1998), Demirguc-Kunt and Maksimovic (1998,1999, 2002), Claessens and Laeven (2003) and Fernandez et al.(2009)

[7]When *MARKETINDEX* and *TURNOVER* are considered as indicators of stock market development, we do not check a significance coefficients in interaction terms (*MARKETINDEX*INVEST* and *TURNOVER*INVEST*)

vant indicator of institutional quality in the finance-growth nexus in MENA countries.

Table 4.10: **The effect of bureaucracy quality on the stock market-growth relationship: *Linear Specification***

Variable	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-.020 (-0.25)	.002 (0.12)						
MCAP			.058 (0.24)	-.0013 (-0.01)				
TRADED					.037 (0.06)	.330 (0.89)		
TURNO-VER							-.203 (-1.55)	.100 (1.53)
BURO	.094 (0.82)	.137 (1.38)	.084 (0.27)	-.058 (-0.15)	.076 (0.28)	.487 (1.37)	-.173 (-1.53)	.068 (0.89)
MARKET-INDEX* BURO	.044 (0.26)	-.013 (-0.40)						
MCAP* BURO			-.065 (-0.14)	.014 (0.03)				
TRADED* BURO					-.033 (-0.03)	-.378 (-0.63)		
TURNO-VER* BURO							.297 (1.48)	-.081 (-0.50)
IIC	-.073 (-0.48)	.053*** (1.99)	.023 (0.35)	.160** (2.20)	.014 (0.72)	-.435 (-1.82)	.202** (2.70)	.007 (0.17)
INF	-.177 (-0.76)	-.248*** (-1.97)	-.183 (-1.20)	-.093 (-0.47)	-.12 (0.213)	-.683 (-1.53)	-.012 (-0.12)	-.345** (-2.68)
TO	.023 (1.45)	.027 (0.70)	-.001 (-0.04)	-.030 (-0.66)	.005 (0.65)	.059 (1.10)	-.015 (-0.29)	-.0224 (-1.77)
GC	-.052 (-0.11)	-1.04** (-2.99)	-.417*** (-2.18)	-.793* (-4.76)	-.411* (-4.21)	1.07 (1.79)	-1.05* (-3.96)	-.326** (-2.70)
cst	.227 (0.58)	-.042 (-0.50)	-.024 (-0.14)	-.324 (-1.59)	.005 (0.04)	1.04*** (1.92)	-.367** (-2.28)	.048 (0.30)
AR(2)	0.186	0.361	0.220	0.746	0.153	0.935	0.437	0.927
Sargan	0.858	0.479	0.957	0.947	0.543	0.130	0.821	0.485
Hansan	0.457	0.897	0.989	0.983	0.829	0.971	0.978	0.961
N	144	42	135	43	142	44	144	43
Threshold Level of INST	na	na	na	na	na	na	na	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*BURO$) which is an interaction term between market-index and bureaucracy quality, (ii)($MCAP*BURO$) is an interaction term between market capitalization and bureaucracy quality, (iii)($TRADED*BURO$) is an interaction term between total value traded and bureaucracy quality and (iv) ($TURNOVER*BURO$) is an interaction term between turnover ratio and bureaucracy quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.11: **The effect of corruption on the stock market-growth relationship: *Linear Specification***

Variable	FD= MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	.130	-.056**						
	(0.98)	(-2.82)						
MCAP			.399	.123				
			(0.96)	(1.43)				
TRADED					.258	.012		
					(1.32)	(0.13)		
TURNO-VER							.129	.021
							(1.07)	(0.69)
CORR	-.058	.169**	.375	.150	.176	.057	.151***	.054
	(-0.42)	(2.42)	(1.25)	(1.50)	(1.81)	(0.77)	(1.89)	(0.49)
MARKET-INDEX* CORR	-.320	.151**						
	(-0.93)	(2.65)						
MCAP* CORR			-.820	-.265				
			(-0.89)	(-1.22)				
TRADED* CORR					-.766	.089		
					(-1.33)	(0.32)		
TURNO-VER* CORR							-.347	.008
							(-0.94)	(0.13)
IIC	-.055	.078	-.0030	.040	.090**	.015	.0506	.145**
	(-0.42)	(0.36)	(-0.05)	(0.33)	(2.38)	(0.32)	(0.58)	(3.03)
INF	-.103	-.163	-.309***	-.262	-.170***	-.300	-.067	-.037
	(-1.17)	(-0.81)	(-2.05)	(-1.30)	(-2.02)	(-1.64)	(-0.62)	(-0.09)
TO	.024	-.0005	.016	-.011	.037	-.044***	-.004	-.036
	(0.55)	(-0.01)	(0.33)	(-0.32)	(0.81)	(-2.20)	(-0.20)	(-1.01)
GC	.206	-1.16***	-.274	-.432	-.652**	-.323	-.378	-.837**
	(0.24)	(-2.20)	(-0.97)	(-0.89)	(-2.70)	(-1.60)	(-0.57)	(-2.83)
cst	.182	-.090	-.095	-.086	-.258	.049	-.139	-.328**
	(0.56)	(-0.14)	(-0.51)	(-0.28)	(-1.82)	(0.37)	(-0.75)	(-2.47)
AR(2)	0.416	0.200	0.338	0.722	0.254	0.309	0.251	0.609
Sargan	0.841	0.088	0.963	0.734	0.547	0.185	0.639	0.296
Hansan	0.916	0.867	0.949	0.759	0.880	0.940	0.789	0.914
N	144	42	144	43	138	44	144	43
Threshold Level of INST	na	.38	na	na	na	na	na	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)(*MARKETINDEX*CORR*) which is an interaction term between market-index and corruption, (ii)(*MCAP*CORR*) is an interaction term between market capitalization and corruption, (iii)(*TRADED*CORR*) is an interactive term between total value trade and corruption and (iv) (*TURNOVER*CORR*) is an interactive term between turnover ratio and corruption. *N* refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation (*AR2*), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.12: **The effect of democracy accountability on the stock market-growth relationship: *Linear Specification***

Variable	FD= MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET -	.130	-.007						
INDEX	(0.98)	(-1.02)						
MCAP			.631	-.181				
			(0.72)	(-0.46)				
TRADED					.049	.024		
					(0.26)	(0.45)		
TURNO-							.146	.053
VER							(1.30)	(1.00)
DEMOC	-.058	.007	.432	-.214	.157***	-.004	.162***	.052
	(-0.42)	(0.20)	(0.80)	(-0.51)	(1.90)	(-0.13)	(2.14)	(0.68)
MARKET-	-.320	.023						
INDEX*	(-0.93)	(1.09)						
DEMOC								
MCAP*			-1.36	.404				
DEMOC			(-0.74)	(0.52)				
TRADED*					-.229	.047		
DEMOC					(-0.43)	(0.47)		
TURNO-							-.395	-.101
VER*							(-1.15)	(-0.35)
DEMOC								
IIC	-.055	.047	.185	.051	.148**	.016	.041	.115
	(-0.42)	(0.19)	(1.25)	(0.92)	(3.00)	(0.32)	(0.47)	(0.71)
INF	-.103	-.221	.128	-.024	-.227***	-.225	-.067	-.150
	(-1.17)	(-0.63)	(0.58)	(-0.11)	(-2.21)	(-1.25)	(-0.60)	(-0.56)
TO	.024	.011	.008	-.015	.034	-.031*	-.004	-.035***
	(0.55)	(0.17)	(0.51)	(-0.39)	(0.65)	(-3.51)	(-0.21)	(-1.97)
GC	.206	-.943***	.035	-.451	-1.06*	-.291	-.318	-.603
	(0.24)	(-1.97)	(0.03)	(-1.43)	(-3.27)	(-1.53)	(-0.49)	(-1.61)
cst	.182	.042	-.859	.049	-.369**	.055	-.122	-.252
	(0.56)	(0.06)	(-1.81)	(0.22)	(-2.30)	(0.36)	(-0.64)	(-0.51)
AR(2)	0.416	0.309	0.387	0.644	0.257	0.341	0.258	0.755
Sargan	0.841	0.082	0.988	0.545	0.708	0.240	0.738	0.747
Hansan	0.916	0.834	0.922	0.853	0.899	0.788	0.910	0.799
N	144	42	131	43	138	44	144	43
Threshold Level of INST	na	na	na	na	na	na	na	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*DEMOC$) which is an interactive term between market-index and democracy accountability, (ii)($MCAP*DEMOC$) is an interactive term between market capitalization and democracy accountability, (iii)($TRADED*DEMOC$) is an interaction term between total value traded and democracy accountability and (iv) ($TURNOVER*DEMOC$) is an interaction term between turnover ratio and democracy accountability. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.13: **The effect of law and order on the stock market-growth relationship: *Linear Specification***

Variable	FD= MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-.076 (-1.21)	-.006 (-0.36)						
MCAP			-.070 (-0.14)	.099 (1.67)				
TRADED					-.450 (-0.46)	.564 (1.75)		
TURNO-VER							-.049 (-0.34)	-.037 (-0.31)
LAW	.376 (1.78)	-.058*** (-1.88)	-.045 (-0.28)	-.014 (-0.45)	-.096 (-0.46)	.015 (0.33)	-.136 (-1.64)	-.013 (-0.16)
MARKET-INDEX* LAW	.121 (1.39)	.007 (0.30)						
MCAP* LAW			.127 (0.19)	-.133 (-1.31)				
TRADED* LAW					.533 (0.46)	-.662 (-1.77)		
TURNO-VER* LAW							.318 (1.41)	.044 (0.26)
IIC	-.156 (-1.16)	.069* (4.62)	.012 (0.13)	.073 (1.34)	.142 (0.49)	-.008 (-0.15)	.054 (0.84)	.023 (0.12)
INF	1.92 (1.77)	-.204 (-1.33)	-.170** (-2.18)	-.179 (-1.07)	-.067 (-0.27)	-.161 (-1.27)	-.063 (-1.04)	-.147 (-0.92)
TO	.140 (1.52)	.011 (0.34)	-.0138 (-0.18)	-.029 (-1.72)	-.010 (-0.26)	-.038 (-1.72)	-.013 (-0.31)	-.037** (-2.15)
GC	.794 (0.98)	-.935** (-2.72)	-.519*** (-1.95)	-.534*** (-2.03)	-.847 (-0.63)	.107 (-0.38)	-.757* (-3.30)	-.289 (-0.32)
cst	-.086 (-0.59)	.007 (0.11)	.123 (0.40)	-.089 (-0.62)	-.228 (-0.36)	.094 (0.76)	.033 (0.23)	.049 (0.10)
AR(2)	0.848	0.607	0.252	0.618	0.362	0.332	0.325	0.559
Sargan	0.686	0.066	0.877	0.502	0.183	0.380	0.269	0.559
Hansan	0.980	0.882	0.980	0.817	0.874	0.510	0.921	0.491
N	144	42	135	43	142	44	144	42
Threshold Level of INST	na	na	na	na	na	na	na	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)(*MARKETINDEX*LAW*) which is an interaction term between market-index and law and order, (ii)(*MCAP*LAW*) is an interaction term between market capitalization and law and order, (iii)(*TRADED*LAW*) is an interaction term between total value traded and law and order and (iv) (*TURNOVER*LAW*) is an interaction term between private credit and turnover ratio . N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.14: **The effect of investment profile on the Stock Market-growth relationship: *Linear Specification***

Variable	FD= MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-.154***	.012						
	(-2.03)	(0.62)						
MCAP			-.632***	-.123				
			(-2.18)	(-1.74)				
TRADED					-.192	-.412		
					(-0.92)	(-1.77)		
TURNO-VER							-.848**	.0004
							(-2.26)	(0.00)
INVEST	-.017	.086	-.335***	-.073	-.209	-.099	-.154	.205
	(-0.38)	(0.80)	(-1.84)	(-0.95)	(-1.41)	(-0.94)	(-0.98)	(1.17)
MARKET-INDEX* INVEST	.180***	.001						
	(2.11)	(0.04)						
MCAP* INVEST			.813**	.267***				
			(2.38)	(2.33)				
TRADED* INVEST					.338***	.526***		
					(1.89)	(1.87)		
TURNO-VER* INVEST							.928**	-.032
							(2.38)	(-0.19)
IIC	-.225	-.003	-.022	-.031	.255	.068	.120	-.126
	(-1.10)	(-0.11)	(-0.30)	(-1.21)	(1.41)	(0.79)	(0.81)	(-0.86)
INF	-1.45***	.051	-.365***	-.198	-.039	-.362	-.004	-.059
	(-2.04)	(0.13)	(-2.08)	(-1.30)	(-0.37)	(-1.78)	(-0.03)	(-0.36)
TO	.036	-.052	.051	-.062**	-.096	-.029	-.012	-.0003
	(0.97)	(-0.93)	(1.19)	(-2.50)	(-0.94)	(-1.74)	(-0.32)	(-0.01)
GC	.264	.344	.144	.053	.015	-.468	-.435	.370
	(-0.86)	(0.43)	(0.47)	(0.44)	(0.03)	(-1.27)	(-0.59)	(0.54)
cst	.915	-.048	.283	.205***	-.686	-.016	.159	.276
	(1.36)	(-0.23)	(1.65)	(1.95)	(-1.14)	(-0.09)	(-0.53)	(1.05)
AR(2)	0.389	0.556	0.273	0.437	0.305	0.988	0.866	0.953
Sargan	0.330	0.186	0.642	0.066	0.572	0.595	0.448	0.553
Hansan	0.800	0.985	0.872	0.912	0.888	0.877	0.764	0.738
N	144	42	135	43	142	44	144	43
Threshold Level of INST	0.85	na	0.77	0.47	0.57	0.78	0.91	na

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)(*MARKETINDEX*INVEST*) which is an interaction term between market-index and investment profile, (ii)(*MCAP*INVEST*) is an interaction term between liquid liabilities and institutional quality, (iii)(*TRADED*INVEST*) is an interactive term between total value traded and investment profile, and (iv) (*TURNOVER*INVEST*) is an interactive term between turnover ratio and investment profile. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

In summary, our main findings are that the coefficients of financial indicators alone have negative sign, however the interaction terms have a significant positive coefficients

in most regressions suggesting that financial development alone may lead to hamper economic growth, but it can be avoided only if the countries are characterized by a reasonable level of institutional quality. Thus, our results provide empirical evidence that there is a conditional relationship between financial development and economic growth in MENA countries. In fact, institutional quality affects the finance growth-nexus. The more developed institutional environment mitigates the negative effect of financial development on economic growth in MENA countries. These results are in line with Levine et al.(2000) who have stressed that growth prospects are enhanced because a sound legal environment encourages the development of financial intermediation. .

While the linear interaction implies that the marginal effect of financial development on growth is larger at a higher level of institutional quality, and it provides an opportunity to capture continuous conditioning influences, it also needs to be recognized that it allows for the possibility of sign changes on the relationships between financial development and economic growth. Thus, in the following section we examine the non-linear effect the institutional quality on the finance-growth relationship.

4.4 A non-linear effect of institutional quality on the finance-growth nexus

To examine if there is a *non-linear* effect of institutional quality on the finance-growth relationship we consider the following equation where the interaction terms between the indicators of finance development and the squared value of institutional quality is introduced ($FD{*}INST^2$). This allow for the possibility that, beyond a certain level, the threshold variable (*Institutional quality*) becomes more or less important in determining the marginal effect of financial development on economic growth.

$$\begin{aligned} GROWTH_{it} &= \alpha_i + \beta_0 FD_{it} + \beta_1 (FD_{it} * INST_{it}) + \beta_2 (FD_{it} * INST_{it}^2) \\ &+ \varphi INST_{it} + \gamma Z_{it} + \varepsilon_{it} \end{aligned} \tag{4.13}$$

4.4.1 Empirical Results

The results for banking sector and stock market development indicators are reported in Tables 4.15 - 4.21.

4.4.1.1 Banking sector

The results from Table 4.15 show that in most regressions the overall banking development coefficients take an inverted *"U-shape"* as the institutional quality rises. In fact, while the coefficients of interaction variables (*BANKINDEX*INST*[8], *PRIVCRE*INST* and *LIABILITIES*INST*) are significantly positive, those of *BANKINDEX*, *PRIVCRE* and *LIABILITIES* interacted with the quadratic institutional quality (*BANKINDEX*INST*^{2}, *PRIVCRE*INST*^{2} and *LIABILITIES*INST*^{2}) are negatively significant.

The results from Table 4.15 show that institutional quality does not matter when banking sector development is proxied by *ASSETS*. In fact, the inverted *"U-shape"* of the *ASSETS* coefficient remains although insignificant with the annual and a four-year average data estimates.

[8] The coefficients of *BANKINDEX*, *BANKINDEX*INST* and *BANKINDEX*INST*^{2} are significant only when we consider an average data. When annual data are considered, the results show that while these coefficients are insignificant, their signs give support to the inverted U-shape form.

Table 4.15: **The effect of institutional quality on the bank-growth relationship: *Non-linear specification***

Variable	FD= BANKINDEX		FD=LIABILITIES		FD=ASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-1.521	-.982**						
	(-1.63)	(-2.28)						
LIABI-LITIES			-1.72***	-.572				
			(-1.89)	(-1.26)				
ASSETS					.233	.070		
					(0.31)	(0.27)		
PRIVCRE							-2.85*	-.506***
							(-3.89)	(-1.89)
INST	0.099	.120**	-.740	-.487	.141	-.016	-.863*	-.253**
	(0.88)	(1.97)	(-1.49)	(-0.71)	(0.28)	(-0.10)	(-3.84)	(-2.43)
BANK-INDEX* INST	5.319	3.29**						
	(1.56)	(2.15)						
BANK-INDEX* $INST^2$	-4.287	-2.56***						
	(-1.50)	(-2.06)						
LAIBI-LITIES* INST			6.983**	2.55**				
			(2.30)	(2.68)				
LIABI-LITIES* $INST^2$			-5.38**	-1.82**				
			(-2.37)	(-3.29)				
ASSETS* INST					-.562	.247		
					(-0.26)	(0.79)		
ASSETS* $INST^2$					.334	-.278		
					(0.24)	(-0.71)		
PRIVCRE* INST							8.69*	1.82**
							(3.72)	(2.69)
PRIVCRE* $INST^2$							-5.79*	-1.15**
							(-3.23)	(-3.00)
IIC	.139*	.057**	.273*	.188***	.043	.083	.082	-.007
	(2.93)	(2.26)	(3.65)	(1.89)	(1.03)	(1.03)	(1.27)	(-0.21)
INF	.032	-.021	.085*	.121	.0110	-.004	.054	.032
	(0.88)	(-0.59)	(4.13)	(1.35)	(0.32)	(-0.07)	(0.78)	(1.38)
TO	-.031	-.005	-.169**	-.084	.0034	-.017	-.035	.0084
	(-0.97)	(-0.39)	(-2.30)	(-1.75)	(0.12)	(-0.72)	(-0.94)	(0.33)
GC	-.898*	-.529*	-1.19*	-.830***	-.490**	-.550	-.590	-.296
	(-3.03)	(-4.03)	(-4.08)	(-1.97)	(-2.56)	(-2.14)	(-1.44)	(-1.52)
cst	-.335*	-.147**	-.440	-.321	-.135	-.212	.271	.169
	(-3.69)	(-2.46)	(-1.05)	(-1.09)	(-0.50)	(-1.26)	(1.04)	(1.43)
AR(2)	0.691	0.433	0.862	0.060	0.683	0.925	0.688	0.160
Sargan	0.121	0.187	0.226	0.949	0.524	0.886	0.444	0.791
Hansen	0.672	0.393	0.829	0.844	0.456	0.942	0.982	0.493
N	222	57	220	63	222	64	222	64

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*INST^2$) which is an interaction term between bank-index and the squared value of institutional quality, (ii)($LIABILITIES*INST^2$) is an interaction term between liquid liabilities and the squared value of institutional quality, (iii)($ASSETS*INST^2$) is an interaction term between bank assets and the squared value of institutional quality and (iv) ($PRIVCRE*INST^2$) is an interaction term between private credit and the squared value of institutional quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Figures (4.14, 4.15, 4.16, 4.17 and 4.18) plot the overall (including interactions) banking sector development coefficient[9] estimates against different values of institutional quality. *"Institutional quality illustrate the inverted U-shaped relationship"* when we consider *BANKINDEX*, *LIABILITIES*, *PRIVCRE* as indicators of banking sector development.

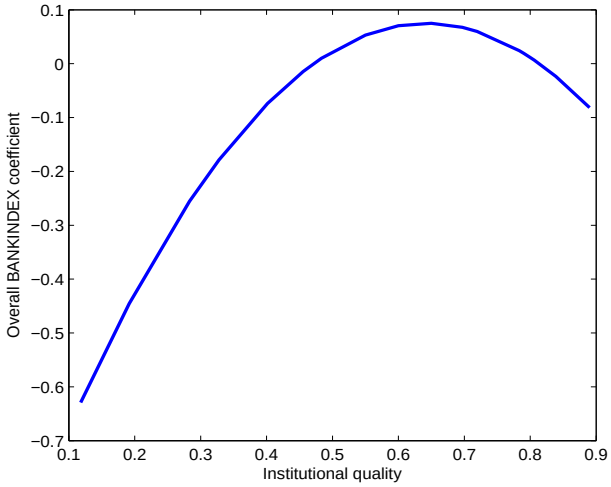

Figure 4.14: **Overall *BANKINDEX* coefficient against different values of institutional quality (Four-year average data)**

[9]The overall banking sector development coefficient is calculated as: $\beta_0 + \beta_1 INST + \beta_1 INST^2$

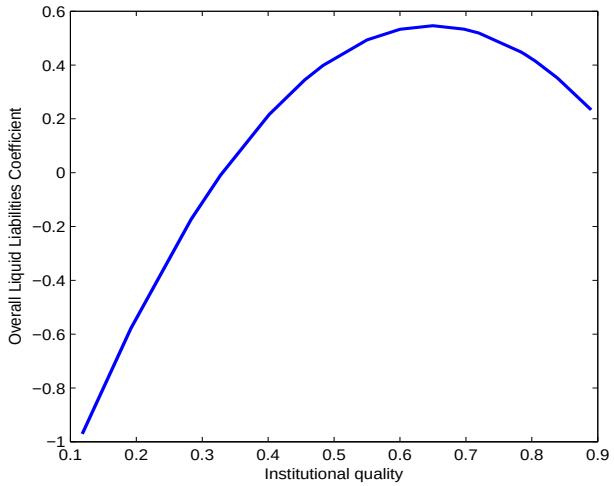

Figure 4.15: **Overall *Liquid Liabilities* coefficient against different values of institutional quality (Annual data)**

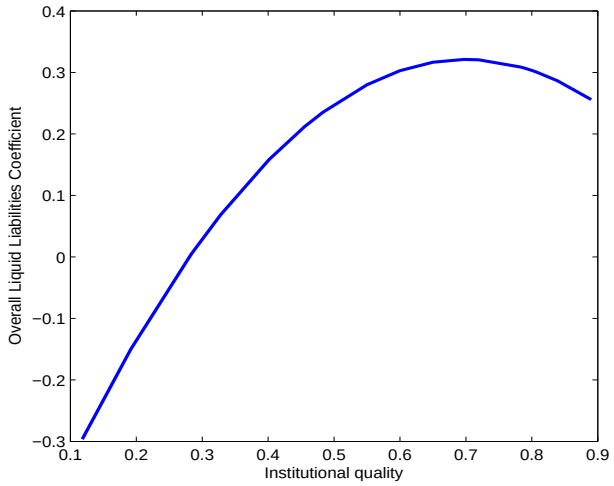

Figure 4.16: **Overall *Liquid Liabilities* coefficient against different values of institutional quality (Four-year average data)**

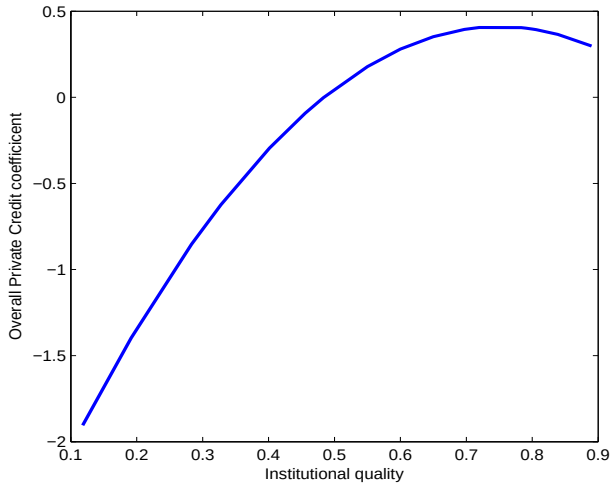

Figure 4.17: **Overall *Private Credit* coefficient against different values of institutional quality (Annual data)**

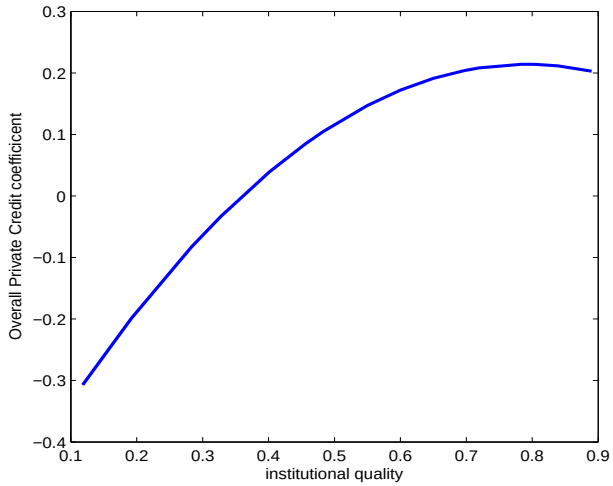

Figure 4.18: **Overall *Private Credit* coefficient against different values of institutional quality (Four-year average data)**

We also looked at the constituents of the composite measure of institutional quality, Tables (4.16, 4.17, 4.18,4.19 and 4.20) illustrate that only when *LAW* is considered, an inverted U-shape relationship can be observed; the interactions of both *BANKINDEX*,

and *PRIVCRE* with the level and squared level of the *LAW* are statistically significant (based on the estimates with both annual and four-year average data Table 4.20). When we use *LIABILITIES* and *ASSETS* the same results are observed but only in the estimates with annual data. Considering the bureaucracy quality (*BURO*) (Table 4.18) we conclude that the responsiveness of economic growth to banking sector development varies in a linear fashion with the quality of bureaucracy . In fact, while the coefficients of the linear interaction are significantly positive, those of quadratic interactions are insignificant. When we use *INVEST*, the results from Table (4.19) show that an inverted U-shape relationship is observed only when we refer to *BANKINDEX* as indicator of banking sector development.

Table 4.16: **The effect of bureaucracy quality on the bank-growth relationship: *Non-linear specification***

Variables	FD=BANKINDEX		FD=LIABILITIES		FD=BANKASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-.278 (-1.00)	-.317 (-1.59)						
LIABI-LITIES			-2.34 (-1.70)	.0612 (0.35)				
ASSETS					1.593 (1.50)	.100 (1.33)		
PRIVCRE							-.097 (-0.36)	-.395 (-1.31)
BURO	.059 (0.59)	.074 (1.09)	-2.215 (-1.74)	.065 (0.27)	.917 (1.12)	.082*** (2.14)	-.0569 (-0.58)	-.201 (-1.69)
BANK-INDEX* BURO	.874 (0.82)	1.109*** (1.80)						
BANK-INDEX* $BURO^2$	-.553 (-0.50)	-.720 (-1.77)						
LAIBI-LITIES* BURO			4.398*** (1.91)	-.097 (-0.31)				
LIABI-LITIES* $BURO^2$			-.646 (-0.85)	.0066 (0.04)				
ASSETS* BURO					-3.518 (-1.66)	-.1640 (-0.73)		
ASSETS* $BURO^2$					1.419** (2.56)	-.002 (-0.02)		
PRIVCRE* BURO							.435 (0.57)	.907*** (1.92)
PRIVCRE* $BURO^2$							-.282 (-0.61)	-.344 (-1.58)
IIC	.051 (0.47)	-.019 (-0.72)	-.232 (-0.99)	.076 (1.38)	.209 (1.17)	.0607* (3.34)	.127** (2.71)	.068 (1.46)
INF	-.001 (-0.04)	.0028 (0.05)	-.057 (-1.02)	.003 (0.09)	.117 (1.29)	-.009 (-0.41)	.0402 (1.66)	.0219 (0.58)
TO	-.013 (-0.22)	.015 (0.91)	.091 (0.87)	-.0089 (-0.39)	-.044 (-0.65)	-.0066 (-1.47)	-.029 (-1.05)	-.0023 (-0.13)
GC	-.555 (-1.35)	-.316* (-3.58)	.735 (0.77)	-.457* (-3.83)	-1.14*** (-1.78)	-.324* (-6.46)	-.896* (-7.33)	-.522* (-7.13)
cst	-.084 (-0.30)	.080 (1.15)	1.90 (1.39)	-.195 (-0.73)	-1.012 (-1.13)	-.178** (-2.56)	-.221 (-1.98)	-.011 (-0.12)
AR(2)	0.675	0.678	0.440	0.729	0.830	0.516	0.915	0.951
Sargan	0.051	0.274	0.146	0.873	0.625	0.135	0.293	0.833
Hansen	0.895	0.838	0.907	0.847	0.699	0.570	0.908	0.671
N	222	65	220	63	222	64	222	64

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*BURO^2$) which is an interaction term between bank-index and the squared value of bureaucracy quality , (ii)($LIABILITIES*BURO^2$) is an interaction term between liquid liabilities and the squared value of bureaucracy quality , (iii)($ASSETS*BURO^2$) is an interaction term between bank assets and the squared value of bureaucracy quality and (iv) ($PRIVCRE*BURO^2$) is an interaction term between private credit and institutional quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.17: **The effect of corruption on the bank-growth relationship: *Non-linear specification***

Variables	FD=BANKINDEX		FD=LIABILITIES		FD=BANKASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	.278 (0.56)	.0637 (0.64)						
LIABI-LITIES			-.014 (-0.02)	.103 (0.93)				
ASSETS					.521 (0.68)	.057 (0.54)		
PRIVCRE							.179 (0.40)	.171 (1.42)
CORR	-.030 (-0.26)	-.0133 (-0.39)	.119 (0.27)	.025 (0.40)	.388 (0.94)	.0052 (0.11)	.3048 (0.79)	.0511 (0.29)
BANK-INDEX* CORR	-.592 (-0.44)	-.1003 (-0.38)						
BANK-INDEX* $CORR^2$	.467 (0.34)	.0725 (0.27)						
LAIBI-LITIES* CORR			.294 (0.15)	-.1291 (-0.34)				
LIABI-LITIES* $CORR^2$			-.453 (-0.35)	.0841 (0.23)				
ASSETS* CORR					-1.45 (-0.66)	-.0122 (-0.10)		
ASSETS* $CORR^2$					.760 (0.54)	-.050 (-0.39)		
PRIVCRE* CORR							-.533 (-0.61)	-.238 (-1.16)
PRIVCRE* $CORR^2$							-.087 (-0.24)	.123 (0.35)
IIC	.026 (0.75)	.0807** (2.52)	.104* (3.07)	.031*** (1.92)	.0868*** (1.79)	.0184 (1.32)	.077 (0.98)	.0082 (0.77)
INF	.010 (0.33)	.0311** (2.22)	.049 (1.19)	-.0008 (-0.02)	.036*** (2.02)	-.041 (-1.03)	-.024 (-1.63)	.039 (1.23)
TO	.0019 (0.15)	-.0142 (-0.84)	-.023 (-0.79)	.008 (0.45)	-.0142 (-1.06)	.0084 (0.59)	.0100 (0.41)	.013 (1.33)
GC	-.434** (-2.96)	-.515* (-4.64)	-.646* (-3.38)	-.271* (-3.15)	.4270 (-1.70)	-.218* (-3.52)	-.437*** (-1.81)	-.353* (-3.59)
cst	.026 (0.15)	-.149 (-1.55)	-.276 (-1.31)	-.102 (-1.68)	.386*** (-1.85)	-.035 (-0.80)	-.272 (-1.44)	-.0126 (-0.14)
AR(2)	0.676	0.942	0.764	0.657	0.708	0.421	0.777	0.679
Sargan	0.066	0.761	0.337	0.197	0.075	0.178	0.557	0.373
Hansen	0.960	0.997	0.988	0.581	0.955	0.649	0.664	0.354
N	222	64	220	63	222	63	222	62

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*CORR^2$) which is an interaction term between bank index and the squared value of corruption, (ii)($LIABILITIES*CORR^2$) is an interaction term between liquid liabilities and the squared value of corruption, (iii)($ASSETS*CORR^2$) is an interaction term between bank assets and institutional quality and (iv) ($PRIVCRE*CORR^2$) is an interaction terms between private credit and the squared value of corruption. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.18: **The effect of democratic accountability on the bank-growth relationship : *Non-linear specification***

Variables	FD=BANKINDEX		FD=LIABILITIES		FD=BANKASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	.125 (0.24)	-.0263 (-0.54)						
LIABI-LITIES			.415 (1.76)	.209 (1.10)				
ASSETS					-.376 (-1.29)	.108 (1.35)		
PRIVCRE							.605 (1.52)	-.0328 (-0.41)
DEMOC	-.045 (-0.86)	-.028 (-0.97)	.253 (1.62)	.153 (1.09)	-.606 (-1.65)	.069 (0.58)	.142 (0.81)	-.113 (-3.13)
BANK-INDEX* DEMOC	-.773 (-0.34)	-.0587 (-0.39)						
BANKINDEX* $DEMOC^2$	.784 (0.41)	.232 (1.51)						
LAIBI-LITIES* DEMOC			-.771 (-1.70)	-.433 (-0.99)				
LIABI-LITIES* $DEMOC^2$			.323 (1.72)	.188 (0.93)				
ASSETS* DEMOC					1.32 (1.45)	-.265 (-1.09)		
ASSETS* $DEMOC^2$					-.375 (-1.13)	.133 (1.52)		
PRIVCRE* DEMOC							-1.81 (-1.22)	-.169 (-0.70)
PRIVCRE* $DEMOC^2$							1.354 (1.31)	.392 (1.76)
IIC	.0940 (1.61)	.0212 (0.86)	.086** (2.30)	-.003 (-0.13)	.0361** (2.44)	.031 (0.68)	-.089 (-0.88)	.0185 (0.57)
INF	.036 (1.20)	-.0236 (-0.95)	.021 (0.71)	-.051** (-2.59)	-.001 (-0.22)	-.0164 (-0.83)	.018 (0.48)	-.022 (-0.46)
TO	-.004 (-0.09)	.0023 (0.14)	-.002 (-0.10)	.0075 (0.43)	-.0009 (-0.12)	.0076 (0.76)	.039 (1.04)	.022 (1.53)
GC	-.772** (-2.34)	-.314* (-3.07)	-.772** (-2.73)	-.150 (-0.98)	-.926** (-3.11)	-.287** (-2.20)	-.201 (-0.58)	-.332* (-3.59)
cst	-.149 (-1.20)	.0100 (0.21)	-.334*** (-1.95)	-.0533 (-0.52)	.259 (1.31)	-.0871 (-0.55)	.2103 (1.00)	.0560 (0.61)
AR(2)	0.955	0.262	0.754	0.644	0.689	0.568	0.634	0.620
Sargan	0.094	0.064	0.431	0.351	0.219	0.191	0.151	0.531
Hansen	0.846	0.779	0.747	0.610	0.919	0.663	0.974	0.893
N	212	63	210	61	212	62	212	62

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*DEMOC^2$) which is an interaction term between bank index and the squared value of democratic accountability, (ii)($LIABILITIES*DEMOC^2$) is an interaction term between liquid liabilities and the squared value of democratic accountability, (iii)($ASSETS*DEMOC^2$) is an interaction term between bank assets and the squared value of democratic accountability and (iv) ($PRIVCRE*DEMOC^2$) is an interaction term between private credit and institutional quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.19: **The effect of investment profile on the bank-growth relationship: *Non-linear specification***

Variables	FD=BANKINDEX		FD=LIABILITIES		FD=BANKASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-	-.779*	-.4700*						
INDEX	(-3.64)	(-4.13)						
LIABI-			-.092	-.063				
LITIES			(-0.82)	(-1.08)				
ASSETS					-.405**	.0106		
					(-2.50)	(0.14)		
PRIVCRE							-.625	.4913
							(-1.69)	(1.23)
INVEST	-.039	-.0313	-.151	-.0540	-.487**	-.0915	-.135	.209
	(-0.59)	(-0.53)	(-0.64)	(-0.97)	(-2.44)	(-1.02)	(-0.72)	(1.63)
BANKINDEX*	2.349*	1.486*						
INVEST	(3.28)	(3.50)						
BANKINDEX*	-1.491**	-1.017**						
INVEST2	(-2.99)	(-2.49)						
LAIBI-			.403	.0455				
LITIES*			(1.12)	(0.18)				
INVEST								
LIABI-			-.146	.1184				
LITIES*			(-0.32)	(0.44)				
$INVEST^2$								
ASSETS*					.945***	-.128		
INVEST					(1.95)	(-0.67)		
ASSETS*					-.082	.293		
$INVEST^2$					(-0.35)	(1.01)		
PRIVCRE*							1.83***	-1.151
INVEST							(1.97)	(-1.08)
PRIVCRE*							-1.346	.723
$INVEST^2$							(-1.60)	(1.08)
IIC	.108	.075	.104	.0075	.096**	.0517	.149**	-.012
	(1.58)	(0.97)	(1.74)	(0.39)	(2.03)	(0.69)	(2.24)	(-0.34)
INF	.034*	.024	.027	.019	.0241	.0171	.038	.044***
	(3.68)	(0.82)	(1.77)	(1.50)	(1.06)	(0.80)	(1.72)	(1.92)
TO	-.025	.0079	-.007	.0082	.004	-.0058	.015	-.014**
	(-0.55)	(0.18)	(-0.48)	(1.22)	(0.12)	(-0.21)	(0.44)	(-2.28)
GC	-.677**	-.512	-.751**	-.171	-.749**	-.379	-.849*	-.156
	(-2.79)	(-1.59)	(-2.61)	(-1.52)	(-2.52)	(-0.98)	(-4.91)	(-0.97)
cst	-.207	-.137	-.166	.043	.039	-.0601	-.250	-.065**
	(-1.37)	(-0.92)	(-0.96)	(0.54)	(0.33)	(-0.28)	(-1.05)	(-2.22)
AR(2)	0.393	0.689	0.885	0.331	0.823	0.206	0.906	0.209
Sargan	0.200	0.935	0.104	0.129	0.174	0.899	0.320	0.937
Hansen	0.860	0.916	0.680	0.629	0.866	0.442	0.555	0.207
N	222	65	220	63	222	64	222	64

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*INVEST^2$) which is an interaction term between bank index and the squared of investment profile, (ii)($LIABILITIES*INVEST^2$) is an interaction term between liquid liabilities and the squared of investment profile, (iii)($ASSETS*INVEST^2$) is an interaction term between bank assets the squared of investment profile and (iv) ($PRIVCRE*INVEST^2$) is an interaction term between private credit and the squared of investment profile. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.20: **The effect of law and order on the bank-growth relationship: *Non-linear specification***

Variables	FD=BANKINDEX		FD=LIABILITIES		FD=BANKASSETS		FD=PRIVCRE	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
BANK-INDEX	-1.19**	-.3906**						
	(-2.24)	(-2.76)						
LIABI-LITIES			-1.058*	-.098				
			(-3.47)	(-0.37)				
ASSETS					-.556***	.0661		
					(-2.07)	(0.68)		
PRIVCRE							-.675***	-.0515
							(-1.81)	(-0.30)
LAW	-.082	.0210	-.786**	-.031	-.208	-.0027	-.308	-.0201
	(-0.98)	(1.05)	(-2.88)	(-0.28)	(-1.54)	(-0.05)	(-1.64)	(-0.26)
BANK-INDEX* LAW	4.20**	1.383**						
	(2.13)	(2.49)						
BANK-INDEX* LAW^2	-3.410***	-1.088***						
	(-2.03)	(-2.13)						
LAIBI-LITIES* LAW			2.453*	.763				
			(3.62)	(1.04)				
LIABI-LITIES* LAW^2			-1.030**	-.613				
			(-2.24)	(-1.17)				
ASSETS* LAW					1.689***	.268		
					(2.14)	(0.81)		
ASSETS* LAW^2					-1.100***	-.263		
					(-1.81)	(-0.89)		
PRIVCRE* LAW							1.671**	.569***
							(2.20)	(2.05)
PRIVCRE* LAW2							-.884**	-.450**
							(-2.28)	(-2.81)
IIC	.2401**	.0406**	.062	.113***	.074	.022	.153**	.048***
	(2.18)	(2.59)	(1.40)	(1.97)	(1.50)	(1.07)	(2.64)	(1.81)
INF	.043	-.0044	.058**	-.0013	.035	-.073***	.0409**	.032
	(1.57)	(-0.16)	(2.51)	(-0.04)	(1.45)	(-1.78)	(2.86)	(0.97)
TO	-.038	.005	-.0061	-.055***	-.012	-.0018	-.0473	-.013
	(-1.07)	(0.53)	(-0.28)	(-1.94)	(-0.85)	(-0.14)	(-1.46)	(-0.74)
GC	-1.046**	-.347*	-.512**	-.503**	-.492***	-.327*	-.864**	-.524*
	(-2.17)	(-4.83)	(-2.79)	(-2.81)	(-1.86)	(-5.65)	(-2.85)	(-4.10)
cst	-.542**	-.078***	.367***	-.289	-.027	-.054	-.135	-.077
	(-2.18)	(-1.98)	(1.99)	(-1.22)	(-0.26)	(-0.66)	(-0.62)	(-0.83)
AR(2)	0.890	0.499	0.839	0.358	0.978	0.467	0.896	0.456
Sargan	0.244	0.310	0.527	0.935	0.086	0.590	0.055	0.954
Hansen	0.935	0.900	0.959	0.967	0.765	0.932	0.880	0.965
N	222	65	220	63	222	64	222	64

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($BANKINDEX*LAW^2$) which is an interaction term between bank index and the quadratic value of law and order, (ii)($LIABILITIES*LAW^2$) is an interaction term between liquid liabilities and the quadratic value of law and order, (iii)($ASSETS*LAW^2$) is an interaction term between bank assets and the quadratic value of law and order and (iv) ($PRIVCRE*LAW^2$) is an interaction term between private credit and the quadratic value of law and order. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

4.4.1.2 Stock market

When the stock market data are considered as indicators of financial development, our main findings are that we don't see an inverted *"U-shape"* relationship between stock market and economic growth. In fact, the interaction terms[10] are insignificant in most regressions. The inverted U-shape relationship is observed only when market capitalization ($MCAP$) is considered and based on the estimates with annual data (Table 4.21). In fact, the coefficient of the quadratic interactive terms ($MCAP * INST^2$) is significantly negative (-0.47).
Looking to the constituents of the components of our institutional index ($INST$), we don't see any strong U-shape relationship in stock market-growth nexus based on these components. The latest results are reported in Tables (4.22, 4.23, 4.24, 4.25 and 4.26).

[10]MARKETINDEX*INST, MARKETINDEX*INST^2, TRADED*INST, TRADED*INST^2, TURNOVER*INST, TURNOVER*INST^2.

Table 4.21: **The effect of institutional quality on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-	.205	.120						
INDEX	(0.23)	(0.64)						
MCAP			-.170	.245				
			(-0.60)	(1.08)				
TRADED				-2.003	2.11			
				(-0.53)	(1.33)			
TURNOVER							.200	.167
							(0.34)	(1.60)
INST	.138	.063	.158	.177	.178	-.100	.066	.165
	(0.61)	(0.87)	(0.59)	(0.83)	(0.33)	(-.100)	(0.28)	(0.80)
MARKET-	-.671	-.556						
INDEX*	(-0.23)	(-1.08)						
INST								
MARKET-	.548	.615						
INDEX*	(0.21)	(1.49)						
$INST^2$								
MCAP*			.541	-.232				
INST			(1.33)	(-0.56)				
MCAP*			-.473***	-.138				
$INST^2$			(-2.06)	(-0.36)				
TRADED*					6.79	-7.44		
INST					(0.49)	(-1.35)		
TRADED*					-5.66	6.55		
$INST^2$					(-0.45)	(1.35)		
TURNO-							-.447	-.175
VER*INST							(-0.44)	(-0.35)
TURNO-							.184	-.034
VER*							(0.28)	(-0.04)
$INST^2$								
IIC	.042	-.040	.061	-.060	.029	-.055	.198	-.064
	(0.24)	(-0.39)	(0.63)	(-0.79)	(0.52)	(-1.03)	(0.55)	(-1.19)
INF	1.13	-.187	-.138	-.080	-.131	-.313***	-.087	-.304
	(0.95)	(-1.45)	(-0.87)	(-0.74)	(-1.61)	(-1.84)	(-0.27)	(-1.39)
TO	.087	-.009	.028	-.040	-.010	-.009	-.013	-.014
	(1.21)	(-0.33)	(1.39)	(-0.88)	(-0.30)	(-0.37)	(-0.23)	(-0.55)
GC	-.917**	-.042	-.605	.147	-.345	-.130	-1.14	-.035
	(-2.53)	(-0.10)	(-1.35)	(0.39)	(-1.17)	(-0.73)	(-1.07)	(-0.38)
cst	-.153	.156	-.170	.115	-.093	.314	-.470	.176
	(-0.28)	(0.67)	(-0.47)	(0.68)	(-0.33)	(1.50)	(-0.43)	(1.72)
AR(2)	113	0.361	0.300	0.354	0.151	0.057	0.234	0.794
Sargan	0.106	0.780	0.548	0.069	0.114	0.674	0.123	0.688
Hansen	0.568	0.791	0.689	0.899	0.995	0.865	0.834	0.812
N	113	42	145	43	122	44	114	43

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*INST^2$) which is an interaction term between market index and the squared value of institutional quality, (ii)($MCAP*INST^2$) is an interaction term between market capitalization and the squared value of institutional quality, (iii)($TRADED*INST^2$) is an interaction term between bank assets and institutional quality and (iv) ($TURNOVER*INST^2$) is an interaction term between private credit and institutional quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.22: **The effect of bureaucracy quality on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-3.274 (-0.57)	.0251 (0.56)						
MCAP			-2.43 (-0.13)	.0499 (0.05)				
TRADED					-2.887 (-1.06)	4.068 (1.10)		
TURNO-VER							-3.127 (-0.81)	.0634 (0.75)
BURO	.641 (1.25)	-.104 (-0.40)	-.136 (-0.06)	-.0431 (-0.04)	.131 (0.93)	-.0132 (-0.07)	.502 (0.86)	-.024 (-0.18)
MARKET-INDEX* BURO	10.24 (0.56)	-.008 (-0.06)						
MARKET-INDEX* $BURO^2$	-7.346 (-0.54)	.0114 (0.09)						
MCAP* BURO			7.404 (0.13)	-.0678 (-0.02)				
MCAP* $BURO^2$			-4.611 (-0.13)	.151 (0.15)				
TRADED* BURO					8.884 (1.08)	-12.23 (-1.06)		
TRADED* $BURO^2$					-6.195 (-1.10)	8.255 (1.03)		
TURNO-VER* BURO							9.548 (0.82)	-.034 (-0.06)
TURNOVER* $BURO^2$							-6.532 (-0.85)	.0601 (0.12)
IIC	-.137 (-0.10)	-.089 (-0.47)	-.230 (-0.20)	-.074 (-0.39)	.042 (0.83)	.0314 (0.36)	-.162 (-0.39)	-.0309 (-0.22)
INF	-.329 (-0.21)	-.248 (-1.41)	-.212 (-0.41)	-.029 (-0.05)	-.243 (-1.50)	.014 (0.05)	-2.58 (-0.67)	.0414 (0.11)
TO	.034 (0.40)	-.032 (-0.37)	-.082 (-0.14)	-.0061 (-0.04)	.0004 (0.02)	-.005 (-0.14)	-.0711 (-0.62)	.0252 (0.73)
GC	-.394 (-0.10)	.183 (0.11)	.610 (0.13)	.1346 (0.18)	-.572** (-2.39)	-.120 (-0.27)	-.817 (-1.67)	-.133 (-0.28)
cst	.228 (0.06)	.400 (0.70)	.798 (0.18)	.2613 (1.55)	-.074 (-0.44)	-.053 (-0.28)	.666 (0.46)	.133 (0.40)
AR(2)	0.392	0.686	0.946	0.461	0.178	0.925	0.592	0.981
Sargan	0.685	0.369	0.054	0.247	0.285	0.148	0.463	0.445
Hansen	0.908	0.679	0.887	0.739	0.879	0.989	0.734	0.925
N	153	42	144	43	151	44	153	43

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*BURO^2$) which is an interaction term between market index and squared value of bureaucracy quality, (ii)($MCAP*BURO^2$) is an interaction term between market capitalization and squared value of bureaucracy quality, (iii)($TRADED*BURO^2$) is an interaction term between total value traded and squared value of bureaucracy quality and (iv) ($TURNOVER*BURO^2$) is an interaction term between turnover ratio and squared value of bureaucracy quality. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.23: **The effect of corruption on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	.131 (0.14)	-.0043 (-0.18)						
MCAP			-.146 (-0.19)	.160 (1.52)				
TRADED					-.795 (-1.43)	.160 (0.25)		
TURNO-VER							1.374 (0.81)	-.0067 (-0.09)
CORR	.0989 (0.44)	.1164 (1.62)	-.0508 (-0.09)	.141 (0.67)	.237 (1.56)	.0926 (0.56)	.0508 (0.70)	.0250 (0.20)
MARKET-INDEX* CORR	-.553 (-0.15)	.0058 (0.04)	.342 (0.19)					
MARKET-INDEX* $CORR^2$	.528 (0.16)	.0442 (0.18)	.0804 (0.07)					
MCAP* CORR				-.297 (-0.70)				
MCAP* $CORR^2$				-.1132 (-0.13)				
TRADED* CORR					3.856 (1.38)	-.437 (-0.15)		
TRADED* $CORR^2$					-4.59 (-1.31)	.3408 (0.09)		
TURNO-VER* CORR							-5.840 (-0.80)	.2303 (0.62)
TURNOVER* $CORR^2$							5.227 (0.79)	-.065 (-0.18)
IIC	.0634 (0.27)	-.0442 (-0.14)	.0218 (0.13)	-.038 (-0.49)	.111** (2.73)	.0308 (0.26)	.032 (0.77)	-.052 (-0.65)
INF	-.440 (-0.28)	-.364 (-1.14)	-.216 (-0.83)	-.109 (-0.71)	-.192 (-1.40)	-.349 (-1.73)	-.236 (-1.11)	-.388 (-1.55)
TO	-.037 (-0.56)	.028 (0.26)	-.039 (-0.74)	.015 (0.63)	.0052 (0.30)	-.039** (-2.36)	.0230 (0.54)	-.0001 (-0.00)
GC	-.549 (-0.85)	-.794 (-1.61)	-.463 (-0.53)	.085 (0.19)	-.742* (-3.88)	-.378 (-0.84)	-.380 (-1.16)	-.3780 (-1.23)
cst	-.089 (-0.13)	.2836 (0.29)	.087 (0.30)	.0667 (0.57)	-.315*** (-1.97)	-.0068 (-0.02)	-.027 (-0.25)	.273 (0.95)
AR(2)	0.294	0.167	0.198	0.831	0.107	0.333	0.163	0.605
Sargan	0.443	0.270	0.541	0.100	0.383	0.193	0.561	0.676
Hansen	0.720	0.948	0.932	0.926	0.887	0.905	0.869	0.872
N	153	42	140	42	147	44	153	43

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*CORR^2$) which is an interaction term between market index and the squared value of corruption , (ii)($MCAP*CORR^2$) is an interaction term between market capitalization and the squared value of corruption, (iii)($TRADED*CORR^2$) is an interaction term between total value traded and the squared value of corruption(iv) ($TURNOVER*CORR^2$) is an interaction term between turnover ratio and the squared value of corruption. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.24: **The effect of democracy quality on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-	.0468	-.0138						
INDEX	(0.36)	(-0.15)						
MCAP			-.0315	.2063				
			(-0.14)	(1.48)				
TRADED					-.375	.151		
					(-0.55)	(0.33)		
TURNO-							.0643	-.314
VER							(0.43)	(-0.49)
DEMOC	.052	.0035	-.122	.086	-.057	.092	-.157	.258
	(0.48)	(0.09)	(-0.45)	(1.01)	(-0.38)	(0.46)	(-0.69)	(0.45)
MARKET-	-.342	.142						
INDEX*	(-0.48)	(0.23)						
DEMOC								
MARKET-	.317	-.120						
INDEX*	(0.50)	(-0.21)						
$DEMOC^2$								
MCAP*			-.616	-.367				
DEMOC			(-0.35)	(-0.93)				
MCAP*			.868	.1104				
$DEMOC^2$			(0.42)	(0.40)				
TRADED*					1.885	.093		
DEMOC					(0.45)	(0.11)		
TRADED*					-1.85	-.246		
$DEMOC^2$					(-0.37)	(-0.50)		
TURNO							-.492	.674
VER*							(-0.53)	(0.51)
DEMOC								
TURNOVER*							.496	-1.578
							(0.57)	(-0.55)
$DEMOC^2$								
IIC	.0455	-.013	.079	-.0297	.217	-.065	.588	.660
	(0.25)	(-0.07)	(0.46)	(-0.42)	(0.42)	(-0.27)	(0.82)	(0.56)
INF	-.145	-.212	-.046	-.0754	-.100	-.377	.565	.195
	(-1.19)	(-0.49)	(-0.38)	(-0.49)	(-0.93)	(-1.06)	(0.58)	(0.37)
TO	.028	.0030	.036	-.0226	-.0223	-.049	-.2017	-.074
	(0.47)	(0.04)	(0.40)	(-0.45)	(-0.54)	(-1.49)	(-0.80)	(-0.48)
GC	-.394	-.212	-.763	-.0060	-.820	.032	.0746	-1.824
	(-0.58)	(-0.36	(-1.51)	(-0.01)	(-0.51)	(0.04)	(0.10)	(-0.65)
cst	-.1107	.1224	-.053	.080	-.506	.239	-1.838	-1.870
	(-0.22)	(0.19)	(-0.09)	(0.41)	(-0.33)	(0.41)	(-0.78)	(-0.54)
AR(2)	0.161	0.517	0.192	0.463	0.105	0.459	0.075	0.748
Sargan	0.666	0.262	0.196	0.368	0.056	0.377	0.812	0.276
Hansen	0.878	0.969	0.998	0.933	0.995	0.980	0.860	0.877
N	143	40	135	41	141	42	143	41

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*DEMOC^2$) which is an interaction term between market index and the squared value democratic accountability , (ii)($MCAP*DEMOC^2$) is an interaction term between market capitalization and the squared value democratic accountability, (iii)($TRADED*DEMOC^2$) is an interaction term between total value traded and the squared value democratic accountability and (iv) ($TURNOVER*DEMOC^2$) is an interaction term between turnover ratio and the squared value democratic accountability. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.25: **The effect of investment profile on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-.1701	-.0418						
	(-0.33)	(-0.49)						
MCAP			.309	.019				
			(1.05)	(0.18)				
TRADED					-2.00	-2.264***		
					(-0.58)	(-2.08)		
TURNOVER							-.653	.085
							(-0.56)	(1.04)
INVEST	.0931	.1210**	-.228	-.075	.0159	-.300	-.0321	-.0027
	(0.42)	(2.63)	(-0.51)	(-0.38)	(0.20)	(-1.14)	(-0.36)	(-0.02)
MARKET-INDEX* INVEST	.496	.347						
	(0.33)	(0.72)						
MARKET-INDEX* $INVEST^2$	-.342	-.3300						
	(-0.33)	(-0.76)						
MCAP* INVEST			1.05	-.122				
			(-1.13)	(-0.79)				
MCAP* $INVEST^2$			2.297	.169				
			(0.93)	(0.71)				
TRADED* INVEST					6.640	5.321***		
					(0.63)	(2.02)		
TRADED* $INVEST^2$					-4.812	-3.061***		
					(-0.65)	(-1.90)		
TURNO-VER* INVEST							2.112	-.507
							(0.53)	(-0.91)
TURNO-VER* $INVEST^2$							-1.526	.476
							(-0.51)	(0.79)
IIC	-.0450	-.072	.0249	-.023	-.174	.165	.0177	.018
	(-0.22)	(-1.06)	(0.24)	(-0.59)	(-0.76)	(1.09)	(0.44)	(0.55)
INF	-.0215	.0503	-.386	-.522	-.0904	-.320	.0419	-.087
	(-0.21)	(0.36)	(-0.70)	(-0.72)	(-0.94)	(-1.20)	(0.24)	(-0.28)
TO	-.008	-.0164	.0322	-.033	-.0111	.0078	-.0005	-.005
	(-0.27)	(-0.73)	(0.52)	(-0.92)	(-0.42)	(0.58)	(-0.02)	(-0.25)
GC	.1190	.0575	-.038	-.112	.662	-.878	.0419	-.103
	(0.10)	(0.36)	(-0.05)	(-0.55)	(0.57)	(-1.28)	(0.07)	(-0.51)
cst	.1009	.209	.137	.220	.496	-.176	-.0355	-.0014
	(0.27)	(0.86)	(0.35)	(0.7	(0.86)	(-0.78)	(-0.54)	(-0.01)
AR(2)	0.243	0.107	0.083	0.661	0.193	0.781	0.294	0.481
Sargan	0.441	0.161	0.103	0.277	0.187	0.744	0.380	0.585
Hansen	0.678	0.839	0.350	0.590	0.777	0.716	0.948	0.915
N	153	42	144	43	153	44	151	42

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*INVEST^2$) which is an interaction term between market index and the quadratic value of investment profile, (ii)($MCAP*INVEST^2$) is an interaction term between market capitalization and the quadratic value of investment profile, (iii)($TRADED*INVEST^2$) is an interaction term between total value traded and the quadratic value of investment profile and (iv) ($TURNOVER*INVEST^2$) is an interaction term between turnover ratio and the quadratic value of investment profile. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

Table 4.26: **The effect of law and order on the stock market-growth relationship: *Non-linear specification***

Variables	FD=MARKETINDEX		FD=MCAP		FD=TRADED		FD=TURNOVER	
	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data	Annual data	4-year average data
MARKET-INDEX	-.289 (-1.17)	.0042 (0.41)						
MCAP			-1.177 (-1.65)	.1078 (0.79)				
TRADED					-2.62 (-0.53)	-.379 (-0.22)		
TURNO-VER							-.118 (-0.08)	-.272** (-2.28)
LAW	.102 (0.31)	-.079 (-0.85)	-.178 (-1.24)	.0073 (0.14)	-.236 (-0.70)	-.0086 (-0.13)	.0297 (0.29)	-.117 (-1.75)
MARKET-INDEX* LAW	1.197 (1.08)	.210 (0.86)						
MARKET INDEX* LAW^2	-.978 (-0.93)	-.251 (-0.85)						
MCAP* LAW			2.743 (1.81)	.295 (0.30)				
MCAP* LAW^2			-1.52*** (-2.02)	-.586 (-0.55)				
TRADED* LAW					4.446 (0.47)	.537 (0.11)		
TRADED* LAW^2					-1.565 (-0.37)	.072 (0.02)		
TURNO-VER* LAW							.4297 (0.07)	.262** (3.14)
TURNO-VER* LAW^2							-.362 (-0.07)	-.0023 (-0.02)
IIC	-.320 (-0.65)	.036 (0.30)	.050 (1.20)	.1463 (1.76)	.275 (0.87)	-.128 (-0.56)	.0513 (0.25)	.150** (2.27)
INF	-.192 (-1.22)	-.188 (-0.99)	-.0357 (-0.28)	-.157 (-1.12)	.162 (0.60)	-.158 (-1.64)	-.0922 (-0.52)	-.064 (-0.20)
TO	.0099 (0.08)	-.035 (-0.43)	.0415 (0.90)	-.0429 (-0.86)	.083 (0.60)	.0041 (0.12)	-.0087 (-0.17)	-.081** (-2.45)
GC	.733 (0.66)	-.419 (-0.97)	-.4001 (-1.83)	-.769** (-2.50)	-1.466 (-1.00)	.317 (0.39)	-.4040 (-0.32)	-.616** (-2.51)
cst	.937 (0.77)	.076 (0.21)	.0237 (0.17)	-.296 (-1.37)	-.5448 (-0.82)	.408 (0.71)	-.078 (-0.17)	-.198 (-1.22)
AR(2)	0.386	0.665	0.174	0.715	0.161	0.331	0.165	0.398
Sargan	0.530	0.418	0.561	0.073	0.699	0.349	0.522	0.263
Hansen	0.767	0.878	0.849	0.869	0.835	0.540	0.889	0.897
N	153	42	144	43	151	44	153	42

Notes: The definitions of our variables appear in Table B.1. The additional interaction terms are: (i)($MARKETINDEX*LAW^2$) which is an interaction term between market index and the squared value of law and order, (ii)($MCAP*LAW$, $MCAP*LAW^2$) is an interaction term between market capitalization and the squared value of law and order, (iii) $TRADED*LAW^2$) is an interaction term between total value traded and the squared value of law and order and (iv) ($TURNOVER*LAW^2$) is an interaction term between turnover ratio and the squared value of law and order. N refers to number of observations included in the estimation. For *Sargan* test, the null hypothesis is that the instruments are not correlated with the residuals. Hansen tests statistic tests the validity of our instruments . For the test for autocorrelation ($AR2$), the null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation. T-statistics for coefficient in parentheses ***, **, * refer to the 1, 5 and 10% levels of significance respectively.

4.5 Conclusion

We re-investigate how financial development affects the economic growth in MENA countries. Specifically, we examine whether the results are affected by institutional quality.
First of all, based on a model which introduces a linear interaction between the indicator of financial development and institutional index *(FD*INST)*, we find that there is a conditional relationship between financial development and economic growth. In fact, institutional quality mitigates the negative effect of financial development on economic growth when both banking sector and stock markets are considered as indicator of financial development. Moreover, the negative effect of financial development on economic growth can be explained by the fact that the level of institutional quality is lower than the threshold level.

Second, among the components of institutional quality index, *BURO*, *LAW* and *INVEST* evidently mitigate the negative effect of banking sector development. That is, progress in banking sector development in countries with an important scores in *LAW*, *BURO* and *INVEST*, facilitates growth. Also, countries with an important score of investment profile (INVEST) can benefit from stock market development.

Third, using a model with quadratic-interaction, we find that while banking sector development and growth illustrate the inverted-U shaped relationship, we don't find the inverted-U shaped relationship, between stock markets development and economic growth.

To benefit from financial development, financial system in MENA countries must be embedded within a sound institutional framework. Our results are in line with Demetriades and Law (2006) who have stressed the importance of institutional quality in the finance-growth nexus.

Conclusion

Key findings

The relationship between financial development and economic growth has long remained an important issue of debate in the literature. The aim of this Thesis is therefore to investigate the effect of financial development on economic growth in MENA countries. To this end, we reviewed theoretical and empirical work on the relationship between financial development and economic growth. The theoretical models have outlined the channels (such as saving rates, investment decisions and technological innovation) through which financial development affects economic growth. Building on the theoretical studies, an important strand of empirical studies has emerged, which proceed from using country-level data, to using industry- and firm-level data. We classify the econometric methodologies on this subject into four groups: (i) cross-country, (ii) panel studies (iii) times series and (iv)industry and firm levels approaches. These different investigations have stressed the importance of financial development in determining economic growth.

We consider indicators of both banking sector and stock market development as indicators of financial sector development, which are the most widely used measures of financial development. Four indicators of banking sector are considered which are: (i) the private credit to GDP ratio ($PRIVCRE$), (ii) the ratio of liquid liabilities to GDP ($LIABILITIES$), (iii) the ratio of the total assets of deposit money banks ($ASSETS$), (iv) and we construct an index of banking sector development ($BANKINDEX$)[11] that aggregates the information contained in the individual indicators.
Four indicators of stock market development are also used. As for banking sector we construct an index of stock market development ($MARKETINDEX$). The individual indicators of stock market development are, an indicator of stock market size ($MCAP$) and two indicators of market liquidity ($TRADED$ and $TURNOVER$).
Building on these indicators we have examined the evolution of the financial system in MENA countries. Our main findings show that within the MENA region there is

[11]The formula used to construct this index is presented in Chapter(II)

substantial variation in the degree of financial development; some countries are fairly well advanced, whereas a few others have significant room for improvement.
We have also examined the effect of financial development on economic growth in MENA region. Applying a GMM-System technique of estimations for a sample of 18 MENA countries between 1984-2007, we find that neither the banking sector nor the stock market can promote economic growth in MENA region. In fact, the results of the GMM-system estimators with both an annual and four-year average data show that the coefficients of financial development are insignificant or even negatively significant. One explanation to these counter-intuitive results may be that the relationship between financial development and economic growth may not be linear, but rather simply be dependent on institutional conditions. Therefore, we examine the institutional determinants of financial development and the effect of institutional environment in the finance-growth nexus.

To examine the institutional determinants of financial development, we construct an index of institutional quality for MENA countries, which is an average of the five PRS indicators (from ICRG) (i) *bureaucracy quality*, (ii) *Law and Order*, (iii) *Corruption* and (iv) *investment profile* and (v) *democratic accountability*. The institutional index range between $0-1$ where higher values indicate higher quality.
Considering fixed effects as well as random effects specifications[12] for a sample of 18 MENA countries over the 1984-2007 period we find that institutional quality affect positively and significantly banking sector development in MENA countries. This result is obtained when we use the banking sector index and the individual indicators of banking sector development respectively. When the indicators of stock market are considered, the results of panel data regressions show that institutional quality appear relevant only for market size ($MCAP$). In fact, only market capitalization is affected positively and significantly by institutional quality.
Our results hold when we consider a four-year averaged data and an alternative institutional data base respectively. In fact, we have constructed an institutional index which is a simple average of the six institutional variables developed by Kaufmann *et al.*(1999).
An instrumental Variables (IV) technique of estimation is considered to remain to the problem of endogeneity of institutional variables. Most of the results are consistent with those of panel data estimations. In fact, institutional quality appear more relevant in banking sector development than in stock market (Chapter III).
Examining the impact of five sub-indicators of the composite ICRG index on financial

[12]we use the Hausman test to select the appropriate estimator. If the Hausman test reject the null hypothesis that the individual effects are not correlated with the explanatory variables, the most suitable estimation would then be the fixed-effects model (FE)

sector, our findings show that while law and order, corruption and investment profile are the most relevant determinant of banking sector development, only investment profile appear the key determinant of stock market development.

Finally we examine the effect of institutional quality on the finance-growth nexus. To this end, a model with interactions variables is estimated. First, we consider an empirical model with linear interaction between financial development and institutional quality. Our main findings show that while most indicators of financial development continue to have a significantly negative effect on economic growth, the sign of the coefficients of interaction variables are significantly positive. Thus, institutional quality mitigate the negative effect of financial development on economic growth. The negative effect of financial development on economic growth can be explained by the fact that MENA region has not attained on average the threshold level of institutional quality behind which financial development can affect positively and significantly economic growth. Indeed the averaged institutional level in MENA region is around 0.52.
Looking to the subcomponents of our institutional index, our findings show that a development of banking sector in a country with an important scores in *Law and Order*, *Bureaucracy* and *Investment Profile* facilitate growth. Also, countries with an important score of *investment profile* (INVEST) can benefit from stock market development in terms of economic growth.
Second, to examine the non-linear effect of institutional quality on the finance-growth relationship, we estimate a model with quadratic-interaction, when we find that while banking sector development and growth illustrate the inverted-U shaped relationship, we don't see this inverted-U shaped relationship, between stock markets development and economic growth.
These results are observed using a *GMM-system* technique of estimations (Chapter IV).

Policy Implications

These results have important implications. Reform must be embarked in the end to promote financial system, in order to enable financial development to be growth enhancing in MENA region. However, they need to do significantly more to reinforce the institutional environment.

The limits of this work

- The study period (1984-2007) is a bit short. Indeed we were obliged to work on this period because of the availability of institutional data base.

- In our study we have considered only the Real Per Capita GDP as indicator of economic growth, then there are other indicators of economic growth that have been considered by other work (i) *Capital Stock Growth* and (ii) *Productivity Growth*. These variables are considered as important channels through which financial development may be linked to economic growth.

Further Research

This thesis can be extended in three ways:

- First, an extended model of Caner and Hansen (2004) can be developed which besides the endogeneity of the slope variable (Financial development), considers the endogeneity of the threshold variable, such the institutional quality.
- This study can be extended to other regions, such Asian region.
- Other conditional variables can be taken into account, such the capital account liberalization, macroeconomic stability..

Appendixes

Appendix A

Appendix Chapter 1

Table A.1: **Related Literature "Financial Development and Economic Growth: A Summary"**

Cross Country Evidence on Finance and Growth				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Goldsmith (1969)	Annual data for 35 countries over 1949-1963 period	- Financial intermediary assets as a share of economic output	OLS and grahpical analysis	The results of OLS show that there is a clear relationship between financial development and economic growth
King and Levine (1993a)	Sample of 77 countries over the over 1960-1989 period	Liquid liabilities to GDP ratio/ The ratio of bank credit divided by bank credit plus central bank domestic assets/ The ratio of credit allocated to private entreprises to total domestic credit	OLS	The empirical results show that there is a positive relationship between each of the financial development indicators and all indicators of economic growth
King and Levine (1993b)	Sample of 80 countries over 1960-1989 period	The indicators defined in King and Levine (1993a)	OLS	Results show that: - Financial development promote economic growth - The predetermined component of . financial development is a good predictor of long-run growth
Atje and Jovanic (1993)	Sample of 94 countries over 1960-1985 period	- Ratio of private credit to GDP - Ratio of annual value of all stock market trades to GDP	OLS	While stock market have both positive levels and growth effects on economic activity, they fail to find a similar effect for bank lending
Levine and Zervos (1998)	Sample of 49 countries over 1960-1989 period	Stock market indicators: - Stock market size - Stock market liquidity - Stock market volatility - Stock market integration Banking sector indicators: - Liquid Liabilities - Private credits	OLS	The mains findings are that while stock market liquidity is positively and significantly correlated with current and future rates of economic growth, capital accumulation, and productivity growth, stock market size, volatility, and integration are not robustly linked with growth. Both predetermined values of stock market and banking sector development affect long-run economic growth.

Table A.2: **Continued**

Instrumental variable approach				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Levine (1998)	Sample of 42 countries over 1976-1993 period	The value of loans made by commercial banks and other deposit taking banks to the private sector divided by GDP	IV	He finds that the exogenous component of banking development is positively associated with all indicators of economic growth
Levine (1999)	Sample of 77 countries over 1960-1989	The four indicators defined in King and Levine (1993b)	IV	He finds that the exogenous component of financial intermediary development (which defined by the legal and regulatory environment) is positively associated with economic growth
Levine et al.(2000)	Sample of 71 countries over 1960-1995 period	- Liquid Liabilities to GDP ratio - The ratio of commercial bank assets divided by commercial bank plus central bank assets - The value of credits by financial intermediaries to the private sector divided by GDP	IV	Financial intermediary development is positively associated with economic growth
Beck et al.(2000)	Sample of 63 countries over 1960-1995 period	The indicators of financial development are similar to those of Levine et al.(2000)	IV	higher levels of financial intermediary promote economic growth and total factor productivity. However, the effect to physical capital growth and savings are ambiguous.
Levine (2002)	Annual data for 48 countries over the period 1980-1995	- Finance-Activity - Finance-Size - Finance-Efficiency - Finance-Aggregate - Structure- Activity - Structure-Efficiency - Structure-Aggregate	IV and (OLS)	The results show that although overall financial development help explain cross-country growth variations there is no support for either the bank-based or the market-based view

Table A.3: **Continued**

Dynamic Panel data analysis: GMM				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Rousseau and Wachtel (2000)	Sample of 47 countries over 1980-1995 period	- Market Capitalization to GDP ratio - Total value traded - M3 to GDP ratio	GMM	The main findings are that: developing deep and liquid financial markets boost economic growth
Levine et al.(2000)	Idem with IV period	Idem with IV	GMM	The results of dynamic panel data are consistent with those of traditional cross-section technique of estimations
Beck et al.(2000)	Idem with IV	Idem with IV	GMM	The results are consistent with those of IV
Benhabib and Spiegel (2000)	A sample of four countries over 1965-1985 period	The indicators of financial development are those of King and Levine (a,b)	GMM	The results show that indicators of financial development are correlated with both total factor-productivity growth and investment
Beck and Levine (2004)	Sample of 40 countries over 1976 - 1998 period	-The indicators of stock market development are similar to those of Rousseau and Wachtel (1998) - The indicator of banking sector is ratio of Bank claims on the private sector by deposit money banks to GDP	GMM	The results show that both stock market and bank lead to promote economic growth
Ben Naceur and Ghazouani (2007)	Sample of 11 MENA countries over the 1979-2003 period	- Indicators of Stock Market: Market capitalization to GDP Total value traded Turnover ratio Stock market index - Banking sector: Private credit to GDP Liquid labilities to GDP. Bank index	GMM	Financial development is unimportant and even harmful for economic growth

Table A.4: **Continued**

Dynamic Panel data analysis (GMM): Continued				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	Results
Hasan et al.(2009a)	sub-national data for a sample of 31 Chinese provinces over 1986-2003 period	- Total bank loans to GDP the ratio of equity and non-financial corporate debt issuance to GDP	GMM	They find that while capital market has a strong influence on growth, the impact of bank lending is not significant and sometimes negative.
Hasan et al.(2009b)	11 European Union countries over 1996-2004 period	- Volume of financial development - Quality of financial development	GMM	There is a significantly positive relationship between growth and both the the quantity and quality of financial development
Dynamic Panel data analysis (PMG)				
Loayza and Rancier (2006)	Sample of 75 countries over 1960-2000 period	Private Credit to GDP	PMG	The main findings are that while economic growth is affected positively and significantly by financial intermediation in the long run, this effect is significantly negative in the short-run.
Dynamic Panel data analysis (Panel Cointegration)				
Christopoulos and Tsionas (2004)	Sample of 10 developing over 1970-2000 period	Liquid liabilities to GDP	Panel Cointegration	The main findings are that the only cointegrating relation implies unidirectional causality from financial depth to growth
Apergis et al.(2007)	heterogeneous sample of 65 countries over 1975-2000 period	- Liquid liabilities - Credit by deposit money banks to the private sector divided by GDP - Credits by deposit money banks and other financial institutions to the private sector divided by GDP	Panel Cointegration	The results provide evidence that there is a strong and positive and statistically significant equilibrium relation between financial development and economic growth

Table A.5: **Continued**

Luintel et al.(2008)	Sample of 14 low- and middle-income countries	- Finance-Activity - Finance-Size - Structure-Size - Structure-Activity	Panel Cointegration	They find that financial structure and financial development matter for output level and economic growth
Kiran et al.(2009)	panel of 10 emerging countries over 1968-2007 period	- Liquid liabilities - credits of deposit money banks to the private sector divided by GDP - Credits by deposit money banks and other financial institutions to private sector divided by GDP	Panel Cointegration	The main finding is that financial development has a positive and significant effect on economic growth

Table A.6: **Continued**

Time-series approach				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Gupta (1984)	Quarterly time series data from (1961 Q1 to 1880 Q4) for 14 developing countries	M3 to GDP ratio	VAR and Granger causality	The results show that causality runs from financial systems to economic growth
Jung (1986)	Sample of 37 less developed countries and 19 developed countries	Ratio of Money to GDP	VAR and Granger causality tests	The results show that the causality runs from economic development to financial development in developed countries, and from financial development to economic development in less developed countries.
Demetriades and Hussein (1996)	16 developing countries	- The ratio of bank deposit liabilities to nominal GDP - the ratio of bank claims on the private sector to nominal GDP	VAR, Engle and Granger (1987) Johansen (1988) methods	The results provide evidence for bidirectional causality and reverse causation from income to finance
Choe and Moosa (1999)	Annual data for Korea over 1970-1992 period	- Deposits Money	VAR	They find that financial development leads to economic growth in Korea
Luintel and Khan (1999)	10 developing countries	- The ratio of total deposit liabilities of deposit banks to one period lagged nominal GDP	VAR	find bi-directional causality between financial development and economic growth
Xu (2000)	41 countries over the 1960- 1993 period	- The total bank deposits to GDP	VAR	The results provide evidence that financial development stimulate economic growth both in the short term and in the long term
Bell and Rousseau (2001)	Annual data for Indian over 1951 to 1995 period	- Domestic Assets of deposit money bank - Private Credit	- Johansen cointegration - VECM - VAR - Granger causality	Financial development promote economic growth in India
Calderon and Liu (2003)	Sample of 109 industrial and developing countries over 1960- 1994 period	- The the ratio of broad money (M2) to GDP - the ratio of credits provided by financial intermediaries to the private sector to GDP	Geweke's (1982) approach	The results show that financial development leads to economic growth and financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries.

Table A.7: **Continued**

Time-series approach: Continued				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Tangavely and Jiunn (2004)	Quarterly data for Australia over 1960 to 1999 period	- Bank claims on private sector to nominal GDP - Liabilities to GDP - Equity Turnover to GDP	- VAR -Granger Causality	- The results suggest that while economic growth causes banking development. Stock market is an important determinant of economic growth in Australia.
Ghirmay (2005)	Sample of 13 Sub-Saharan African countries over 30 Years	- Private Credit to GDP	Johansen cointegration, VECM, VAR	The results show that causality runs from financial development to economic growth, again in eight of the countries
Caporale et al.(2005)	Four developing countries, Quarterly data from 1979Q1 to 1998Q2	- Market Capitalization ratio - Value Traded ratio	VAR	Provide evidence that the causality runs from stock market to economic growth through increasing investment efficiency
Hondroyiannis et al.(2005)	Annual data for Greece over 1986 to 1999	- Private credit to GDP - Market capitalization GDP	VAR	The results show that while both bank and stock market promote economic growth, the market contribution is relatively limited
Rousseau and Vuthipadation (2005)	10 Asian countries from 1950 to 2000	- (M2-M1) - Credit allocated to the private sector	- VAR - VECM	- Strong uni-directional link from finance to investment supporting the factor accumulation channel
Boulila and Trabelsi (2005)	Sample of 16 MENA countries over 1960-2002 period	-Liquid Liabilities to GDP ratio - The ratio of the claims to the private sector to GDP - The ratio of financial saving to GDP	VAR	The evidence points to the causality running from real growth to financial development

Table A.8: **Continued**

Time-series approach: Continued				
Study	**Sample**	**Indicators of financial development**	**Econometric Method**	**Results**
Abu-Bader and Abu-Qarn (2008a)	-Sample of 6 MENA counries over 1960-2004 period	- M2/GDP - The ratio of M2 minus currency to GDP - The ratio of bank credit to the private sector to nominal GDP - The ratio of credit issued to non financial private firms to total domestic credit	VAR	- The results stress that there is unidirectional causality running from financial development to economic growth in five out of the six countries
Abu Bader and Abu-Qarn (2008b)	Annual data for Egypt over 1960-2001 period	- The ratio of money stock, M2, to nominal GDP - The ratio of M2 minus currency to GDP - The ratio of bank credit to the private sector to nominal GDP - The ratio of credit issued to non-financial private firms to total domestic credit	- VAR - VECM - Granger causality	The evidence stresses that the causality runs from financial development to economic growth in Egypt.

Table A.9: **Industry and Firm level approach**

Industry level analysis				
Jayartne and Strahan (1996)	Data from United States over 1970-1995 period	Bank lending quality	OLS	Their findings show that branch reform boosted bank-lending quality and accelerated real per capita growth rates
Rajan and Zingales (1998)	Sample of 41 countries and 36 manufacturing industries over 1980-1990 period	- Total Capitalization which equals the summation of stock market capitalization and domestic credit to GDP ratio - Accounting standards	OLS	The results show that financial development influences industrial growth by influencing the availability of external finance
Beck and Levine (2002)	Sample of 42 countries and 36 industries over 1980-1989 period	-Finance activity: equals the sum of the log of the product of Private Credit and Value Traded -Finance-Size: equals the log of the sum of Private Credit and Market Capitalization	OLS TSLS	They find that overall financial development is critically important for industry growth and the efficiency of capital allocation
Beck et al. (2008)	Sample of 44 countries and 36 industries in the manufacturing sector over 1980-1989 period	- Private Credit to GDP ratio	OLS IV	The results show that financial development boosts the growth of industries that are naturally composed of small firms more than large-firm industries
Firm level analysis				
Demirguc-Kunt and Maksimovic (1998)	Firm-level data for the largest publicly traded manufacturing firms in 26 countries over 1980-1991 period	- Market Capitalization to GDP ratio - Turnover ratio - The ratio of domestic assets of deposit banks to GDP	OLS	The results provide firm-level support for the proposition that the development of financial markets facilitates economic growth
Beck et al.(2005)	A size-stratified survey of over 4,000 firms in 54 countries over 1990-1995 period	Private Credit to GDP ratio	Panel data with Random Effects	Their findings show that financial development weakens the impact of various barriers to firm growth, and it is again the small firms that benefit the most

Appendix B

Appendix Chapter 2

Table B.1: **Definitions, Proxies and Data sources**

Variable	Proxy	Label	Expected sign	Source
Economic Growth	Growth rate of real per capita GDP	GROWTH		WDI 2007
Banking sector index	Conglomerate index of banking sector development	BANKINDEX	+	Beck et al. (November 2008) revised data base and AuthorŠs calculations
Private Credit	Credits by financial intermediaries to the private sector divided by GDP	PRIVCRE	+	Beck et al.(November 2008)
Bank Assets	Ratio of total assets of deposit money banks	ASSETS	+	Beck et al.(November 2008)
Liquid Liabilities	Ratio of liquid liabilities of the financial sector	LIABILITIES	+	Beck et al.(November 2008)
Stock market Index	Conglomerate index of stock market development	MARKETINDEX	+	Beck et al.(November 2008) revised data base and AuthorŠs calculations
Stock Market Capitalization	Market capitalization to GDP ratio	MCAP	+	Beck et al.(November 2008)
Value Traded	Total value of domestic equities traded as a percent of GDP	TRADED	+	Beck et al.(November 2008)
Turnover Ratio	Value of trades of shares on national stock markets divided by market capitalization	TURNOVER	+	Beck et al.(November 2008)
Initial Income Level	Log of initial real per capita GDP	IIC	-	WDI 2008
Inflation	Annual Inflation Rate	INF	-	WDI 2008
Trade Openness	Sum of exports and imports to GDP	TO	+	WDI 2008
Government Consumption	Ratio of government consumption to GDP	GC	-	WDI 2008

Table B.2: **Summary Statistics**

Variable	obs	Mean	Std. Dev.	Min	Max
GROWTH	346	.0111	.057	-.428	.346
BANKINDEX	248	-.036	.411	-1	.945
LIABILITIES	238	.646	.235	.262	1.31
ASSETS	240	.590	.251	.089	1.35
PRIVCRE	239	.449	.228	.0439	1.02
MARKETINDEX	134	.011	1.383	-.950	8.75
MCAP	182	.481	.4867	.021	2.984
TRADED	183	.182	.408	.0007	3.496
TURNOVER	141	.292	.3511	.0089	2.31
IIC	343	3.519	.509	2.646	4.546
INF	331	.090	.180	-.104	1.77
TO	355	.827	.341	.1377	1.91
GC	317	.211	.0747	.01	.762

Table B.3: **Correlation Matrix**

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
(1)GROWTH	1													
(2)BANKINDEX	0.017	1												
(3)LIABILITIES	-0.077	0.833*	1											
(4)ASSETS	0.053	0.862*	0.644*	1										
(5)PRIVCRE	-0.058	0.861*	0.560*	0.580*	1									
(6)MARKETINDEX	0.054	0.152	0.127	0.104	0.166*	1								
(7)MCAP	0.167*	0.389*	0.363*	0.281*	0.343*	0.814*	1							
(8)TRADED	0.1	0.179*	0.120*	0.152*	0.185*	0.986*	0.749*	1						
(9)TURNOVER	0.006	0.0114	-0.031	0.023	0.045	0.901*	0.534*	0.888*	1					
(10)IIC	-0.029	0.200*	-0.086	0.245*	0.436*	0.214*	0.213*	0.226*	0.294*	1				
(11)INF	-0.004	-0.083	-0.054	0.145*	-0.199*	-0.145	-0.264*	-0.152*	-0.100	-0.161*	-0.246*	1		
(12)TO	0.035	0.362*	0.303*	0.181*	0.381*	0.279*	0.526*	0.223*	0.055	0.415*	0.172*	-0.128*	1	
(13)GC	-0.153*	0.265*	0.220*	0.303*	0.399*	0.204*	0.182*	0.174*	0.250*	0.504*	-0.280*	0.015	0.322*	1

Appendix C

Appendix Chapter 3

Table C.1: **Empirical Evidence:"Institutional Determinants of Financial Development"**

Study	**Sample**	**Indicators of Institutional Quality**	**Econometric Method**	**Results**
La Porta *et al.* (1997), La Porta *et al.* (1998)	A Sample of 49 countries over the word	- Shareholders rights Indices - Creditor rights Indices - Law Enforcement	OLS	The results show that good law enforcement has a large effect on the valuation and breadth of both debt and equity markets. The results also show that the quality of the legal environment has a significant effect on the ability of different firms in different countries to raise external finance. The results also show that common law countries generally have the best,and the civil law countries, the worst legal protections of investors
Pistor et al. (2000)	A sample of 26 transition economies over 1994-1998 period	- Shareholders rights - Creditor rights - Rule of Law - Legal Effectiveness - Enforcement	OLS and IV	- The results show that the the effectiveness of legal institutions (Legality)tends to dominate the impact of the protection of both creditor and shareholder rights in promoting credit market development
Beck et al. (2003)	Sample of 70 former colonies	-French Legal Origin	OLS	The results provide evidence to the "*Law and Finance*" theory. In fact, French Legal Origin is significantly and negatively related to financial development.
Beck and Levine (2002)	The data are for 42 countries and 36 industries over 1980-1989 period	- Judicial Efficiency	OLS	They provide support to the "Law and Finance" view. That is, the level of financial development is high in countries with efficient legal system
Wurgler (2000)	Data set for 65 countries, 28 industries over 1963-1993 period		OLS	They find that the legal protection of minority investors is positively correlated with the efficiency of capital allocation

Table C.2: **Empirical Evidence:"Institutional Determinants of Financial Development"**

Study	Sample	Indicators of Institutional Quality	Econometric Method	Results
Galindo and Micco (2001)	- Sample of 59 countries for the 1990-1999 period	- LLSV creditor rights index - law enforceability	OLS and IV	The results show that an improvement in effective creditor rights reduces the volatility of the credit cycle
Djankov et al. (2007)	A Sample of 129 countries over 1978-2003 period	- Creditor rights index - Law enforcement - Legal Origin	OLS	The main findings are that both creditor protection through the legal system and information sharing institutions are associated with higher ratio of private credit to GDP. They also give a support to the "Law and Finance" theory. That is common law countries have sharply higher creditor rights scores than French civil law countries
Baltagi et al. (2007)	A Sample of 42 countries over the 1980 -2003 period	- ICRG Institutional Index: - Corruption - Rule of Law - Bureaucratic Quality - Government Repudiation of Contracts - Risk of Expropriation	GMM	The main findings are that institutions can explain a large part of the variation in financial development across countries and over time
Law and Habibullah (2009)	A Sample of 25 economies during 1980-2001	- The indicator of institutional quality is the sum of 5 PRS indicators: - Corruption - Rule of Law - Bureaucratic quality - Government repudiation of contracts - risk of expropriation	GMM PMG	The evidence shows that institutional quality is a significant determinant of both bank and stock market development

Table C.3: **Empirical Evidence:"Institutional Determinants of Financial Development"**

Study	Sample	Indicators of Institutional Quality	Econometric Method	Results
Yartey (2008)	Panel data of 42 emerging economies over 1990 to 2004	- a composite index from ICRG (the sum of the 12 indicators of ICRG) - Law and order - Bureaucratic quality - Democratic accountability - Corruption	GMM	The main findings are that institutional quality is an important determinant of stock market development in emerging economies.
Law and Azman-Saini (2008)	A sample of 63 developed and developing countries over 1996- 2004	- Voice and accountability - Political Stability and Lack of violence - Government effectiveness - Regulatory quality - Rule of Law - Control of Corruption	GMM	The mains findings are that while institutional quality appear relevant for banking sector development, it has no effect on stock market. Regulatory quality depict the U-shaped relationship with both banking sector and and stock market development
Anayiotos and Toroyan (2009)	37 Sub-Saharan Africa countries over 2003-2004	- Reliable Information - Contract Enforcement - Political Stability - Corruption	non-parametric empirical tool	They provide evidence that institutional quality promotes financial depth in SSA countries
Gries and Meierrieks (2010)	19 Sub-Saharan African countries for the period of 1984-2007	- Protection of property rights - corruption - rule of law	- GMM - OLS - Fixed effects model	The evidence provides support to the hypothesis that institutional quality is an important determinant of financial development. In fact, the low level of financial development in SSA countries are a consequence of their institutions
Girma and Shortland (2008),	Sample of developed and developing countries from 1975-2000	- Political variables (from Marshall et al 2003)	- OLS - GMM	The results show that the degree of democracy and political stability are significant explanatory factors in determining the speed of financial development

Table C.4: **Empirical Evidence:"Institutional Determinants of Financial Development: Other Institutions"**

Study	Sample	Indicators of Institutional Quality	Econometric Method	Results
Roe and Siegel (2009)	Sample of 65 countries over the period of 1976-2003	- They consider four different indicators of political stability. - Legal Origin	OLS	The findings show that financial backwardness is significantly rooted in severe political instability. The results also show that current political instability explains the level of financial development more than historical legal origin
Calderon et al. (2001)	sample of 48 countries during 1980-1995	- Trust - Rule of Law	- OLS - IV	The results found that trust and rule of law are strongly related to financial development.
Guiso et al. (2004)	Microeconomic data on Italian households and firms in 1989 1991, 1993, and 1995	- Social Capital	- OLS - IV	The results provide evidence that supports the hypothesis that social capital and financial development measures are highly correlated. The results also show that The effect of social capital is stronger where legal enforcement is weaker and among less-educated people

Table C.5: **Correlation Matrix Banking sector data set**

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
(1)BANKINDEX	1									
(2)PRIVCRE	0.8613*	1								
(3)LIABILITIES	0.8336*	0.5600*	1							
(4)ASSETS	0.862*	0.580*	0.644*	1						
(5)ICOME	0.231*	0.433*	-0.068	0.212*	1					
(6)INF	-0.083	-0.199*	-0.054	0.145*	-0.340*	1				
(7)TO	0.362*	0.381*	0.303*	0.181*	0.386*	-0.128*	1			
(8)KO	0.216*	0.4537*	0.1144*	0.1608*	0.4570*	-0.1249*	0.5371*	1		
(9)SSCE	0.240*	0.310*	0.026	0.290*	0.647*	-0.246*	0.1723*	0.1541*	1	
(10)INST	0.467*	0.450*	0.223*	0.488*	0.332*	-0.183*	0.213*	0.129*	0.302*	1

Table C.6: **Summary Statistics: Banking sector data set**

Variable	**Obs**	**Mean**	**Std.Dev**	**Min**	**Max**
BANKINDEX	262	.005	.406	-.739	1.059
PRIVCRE	262	.427	.230	.043	.999
LIABILITIES	259	.630	.232	.262	1.278
ASSETS	262	.536	.253	.086	1.215
INST	376	.520	.114	.118	.838

Table C.7: **Correlation Matrix Stock Market data set**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) MARKETINDEX	1									
(2) MCAP	0.814*	1								
(3) TRADE	0.986*	0.749*	1							
(4) TURNOVER	0.901*	0.534*	0.888*	1						
(5) ICOME	0.288*	0.2923*	0.278*	0.344*	1					
(6) INF	-0.145	-0.264*	-0.152*	-0.1002	-0.340*	1				
(7) TO	0.279*	0.526*	0.223*	0.055	0.386*	-0.128*	1			
(8) KO	0.281*	0.403*	0.203*	0.205*	0.457*	-0.124*	0.537*	1		
(9) SSCE	0.209*	0.368*	0.198*	0.168	0.647*	-0.246*	0.172*	0.154*	1	
(10) INST	0.130	0.240*	0.147*	0.083	0.332*	-0.183*	0.213*	0.129*	0.302*	1

Table C.8: **Summary Statistics: Stock Market data set**

	Obs	**Mean**	**Std.Dev**	**Min**	**Max**
MARKETINDEX	195	-.054	1.19	-.958	8.025
MCAP	177	.430	.409	.023	2.420
TRADE	183	.182	.408	.0007	3.49
TURNOVER	141	.292	.351	.0089	2.317
INST	376	.564	.128	.134	.938

Table C.9: **Average of Institutional Index in MENA countries over (1984-2007) period**

Country	**Average of institutional index**	
Algeria	AL	0,465
Bahrain	BH	0,583
Egypt	EG	0,493
Iran	IR	0,500
Israel	IS	0,761
Jordan	JO	0,569
Kuwait	KU	0,543
Lebanon	LE	0,434
Libya	LI	0,436
Morocco	MO	0,557
Oman	OM	0,555
Qatar	QA	0,494
Saudi Arabia	SA	0,512
Syrian Arab Republic	SY	0,416
Tunisia	TU	0,522
UAE	UA	0,522
Yemen	YE	0,487
MENA	MENA	0,520

Notes: The Original data are extracted from ICRG data base

Appendix D

Appendix Chapter 4

Table D.1: **Empirical Evidence: Conditional Finance-Growth Relationship**

Study	**Sample**	**Conditional Variables**	**Econometric Method**	**Results**
		Macroeconomic Conditions		
Deidda and Fattouh (2002)	Sample of 119 countries over the period of 1960-1989	- The initial income per capita	- OLS	The evidence is consistent with the hypothesis of the non-monotonic finance-growth relationship. A significantly positive relationship between financial development and economic growth is observed only for countries with high income per capita
Rioja and Valev (2004)	- Panel of 74 countries during the 1960 to 1995 period	Financial development	GMM	The results provide empirical support to the non-linearity in the finance-growth relationship Their findings show that the effect of finance on growth is not uniformly. In fact, while financial development exerts a strong positive effect on economic growth in the middle and high regions, this effect is ambiguous in the low region
Rousseau and Wachtel(2002	Sample of 84 countries from 1960-1995	Inflation rate		The results show that there is an inflation threshold for the finance-growth relationship
Huang et al.(2009)	Levine and al. (2000) data set over 1960-1995 period	Inflation rate	The threshold regression with instrumental variables of Caner and Hansen's (2004) instrumental-variable	They find strong evidence of a nonlinear inflation threshold in the finance-growth, below which financial development exerts a significantly positive effect on economic growth while, above the growth effect of finance appears to be no significant

Table D.2: **Empirical Evidence: Conditional Finance-Growth Relationship**

Study	**Sample**	**Conditional Variables**	**Econometric Method**	**Results**
Shen and Lee (2006)	Sample of 48 countries over 1976 to 2001 period	- Financial liberalization, - The degree of a country's level of development - Twin crises - Governance	OLS	The empirical evidences give support to the hypothesis of non-linear financial-growth relationship. The conditional variables of financial liberalization, high-income level, and good shareholder protection mitigate the negative impacts of banking development on growth. The the conditional variables of middle-income level, Latin American, Sub-Saharan African, and East Asia dummies, strengthen the positive impacts of stock market development on growth
Institutional Conditions				
Demetriades and Law (2006)	72 countries over the 1978-2000 period	Institutional quality (is obtained by summing five indicators from ICRG which are Corruption; Rule of Law; Bureaucratic quality Government Repudiation of Contracts Risk of Expro-priation)	- OLS - Static fixed-effects estimators - PMG estimators - MG estimators	They find that financial development has larger effect on long-run economic development when the financial system is embedded within a sound institutional framework.

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Résumé

Cette thèse examine (i) l'impact du secteur bancaire et des marchés financiers sur la croissance économique, (ii) l'effet de la qualité institutionnelle sur la détermination du développement financier, (iii) Comment la qualité des institutions affecte la relation entre le développement financier et la croissance économique. A cette fin, nous construisons un indice de qualité institutionnel pour les pays de la région MENA. Appliquant la méthode d'estimation des moindres carrés généralisés (MCG) pour un échantillon de 18 pays de la région MENA pour la période de 1984-2007 nous constatons que ni le secteur bancaire ni les marchés financiers ne contribuent à la croissance économique et qu'ils l'affectent même négativement. Adoptant l'approche d'estimation sur données de panel et celle des variables instrumentales (IV) nos résultats montrent l'importance de l'environnement institutionnel dans la détermination du développement financier de la région MENA. En outre, nos résultats montrent que la qualité des institutions a un important effet dans la relation entre développement financier et croissance économique. Plus précisement, elle permet d'atténuer l'effet négatif du développement financier sur la croissance économique. Par conséquent, nos résultats fournissent une évidence empirique, que pour que le développement financier puisse contribuer à la croissance économique, les pays de la région MENA doivent avoir un certain niveau de développement institutionnel. Examinant l'effet non-linéaire de la qualité des institutions sur la relation entre développement financier et croissance économique nos résultats montrent que la relation entre développement du secteur bancaire et croissance économique présente la forme du "U-inversé", par contre cette forme n'est pas observée lorsque les marchés financiers sont considérés.

Mots clés : Croissance économique, développement du secteur bancaire, développement des marchés financiers, qualité des institutions, région MENA, données de panel.

Abstract

This thesis examines (i) the impact of banks and stock markets on economic growth (ii) the effect of institutional quality in determining financial development and (iii) how institutional quality affects the finance-growth nexus in the MENA region. To this end, we construct a yearly institutional index for MENA countries. Applying the generalized-method-of-moments (GMM) estimators developed for dynamic panel data for a sample of 18 MENA countries over 1984-2007 period, we find that both bank and stock market development are unimportant or even harmful for economic growth. Considering both a panel data and the instrumental variable (IV) approaches of estimation, our results outlined the importance of institutional quality in determining financial development in MENA region. Moreover, our results show that institutional quality affects the finance-growth nexus in MENA countries. In fact, it mitigates the negative effect of financial development on economic growth. Therefore, our results provide empirical evidence that in order for financial development to contribute to economic growth, MENA countries must possess certain level of institutional quality. Examining the non-linear effect of institutional quality on the finance-growth nexus, our results show that banking sector development and growth exhibit an inverted-U shaped relationship. However, we do not find the same pattern in the stock market-growth relationship.

Keywords: Banking sector development, stock market development, economic growth, institutional quality, MENA region, panel data.