T.C.
DOKUZ EYLÜL ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İNGİLİZCE İKTİSAT ANABİLİM DALI
İNGİLİZCE İKTİSAT PROGRAMI
YÜKSEK LİSANS TEZİ

THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT IN THE EU MEMBER AND CANDIDATE COUNTRIES: EVIDENCE FROM DYNAMIC AND STATIC PANEL DATA MODELS

MÜKREMİN SEÇKİN YENİEL

Danışman
DOÇ.DR ADNAN KASMAN

2009

YEMİN METNİ

Yüksek Lisans Tezi olarak sunduğum "**The Relationship Between Economic Growth and Financial Development in the EU Member and Candidate Countries: Evidence From Dynamic and Static Panel Data Models**" adlı çalışmanın, tarafımdan, bilimsel ahlak ve geleneklere aykırı düşecek bir yardıma başvurmaksızın yazıldığını ve yararlandığım eserlerin kaynakçada gösterilenlerden oluştuğunu, bunlara atıf yapılarak yararlanılmış olduğunu belirtir ve bunu onurumla doğrularım.

…../…../2009

YÜKSEK LİSANS TEZİ SINAV TUTANAĞI

Öğrencinin

Adı ve Soyadı   : **Mükremin Seçkin YENİEL**
Anabilim Dalı   : **İngilizce İktisat**
Programı   : **İngilizce İktisat**
Tez Konusu   : **The Relationship Between Economic Growth and Financial Development in the EU Member and Candidate Countries: Evidence From Dynamic and Static Panel Data Models**

Sınav Tarihi ve Saati   :....../......./........ ......:......

Yukarıda kimlik bilgileri belirtilen öğrenci Sosyal Bilimler Enstitüsü'nün ………………….. tarih ve ………. sayılı toplantısında oluşturulan jürimiz tarafından Lisansüstü Yönetmeliği'nin 18. maddesi gereğince yüksek lisans tez sınavına alınmıştır.

Adayın kişisel çalışmaya dayanan tezini ………. dakikalık süre içinde savunmasından sonra jüri üyelerince gerek tez konusu gerekse tezin dayanağı olan Anabilim dallarından sorulan sorulara verdiği cevaplar değerlendirilerek tezin,

BAŞARILI OLDUĞUNA   O   OY BİRLİĞİ O
DÜZELTİLMESİNE   O*   OY ÇOKLUĞU O
REDDİNE   O**
ile karar verilmiştir.

Jüri teşkil edilmediği için sınav yapılamamıştır.   O***
Öğrenci sınava gelmemiştir.   O**

* Bu halde adaya 3 ay süre verilir.
** Bu halde adayın kaydı silinir.
*** Bu halde sınav için yeni bir tarih belirlenir.

                                                        Evet
Tez burs, ödül veya teşvik programlarına (Tüba, Fulbright vb.) aday olabilir.   O
Tez mevcut hali ile basılabilir.   O
Tez gözden geçirildikten sonra basılabilir.   O
Tezin basımı gerekliliği yoktur.   O

JÜRİ ÜYELERİ   İMZA

……………………………   □ Başarılı □ Düzeltme □ Red ……………...

……………………………   □ Başarılı □ Düzeltme □Red ……….............

…………………………..…   □ Başarılı □ Düzeltme □ Red ……….………

ABSTRACT
Master Thesis
The Relationship Between Economic Growth and Financial Development in the
EU Member and Candidate Countries: Evidence From Dynamic and Static
Panel Data Models
Mükremin Seçkin YENİEL

Dokuz Eylul University

Institute Of Social Sciences

Department of Economics (English)

This thesis takes both theoretical and empirical approach to study the relationship between financial development and economic growth. In theoretical part of the study, we examine the development and the motivations behind the theory and analyze the model which explains the link between financial development and economic growth. In empirical part of the study, we investigate the impact of stock markets and banks on economic growth using a panel data set on 29 European Union member and candidate countries for the period 1993-2007. We divide the data set into two sub-groups using the stages of economic development and examine the relation through static and dynamic regression analyses, panel cointegration analyses and causality analyses.

Static model regression results indicate that banking development affects economic growth more than stock markets development in developing economies and stock market development affects economic growth more than banking development in developed economies. Dynamic model regression results indicate that stock market development is more efficient both in developing and developed economies. Long run relationship between financial development and economic growth is examined by using Pedroni (1997, 1999) cointegration analysis and results support the existence of the relation. We examined the direction of causality between financial development and economic growth using both Granger (1969) causality and dynamic causality

approaches. In developing countries, a bidirectional casual relation exists between banking development and economic growth while there is only a unidirectional relation exists between stock market development and economic growth. In developed countries, the only casual relation exists between stock market development and economic growth.

Key Words: 1. Financial Development 2. Economic Growth 3. Dynamic Panel Analysis

ÖZET

Yüksek Lisans Tezi

AB üyesi ve Aday Ülkelerde Ekonomik Büyüme ve Finansal Gelişme Arasındaki İlişki: Dinamik ve Statik Panel Veri Analizi
Mükremin Seçkin YENİEL

Dokuz Eylül Üniversitesi
Sosyal Bilimleri Enstitüsü
İngilizce İktisat Anabilim Dalı
İngilizce İktisat Programı

Bu tezde finansal gelişme ve ekonomik büyüme arasındaki ilişki hem teorik hem de ampirik yaklaşımlarla incelenmiştir. Çalışmanın teorik kısmında finansal gelişme ve ekonomik büyüme arasındaki ilişkinin gelişimini ve finansal gelişme ile ekonomik büyüme arasındaki bağlantı incelenmiştir. Çalışmanın ampirik kısmında ise Avrupa Birliğine üye ve üyeliğe aday 29 ülkenin oluşturduğu panel veri seti ile sermaye piyasaları ve bankacılık sektörünün ekonomik büyüme üzerine etkileri 1993-2007 yılları için incelenmiştir. Çalışmaya konu olan ülkeler ekonomik gelişmişliklerine göre iki alt gruba ayrılmış ve ilişkinin incelenmesinde statik ve dinamik panel veri analizleri, panel eşbütünleşme analizi ve nedensellik analizleri kullanılmıştır.

Statik model regresyon sonuçları, gelişmekte olan ülkelerde bankacılık sektöründeki gelişmenin ekonomik büyüme üstünde daha etkili, gelişmiş ülkelerde ise sermaye piyasalarındaki gelişmenin ekonomik büyüme üstünde daha etkili olduğunu göstermektedir. Dinamik model regresyon sonuçları ise sermaye piyasasındaki gelişmelerin hem gelişmekte olan hem de gelişmiş ülke ekonomilerinde daha etkili olduğunu göstermektedir. Finansal gelişme ve ekonomik büyüme arasındaki uzun dönemli ilişkinin incelenmesinde Pedroni (1997, 1999) eşbütünleşme analizi yöntemi kullanılmış ve sonuçlar uzun dönemli ilişkinin varlığını desteklemiştir. Finansal gelişme ve ekonomik büyüme arasındaki nedensellik ilişkisinin incelenmesinde Granger (1969) nedensellik ve dinamik nedensellik yaklaşımları kullanılmıştır. Gelişmekte olan ülkelerde bankacılık sektöründeki gelişme ile ekonomik büyüme arasında iki yönlü bir

nedensellik tespit edilirken, sermaye piyasasındaki gelişme ile ekonomik büyüme arasında tek yönlü bir nedensellik tespit edilmiştir. Gelişmiş ülkelerde sadece sermaye piyasaları ile ekonomik büyüme arasında bir nedensellik tespit edilebilmiştir.

Anahtar Kelimeler: 1. Finansal Gelişme, 2. Ekonomik Büyüme, 3. Dinamik Panel Analizi.

THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT IN THE EU MEMBER AND CANDIDATE COUNTRIES: EVIDENCE FROM DYNAMIC AND STATIC PANEL DATA MODELS

CONTENTS

CHAPTER 1
INTRODUCTION

CHAPTER 2
THE ROLE OF FINANCIAL DEVELOPMENT IN AN ECONOMY

CHAPTER 3

EMPRICAL EVIDANCE ON FINANCE AND GROWTH

CHAPTER 4

DATA AND METHODOLOGY

CHAPTER 5
EMPRICAL RESULTS

LIST OF TABLES AND FIGURES

CHAPTER 1

INTRODUCTION

Achieving a faster economic growth and stability is one of the most important policy objectives for macroeconomic policy makers, which continues to be a major issue. Economic researchers, classical as well as endogenous growth proponents, have been trying to explain various mechanics of economic growth. Beginning with Bagehot (1873) and after Schumpeter (1911), and more recently Gurley and Shaw (1955, 1960 and 1967), McKinnon (1973) and Shaw (1973), the role of finance sector development in economic growth has been extensively studied and financial development is usually measured through improvement in quantity and quality of financial intermediation, and the efficiency of the provided financial intermediation.

On the other hand, some of the economists disagree about the role of the financial sector in economic growth. Finance is not seen as an important topic among "pioneers of the development economics", Nobel Prize winners and Nobel Laureates. For example, Robert Lucas (1988) features the role of finance sector as "over-stressed" and Merton Miller (1998), sees contributions of financial markets to economic growth, too obvious to discus. However, today economists, at least, agree on the important role of finance sector activities on economic development. Financial intermediaries and markets arise to provide important financial services. Such as production of information about possible investments, monitor investments and exert corporate governance, management of risk, mobilize and pool savings, and ease exchange of goods and services. The existing literature explains the importance of financial intermediation services intuitively.

Although the importance of finance in economic growth is now more widely accepted, the direction of causality between financial development and economic growth has not been empirically resolved. Theoretically there are three possible casual relations. The first – called as 'demand following' – views the demand for financial services as dependent upon the growth of real output and upon

the commercialization and modernization of agriculture and other subsistence sectors (Patrick ,1966). Thus the creation of modern financial institutions, their financial assets and liabilities and related financial services are a response to the demand for these services by investors and savers in the real economy.

The second causal relationship between financial development and economic growth is termed as 'supply leading'. 'Supply leading' has two functions: to transfer resources from the traditional, low-growth sectors to the modern high-growth sectors and to promote and stimulate an entrepreneurial response in these modern sectors (Patrick ,1966). This implies that the creation of financial institutions and their services occurs in advance of demand for them. Thus the availability of financial services stimulates the demand for these services by the entrepreneurs in the modern, growth-inducing sectors.

The third one came after emergence of the so-called new theories of endogenous economic growth, which has given a new impetus to the relationship between growth and financial development as these models postulate that savings behavior directly influences not only equilibrium income levels but also growth rates. It is the bi-directional relationship between economic growth and financial development.

In view of the papers stated above, this study investigates the link between financial development and economic growth in the 29 European Union member and candidate countries except for FYR Macedonia for the period 1993-2007. Additionally, we divide the sample into two sub-groups, using the stages of economic development. In this manner, EU 15 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom) countries consist the economically advanced group, while 10 transition countries (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia) with candidate countries (Croatia and Turkey) consist developing group. The contribution of this thesis is two-fold: First, we investigate the relation between financial development

and economic growth through cointegration and causality analysis. Second, we use two samples in order to distinguish the difference between developed and developing countries.

At this point, of the study it would be informative to examine financial market integration and draw a general picture financial market for each country as in the following sub-sections.

1.1 A BRIEF HISTORY OF EUROPEAN UNION AND FINANCIAL MARKET INTEGRATION

On March 25, 1957 six countries (Belgium, France, Germany, Italy, Luxembourg, and the Netherlands) signed the treaty for the establishment of the European Economic Community (EEC). Enlargement of the European Union has occurred six times. Thus, since 1957 the number of EU Member States has increased to twenty-seven. The largest enlargement occurred on May 1, 2004, when 10 new countries became members of the European Union (EU). By the last enlargment, Bulgaria and Romania joined the union on January 1, 2007.

As it is stated above, the Treaty of Rome entered into force, establishing the European Economic Community (EEC), which later becomes the European Community (EC). On January 1 1973 (First Enlargement); Denmark, Ireland, and the United Kingdom join to the EC (Norway signed the treaty but failed to ratify due to a negative opinion in a national referendum on accession). On January 1 1981 (Second Enlargement); Greece accedes to the EC in 1985. On January 1 1986 (Third Enlargement); Portugal and Spain accede to the EC. On November 1 1993; The Maastricht Treaty took effect, formally establishing the European Union. On January 1 1995 (Fourth Enlargement); Austria, Finland, and Sweden, accede to the EU. On May 1 2004 (Fifth Enlargement); Comprising the largest number of countries ever admitted in one enlargement, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia accede to the EU at a ceremony in Dublin. Finally on 1 January 2007 as a second part of the fifth enlargement process ; Bulgaria and Romania become members of the EU.

Today the EU is the most complex economic union in the world and after each enlargement process a serious harmonization process has also occurred. During these harmonization processes the main purpose is eliminating legal and structural differences among member states and creating a fully integrated market. At this point, integration of financial markets is fundamental due to the broader process of market integration and will facilitate progress in other areas. As we mentioned earlier it would be useful to understand this process briefly, since the main objective of this study is to examine the differences between developed and developing members in terms of financial intermediation. Taking into account the legal and economic differences, we focus on the relation between economic growth and financial development in the EU member and candidate countries. Particularly, we divide our sample into two sub-groups; developed and developing economies. Hence, we also give a brief summary about the integration period during the sample period.

As it is stated by Economic Research Europe Ltd. (1996), until the mid-1980s most EU banking systems were highly regulated. Interest rate regulations still existed in most of the EU countries with the exception of Germany and the Netherlands which were fully deregulated in 1981 and the UK that deregulated in 1979. Also capital controls were not deregulated in Belgium, France, Greece, Ireland, Italy, Portugal and Spain. Moreover, banks branching were restricted in France, Italy and Portugal, and since there was a capital requirement at the branch level in most of the countries, competition through branching was less efficient.

During the last couple of decades most of the regulations and constraints imposed on banks by national authorities have been reduced systematically. This process has occurred in two ways. First, EU member states have made a pre-emptive movement to deregulate the banking industry by eliminating any restrictions on interest rates. Second, there has been a process of harmonization which facilitates operations of all credit institutions in different member states. The main institutional changes related to the harmonization of the banking industry in the EU, which serve as a framework for the construction of a harmonization process, can be summarized as follows.

The first step in the harmonization process was the adoption of Council Directive 73/183, which given in 1973 and removed all the restrictions on freedom of establishment and provision of financial services by credit institutions in other member states. The next step was the First Banking Directive (77/780), in which a credit institution defined as 'an undertaking whose business is to receive deposits and other repayable funds from the public and to grant credit for its own account'. After the adoption of the Second Banking Directive (89/646, SBD hereafter) an important progress was made in which an effective minimum degree of harmonization of rules combined with the principle of mutual recognition and home country control. By the adoption of the SBD some minimum prudential standards was set and capital requirements were taken from the branches and applied to the bank level. As a result, the cost of opening new offices reduced.

Capital flows liberalization and the application of the mutual recognition principle were expected to increase cross-border banking activity, by giving rise to intensified competition and higher risk-taking. Therefore, the SBD call for more Directives on setting additional prudential standards and regulatory measures to protect the interest of consumers of financial services, on improving the disclosure of information as well as providing the well-functioning of payment systems. Additionally, since the SBD grants the 'single passport' on the basis of the institutional definition of an undertaking, the principle of mutual recognition have extended in two ways. On the one hand, allow non-bank subsidiaries of banks and on the other, intends further Directives applied to investment firms and undertakings for collective units of transferable securities (UCITS). The Investment Services Directive (93/22) regulates investment services and securities brokerage, and Directive 85/611 amended by Directive 88/220 regulates UCITS's business.

More recently, Directive 2000/12 amended by Directive 2000/28 has provided a comprehensive and unified code on the taking up and pursuit of business of credit institutions. This is one of the multiple initiatives that the Financial Services Action Plan endorsed in 1999 put forward with the aim of achieving a single market

for wholesale financial services, securing the retail financial sector as well as adopting state-of-the-art prudential rules and supervisory procedures by 2005. As a result, the process of full integration of wholesale markets can be seen as complete while the retail-banking sector is in the process of realization.

1.2 AN ANALYSIS OF FINANCIAL SECTORS IN THE EU MEMBER AND CANDIDATE CIUNTRIES

In this sub-section, we will introduce some selected measures of monetization and financial development in order to draw a broad picture of financial sectors of the EU member and candidate countries during the period from 1995 to 2007. We divide sample period in three-sub periods; 1995-1998, 1999-2002 and 2003-2007 and choose to analyze six commonly used measures of financial intermediation. These measures are: the ratio of M2 to GDP, ratio of Central Banks' assets to GDP, ratio of commercial banks' assets to GDP, ratio of total banking system assets to GDP, ratio of market capitalization to GDP and ratio of total value of stocks traded to GDP. The summary statistics of these measures for the EU 15 and transition and candidate countries are presented in Table 1 and Table 2, respectively. Table 3, however summarizes the average values of these measures for each group of country.

Before examining the Tables it would be useful to analyze the significance of these variables. The ratio of M2 to GDP is the traditional measure of financial intermediation and captures the degree of monetization in the system and indicates the financial intermediation activity indirectly. The ratio of Central Banks' assets to GDP, ratio of commercial banks' assets to GDP, and the ratio of total banking system assets to GDP are also an indirect measure of financial intermediation. However, it is very important to show the participation of central bank in financial intermediation. According to the theory, since commercial banks operate in market mechanism and under the pressure of competition, they perform in a more efficient manner. The last two indicators, the ratio of market capitalization to GDP and the ratio of total value of stocks traded to GDP show stock market development.

In Table 1 the of M2 to GDP is less than one only for six countries (Austria, Denmark, Finland, Greece, Italy, Sweden) and increasing for all countries during the period. The ratio of Central Banks' assets to GDP represents the government side financial intermediation activities. It is very low in all countries and decreases over the period. The ratio of commercial banks' assets to GDP indicates commercial banks role in financial intermediation and it is also pretty high for most of the countries and greater than one except Finland and Sweden. When we compare this ratio with the ratio of total banking assets they are almost the same which again indicates limited role of government in financial intermediation in developed countries. The last two indicators indicate that increase in stock market activity is very sharp. Although, for some countries we observe a decrease in second period, in average both the ratio of market capitalization to GDP and ratio of total value of stocks traded to GDP nearly doubled in most countries during the period.

Table 2 presents the measures for each transition and candidate country. The ratio of M2 to GDP is less than one for almost all of the countries except Malta and Cyprus and increase for all countries during the sample period. However, while this increase is very small for some countries for others such as Croatia, Estonia, Latvia, Lithuania and Turkey, it is significantly high. Ratio of Central Banks' assets to GDP represents the government participation of the financial intermediation activities and decreases during the sample period except Cyprus. However, during the sample period the ratio decreased from 0.40 to 0.04 in Hungary. The ratio of commercial banks' assets to GDP indicates commercial banks role in financial intermediation and it is not as high as the EU 15 countries as it is expected. The last two indicators indicate stock market activity and increase in stock market activity for developing countries is not as sharp as in EU 15 countries.

In Table 3, average values of the selected measures are presented. All of the measures except the ratio of M2 to GDP indicate that there is a huge difference between developed and developing countries in the light of this limited perspective. Hence, the main objective in this thesis is to examine the relationship between financial development and economic growth in these two groups. We also investigate

the differences in two groups with respect to the relationship between two variables and check whether these differences decreased during the sample period.

Table 3.Selected measures of monetization and financial development in the EU 15 countries, 1995-2007

	Austria			Belgium			Denmark			Finland			France		
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07
M2/GDP	0,43	0,50	0,69	0,85	1,02	1,20	0,42	0,40	0,50	0,52	0,52	0,56	0,68	0,87	0,93
Assets/GDP															
Central Bank	0,004	0,006	0,007	0,010	0,004	0,003	0,018	0,014	0,012	0,007	0,001	0,0001	0,009	0,003	0,003
Commercial Banks	1,265	1,221	1,227	1,491	1,237	1,082	0,39	1,58	1,66	0,622	0,605	0,6902	1,007	1,026	1,059
Total Banking System	1,269	1,208	1,215	1,502	1,242	1,084	0,41	1,59	1,67	0,629	0,607	0,6903	1,016	1,029	1,063
Market Capitalization of Listed Companies (% of GDP)	15,25	14,75	42,39	57,91	68,44	79,28	45,43	56,755	72,43	65,24	190,6	116,7	46,38	91,04	89,8
Stocks Traded, Total Value (% of GDP)	8,37	4,22	16,87	12,11	17,71	33,80	25,29	41,662	54,60	26,94	132,4	149,1	27,31	70,04	89,2

	Germany			Greece			Ireland			Italy			Luxemburg		
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07
M2/GDP	0,69	1,31	1,37	0,58	0,75	0,88	0,76	1,16	1,36	0,55	0,58	0,61			
Assets/GDP															
Central Bank	0,007	0,003	0,002	0,21	0,14	0,10	0,003	0,002	0,000	0,094	0,058	0,046	0,009	0,000	0,002
Commercial Banks	1,360	1,453	1,412	0,68	0,84	0,94	0,786	1,047	1,236	0,777	0,913	1,006	1,005	1,162	1,131
Total Banking System	1,366	1,455	1,414	0,89	0,97	1,04	0,789	1,049	1,236	0,871	0,971	1,053	1,013	1,162	1,134
Market Capitalization of Listed Companies (% of GDP)	34,67	56,15	50,40	24,82	76,76	57,56	55,40	69,42	60,83	28,71	54,33	47,60	168,01	141,0	191,4
Stocks Traded, Total Value (% of GDP)	28,48	57,62	69,88	13,14	56,91	26,76	26,00	28,97	34,88	17,89	52,33	67,44	3,17	3,55	0,74

	Netherlands			Portugal			Spain			Sweden			United Kingdom		
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07
M2/GDP	0,81	1,12	1,27	0,97	1,00	1,06	0,71	0,96	1,31	0,44	0,45	0,47	0,82	1,09	1,23
Assets/GDP															
Central Bank	0,007	0,004	0,001	0,016	0,003	0,002	0,038	0,023	0,020	0,033	0,008	0,000	0,034	0,024	0,021
Commercial Banks	1,151	1,510	1,699	0,990	1,354	1,537	1,033	1,137	1,297	0,441	0,709	1,101	1,166	1,274	1,464
Total Banking System	1,157	1,514	1,700	1,006	1,357	1,539	1,071	1,161	1,318	0,474	0,716	1,101	1,201	1,298	1,485
Market Capitalization of Listed Companies (% of GDP)	111,69	135,34	103,63	31,30	45,55	45,24	47,45	75,33	98,33	95,62	115,8	120,6	146,6	162,03	140,91
Stocks Traded, Total Value (% of GDP)	79,66	163,92	151,77	17,18	30,33	31,81	61,45	143,92	144,72	59,87	120,2	145,8	59,42	118,09	207,5

Table 4.Selected measures of monetization and financial development in transition and candidate countries, 1995-2007

	Bulgaria			Croatia			Cyprus			Czech Republic			Estonia		
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07
M2/GDP	0,51	0,38	0,57	0,35	0,54	0,68	0,93	1,10	1,21	0,67	0,66	0,70	0,27	0,35	0,44
Assets/GDP															
Central Bank	0,095	0,080	0,052	0,002	0,001	0,000	0,124	0,117	0,142	0,013	0,023	0,018	0,001	0,001	0,001
Commercial Banks	0,437	0,179	0,338	0,481	0,533	0,664	0,966	1,250	1,402	0,719	0,538	0,493	0,192	0,253	0,254
Total Banking System	0,532	0,259	0,390	0,483	0,535	0,665	1,090	1,368	1,545	0,732	0,562	0,511	0,192	0,361	0,361
Market Capitalization of Listed Companies (% of GDP)	2,08	4,69	17,87	13,49	15,46	38,06	25,59	57,23	48,05	24,84	18,80	28,06	15,83	30,55	37,92
Stocks Traded, Total Value (% of GDP)	0,03	0,625	2,81	0,90	0,66	1,83	4,48	52,19	7,03	10,08	7,99	17,95	23,33	4,44	7,93
	Hungary			Latvia			Lithuania			Malta			Poland		
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07
M2/GDP	0,47	0,46	0,49	0,23	0,29	0,43	0,19	0,25	0,42	1,27	1,41	1,50	0,34	0,42	0,44
Assets/GDP															
Central Bank	0,406	0,161	0,046	0,013	0,013	0,011	0,000	0,000	0,000	0,047	0,006	0,006	0,035	0,023	0,002
Commercial Banks	0,344	0,393	0,536	0,138	0,220	0,408	0,148	0,176	0,259	1,166	1,394	1,429	0,280	0,347	0,387
Total Banking System	0,750	0,554	0,582	0,151	0,233	0,419	0,149	0,176	0,259	1,213	1,399	1,435	0,315	0,371	0,389
Market Capitalization of Listed Companies (% of GDP)	19,91	24,54	28,63	3,54	7,15	12,89	9,90	11,14	28,42	13,77	43,36	56,87	7,07	16,01	29,94
Stocks Traded, Total Value (% of GDP)	13,72	18,32	16,15	0,95	1,71	0,92	1,34	1,86	2,87	0,79	4,10	2,06	3,95	5,51	7,88
	Romania			Slovak Republic			Slovenia			Turkey					
Financial Indicators	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07	95-98	99-02	03-07			
M2/GDP	0,32	0,30	0,32	0,59	0,62	0,54	0,40	0,49	0,53	0,18	0,19	0,28			
Assets/GDP															
Central Bank	0,02	0,01	0,00	0,036	0,002	0,010	0,006	0,003	0,004	0,038	0,067	0,132			
Commercial Banks	0,20	0,11	0,11	0,566	0,635	0,544	0,366	0,451	0,527	0,237	0,416	0,409			
Total Banking System	0,22	0,12	0,11	0,602	0,637	0,554	0,371	0,454	0,531	0,274	0,482	0,541			
Market Capitalization of Listed Companies (% of GDP)	1,16	5,15	18,20	7,31	6,57	9,54	6,08	14,34	29,08	13,98	27,50	27,87			
Stocks Traded, Total Value (% of GDP)	0,73	0,76	1,96	7,42	3,62	1,42	2,17	3,52	3,08	20,84	42,46	37,02			

Table 5. Average values of the selected measures for two groups

Financial Indicators	EU 15 Countries	Transition and Candidate Countries
M2/GDP (%)	76	54
Assets/GDP (%)		
Central Bank (%)	2,2	4,2
Commercial Banks (%)	110	49
Total Banking System	112	54
Market Capitalization of Listed Companies (% of GDP)	80,99	20,43
Stocks Traded, Total Value (% of GDP)	60,73	8,31

A growing literature exists on the relationship between economic growth and financial development. However, this paper differs from the existing literature we divide sample into two sub groups; old members (EU 15), and new members and candidate countries. Dividing the sample countries is important since legal and economic differences are significant between two groups. Hence, in this study we focus on the relationship between financial development and economic growth, and the differences between these two groups. Furthermore, as many economic relationships are dynamic in nature, we question. We use both the Generalized Method of Moments (GMM) dynamic panel models and Ordinary Least Squares (fixed effects) models to investigate the relationship.

The plan of the paper is as follows: Chapter 2 explains the role of financial intermediation in economic growth. Chapter 3 gives a review of existing empirical literature on finance and growth. Chapter 4 gives details of the data and discusses the econometric methodology. Chapter 5 reports the empirical results and Chapter 6 concludes.

CHAPTER 2

THE ROLE OF FINANCIAL DEVELOPMENT IN AN ECONOMY

The costs of acquiring information, enforcing contracts, and making transactions create incentives for the emergence of particular types of financial contracts, markets and intermediaries (Levine, 2002: 4). Under different circumstances different types of financial contracts, markets and intermediaries emerge across countries. The role of financial intermediation can be best explained by defining functions or mechanisms of the financial system, and how these functions influence savings and investment decisions and as a result economic growth. It is possible to organize these mechanisms as, (i) funds pooling mechanism, (ii) risk diversification mechanism, (iii) liquidity provision mechanism, (iv) screening mechanism, and (v) monitoring mechanism. Each of these financial mechanisms ameliorates market frictions in different ways. However, it is possible to define three main channels that how financial intermediation affects growth; (1) increasing savings; (2) tunneling savings to investment; and (3) improving the allocation of resources.

Figure 1. Link between financial development and economic growth[1]
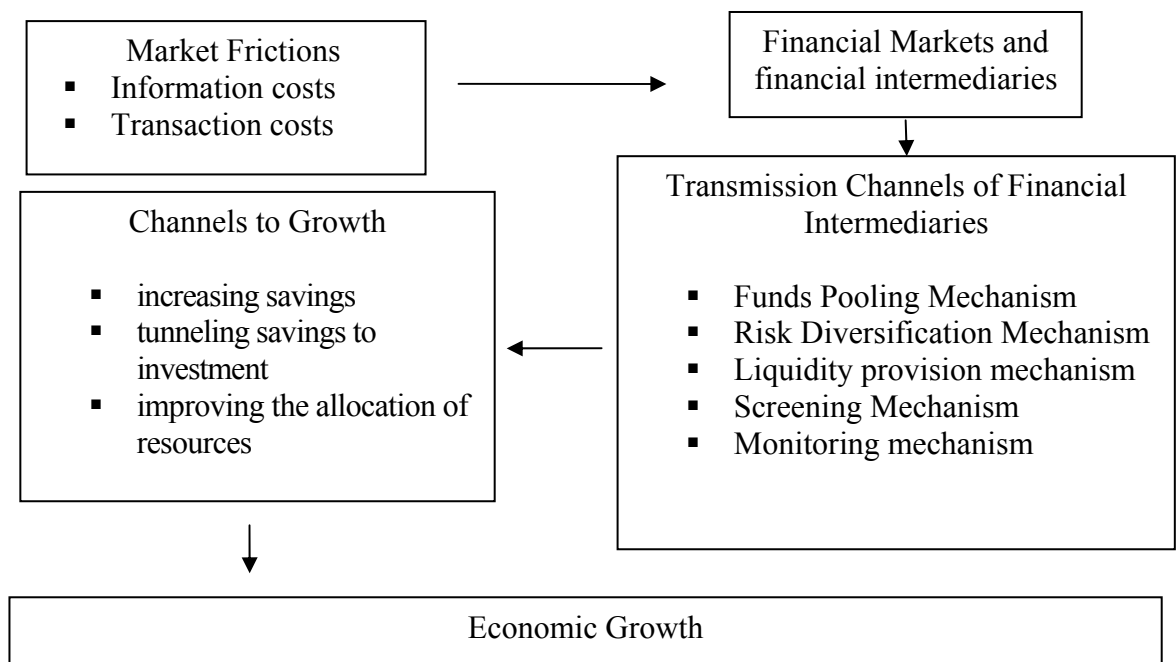
In the following sub-sections we will first analyze the transmission channels of financial Intermediaries, second examine how these mechanisms stimulate economic growth and finally causality of the relation will be examined.

2.1 TRANSMISSION CHANNELS OF FINANCIAL INTERMEDIARIES

Early contributions of Goldsmith (1969), McKinnon (1973), Gurley and Shaw (1955 and 1960) on the role of financial intermediaries were highly descriptive. In recent years, some studies have tried to explain the role of financial intermediation services in real economic activity in the context of a formal model such as Bencivenga and Smith (1991) and Levine (1997 and 2002). These recent contributions emphasize different channels through which the financial system affects savings and investment, and therefore economic growth.

2.1.1 Funds Pooling Mechanism

Funds pooling mechanism is the first channel through which financial intermediaries affect an economy. Financial intermediaries pool together funds from many small savers and create a large quantity of funds available to borrowers. By doing so, financial intermediaries improve the allocation of resources. Bank loans play an important role in investment and the real economy and it is possible to explain this, both from savers and consumers side. This is a fact that most of the high-returns projects required a large amount of investment and without financial intermediaries, especially without banks it is almost impossible for small savers to invest on these projects. On the other hand, large companies generally have more options to finance their projects such as issuing their own securities or finding international partners. However, for most of the companies, especially in developing countries, the only way of financing their investments is approaching a bank. If they do not obtain a loan from a bank, they can not borrow at all. Therefore, banks play an important role in investment and the real economy.

The importance of financial intermediaries in pooling funds is clear and it is also possible to explain why financial intermediaries especially banks are much more

---

[1] Adapted from Kularetne (2001;11)

efficient theoretically. Many factors have been identified to explain this and the most important ones can be defined as economies of scale, economies of scope, and economies of specialization.

Banks operate in a larger scale which creates a cost advantage. Any transaction occurs between borrowers and lenders involve a cost. The lender has to collect enough information about the borrower's credibility and income potential to assess his credit-worthiness. In the next step, a financial contract concerning repayment schedules and other conditions would be prepared. After the transaction takes place, the lender must monitor the borrower's performance. These information and transactions costs are often too high for individual lenders. It is possible to define this situation as market frictions which create a demand for financial intermediary services and at this point financial intermediaries arise to reduce such costs. With their larger scale of operations and their expertise in lending procedures, banks can operate at a much lower cost and hence a lower interest rate than individual lenders. As a result, banks play a major role in lending services.

Economies of scope is also an other important determinant that financial intermediaries can provide different financial options for different projects. It is more efficient to provide lending services in conjunction with other financial services and by this way financing investments and projects become easier and more efficient.

Finally, consider about economies of specialization. Through accumulating expertise, increasing knowledge on their operations and improving customer relationships over time banks increase their operational efficiency. Financial intermediaries specialize in pooling funds and making loans, especially to small firms. Banks develop expertise in evaluating potential borrowers, making financial contracts, and monitoring borrowers' behavior after the lending. By this way, they also establish long-term relationships with the customers.

Overall, financial intermediaries' services on pooling funds have a potentially powerful impact on economic activities. More specifically, financial intermediaries not only finance investments or projects that would possibly not take place otherwise, but

also improve the efficiency of investment by providing savers with investment opportunities in large projects and making more of these projects real.

2.1.2 Risk Diversification Mechanism

Risk diversification is the second mechanism through which financial intermediaries affect the economy. Every project or investment incurs a risk and in general high return projects are more risky which makes it difficult to find finance for them. However, financial intermediaries reduce these risks by holding diversified portfolios. By doing so, they make higher-return but more risky investments available to small savers, improve the efficiency of resource allocation, and thus promote economic growth.

Although more risky projects generally create higher returns than low-risk projects investors might not want to take on too much risk unless they are effectively insured. Thus, savers discouraged from lending because of default risks. Without financial intermediaries, many high-risk, high-return projects would not be realized. As a result, risks lower investment level and efficiency which in turn lower economic growth. Financial intermediaries may arise to help savers to diversify these risks. Savers would like to hold diversified portfolios to reduce risks, and financial intermediaries can provide such portfolio diversification services. Banks reduce investment risk by holding a portfolio of loans to many entrepreneurs with different types of risk. In addition, banks can offer these services at lower cost than individual savers can manage.

Many studies have examined how the financial intermediaries would affect resource allocation through risk diversification. Such as Gurley and Shaw (1955, 1960 and 1967) state that as the financial intermediaries developed, default risk of investments would be reduced through portfolio diversification, which will, in turn, increase financial saving and improve its productive use. Recently, endogenous growth models have been applied to study this issue. Important papers include Greenwood and Jovanovic (1990), Levine (1991, 1992a). These studies use endogenous models in which financial institutions that provide risk diversification tend to channel funds to the investment projects that yield the highest return. Thus, through diversified portfolios, financial intermediaries can affect long-run economic growth by improving capital productivity.

As a result, in the absence of financial intermediaries, risk-averse agents would prefer technological flexibility to high productivity. Financial markets, in contrast, provide agents with a diversified portfolio to insure themselves against negative demand shocks and, at the same time, to choose the more productive technology.

2.1.3 Liquidity Provision Mechanism

In addition to productivity and default risks another important type of risks is liquidity risk. Liquidity can be defined as an asset's ability to be easily converted through an act of buying or selling without causing a significant movement in the price and with minimum loss of value. Similar to the productivity and default risks, liquidity risk also discourages savers about making investments and thus, lowers economic growth. At this point financial intermediation activities again play an important role by providing liquidity management which in turn improve efficiency of investment and, therefore, increase economic activity.

High-return projects not only include higher risk but also required long run commitment of capital which means that they are illiquid. Illiquidity is not preferable thing from savers perspective because savers do not like to relinquish control of their savings for long periods. More specifically, if savers had to choices that investing an illiquid, high-return project and a liquid, low-return project, they probably choose to invest on liquid project, because they face uncertain liquidity needs. Individuals are subject to liquidity shocks, which they might need access to their savings before the illiquid project matures and without financial intermediaries, some savers may be forced to liquidate their investment. However, in this case removal of the invested capital will result in a very low return due to the interruption in production. As a result, in the absence of the financial intermediaries, investors would prefer to hold assets that are liquid to avoid receiving a low return when uncertain liquidity needs arise. These investments in liquid low-return projects reduce efficiency of investment and therefore the performance of an economy.

Cost of information and transactions would increase liquidity risk which creates a motivation for the emergence of financial intermediaries that reduce liquidity risk. By diversifying liquidity risks among projects financial intermediaries can provide liquidity to savers. Thus, savers obtain an opportunity to invest high return projects. In particular, with financial intermediaries, savers can hold liquid assets - like demand deposits - which they can quickly and easily sell when they need. At the same time, intermediaries transform these liquid financial instruments into long-term capital investments in illiquid projects which enhance investment efficiency by providing access to long-term projects through liquidity management.

Relationship between liquidity management and economic growth has been studied and these studies indicate that a better liquidity management would provide financial intermediaries more productive investment options which promote economic growth. For example, Diamond and Dybvig (1983) model the emergence of financial markets in response to liquidity risk in which liquidity risk creates incentives to invest in the liquid and low-return projects. According to the model, it is prohibitively costly that verifying whether an individual has received a shock or not and this information cost creates an incentive for financial markets to emerge. As stock market transactions costs fall, more investment occurs in the illiquid, high-return project. Similarly, Levine (1991,1992a) also shows that liquidity risk would lead equity markets to arise, and examines how they affect investment incentives and economic growth.

In addition to the stock markets, other financial intermediaries may also diversify liquidity risk. For example, Bencivenga and Smith (1991) create a model in which banks provide liquidity management. By offering liquid deposits to savers and invest in portfolios which consist both low- return and illiquid high-return projects. Banks provide demand deposits and choose a particular mixture of liquid and illiquid investments, by doing so banks provide insurance to savers against liquidity risk, while simultaneously channeling savings to long-run high-return projects.

2.1.4 Screening Mechanism

Screening mechanism is the fourth mechanism and up to now we examined three mechanisms funds pooling, risk diversification, and liquidity provision. However, before examining last two mechanisms it would be useful to explain imperfect information problem briefly.

Many studies indicate that information in financial markets is imperfect and this situation restricts efficiency of financial system. According to Stiglitz and Weiss (1981), costs of acquiring information about borrowers' risk is very high and most of the time it would be pretty difficult, by this reason lenders are not fully informed about the risk of the investment and loan contracts are assumed to allow the possibility of failure. If the investment fails, overall return on lending decreases. In particular, under this assumption higher interest rates would lead firms to invest on more risky projects with lower possibility of success. This situation is usually called as incentive effect. As a result, expected return on a lender's loan portfolio will reduced.

Therefore, as a result of imperfect information, higher interest rates may cause the adverse selection problem. High interest rates discourage investors from seeking loans and those who still willing to pay high interest rates would probably be the low quality firms. Thus, high interest rates would change the proportion of borrowers in loan portfolio by replacing more risk-averse borrowers with less risk-averse ones, which in turn increase the possibility of failures and, thus, decreased the expected return of the lenders. However, this problem would be totally eliminated by informing lenders about all the risk of the projects.

At this point moral hazard problem may also arise because it is not always in firms' best interest to behave honestly. Managers may not report truthfully about the risk level of the projects or make decisions and practices that are not in savers' best interests. At this point it is very costly and difficult for lenders to monitor borrowers' performance which creates an incentive for financial intermediaries to provide these services.

Both adverse selection and moral hazard problems may stimulate lenders not to raise interest rates but rather ration credit to borrowers. Credit rationing results in an excess demand for loans in the market and, therefore, some productive investment projects can not be financed. Thus, imperfect information conditions lead to limitations in financing the economy, which have detrimental effects on long-term growth.

After discussing how imperfect information leads to credit rationing it can be said that efficiency of loan funds depends significantly on the screening and monitoring functions of the financial system. Financial intermediaries gather information, evaluate projects and monitor borrower's performance after providing loan. By doing so, they improve the efficiency of investment.

The screening mechanism is in order when financial intermediaries select investment projects and channel funds to the most profitable ones. Since, there is imperfect information in credit market, it would be costly for individual savers to evaluate investments projects. Collecting and processing information about firms, managers and economic conditions is not an easy job for an ordinary individual. Consequently, high information costs create incentives for financial intermediaries to emerge. Due to economies of scale, financial intermediaries can economize on the costs of acquiring and processing information. By so doing, financial intermediaries improve resource allocation.

The screening mechanism is exemplified by Bernanke (1983) that there are two extreme type of small borrowers, a good one and a bad one. The good one seeks loans to undertake investment projects and will pay back the loans. However, the bad one has no project and will take the money and run. At this point, there is a cost associated with identifying good borrowers from bad ones prior to investing in them and financial intermediaries differentiate between good and bad borrowers. As a result, financial intermediaries provide a channel to improve investment efficiency through the screening mechanism.

2.1.5 Monitoring Mechanism

The fifth and last mechanism is the monitoring mechanism. In the screening mechanism financial intermediaries evaluate projects and make decisions whether these projects reliable or not. In the monitoring mechanism, on the other hand, financial intermediaries ensure that whether lenders' funds are used in the way promised by the borrower or not. Since, imperfect information exists in the credit market monitoring mechanism plays a significant role in borrowers' incentive to behave truthfully and make decisions through the lenders' interest.

It is very difficult to explain the importance of monitoring services without the concept of imperfect information. Financial intermediaries reduce costs of acquiring information and channeling savings to investment projects and after the loans are made, imperfect information problem still exists. In particular, borrowers might not have the incentive to behave the way they have promised and it would be too costly for individual savers to monitor borrowers' performance. Individuals may have to rely on publicly available information rather than gathering information themselves.

Monitoring costs is an important incentive for financial intermediaries to arise. They collect information about borrowers' operations and make interferences if it is necessary to improve their performance. In addition to collecting information they also collect from borrowers who do not repay in full on time. Furthermore, financial intermediaries develop long-term relations with their customers and long-term customers would generally have more incentive to fulfill commitment which may further help financial intermediaries to monitor borrowers' performance. In addition, over time financial intermediaries would create a memory or database about the bad costumers and they do not need to investigate every time. As a result, financial intermediaries perform an important role in mediating divergent incentives between lenders and borrowers that arise from imperfect information.

So far we have presented five transmission mechanisms of the financial system funds pooling, risk diversification, liquidity provision, screening and monitoring. Next, we discuss three main channels through which financial intermediation affects growth.

2.2 FINANCIAL INTERMEDIATION SERVICES

We have discussed five transmission mechanisms of the financial system in the previous sub-section. In this sub-section we discussed three main channels : (1) increasing savings; (2) tunneling savings to investment; and (3) improving the allocation of resources. We discussed them below.

2.2.1 Increasing Savings

Generally the most important service of the financial intermediation is accepted as the channeling savings to investments. However, before channeling savings financial system has to increase savings level. At this point, financial intermediaries are able to provide savers with a relatively higher yield, and therefore stimulate savings by pooling funds, diversifying risks, liquidity management, screening and monitoring.

Many studies have examined financial intermediaries' role in increasing savings. McKinnon (1973) and Shaw (1973) emphasize the role played by financial intermediation in increasing savings and, hence, investment. According to these studies financial development not only increase capital productivity but also the saving rate and by doing so, investment level and economic growth. Additionally, they also state that repression policies would result in negative real interest rates and will reduce savings level. Moreover, Shaw also highlighted that an increase in savings level would promote financial intermediation activities in turn. As a result, both of the studies argue that financial intermediation activities would lead an increase in real interest rates which will increase the savings level.

2.2.2 Tunneling Savings to Investments

In addition to the role in increasing saving level financial sector also plays a significant role in channeling funds to the investments. As it is states in the previous sub-section financial intermediaries collect savings from their customers and create a fund, it can be seen as the first step. In the second step, financial intermediaries and markets perform one of the most important and vital economic function by channeling funds from lenders to borrowers. By doing so, financial sector promotes economic growth through increasing productivity and efficiency of overall economy.

Gurley and Shaw (1955, 1960 and 1967) explicitly stress the importance of financial intermediation in channeling savings to investment. In particular, financial intermediation helps many entrepreneurs to make their projects real. In the absence of financial intermediation activities, number of investments and projects would be reduced because only the individuals who have enough resources can realize their projects which in turn restrict the possible economic activity and economic growth. Thus, without financial intermediaries mobilizing and allocating scare resources, even the best investment projects would either be constrained to economically inefficient scales or never occurs.

Mobilizing savings of many individual savers is very costly and almost impossible without financial intermediaries. Because as we mentioned in previous sections it includes overcoming the imperfect information problems and a complex structure of risk. It is possible to define these risks as productivity risk, default risk and liquidity risk. First, productivity risk, that is, firms are subject to sector-specific productivity shocks. Second, default risk, that is, some firms are "bad" in the sense that they default their commitments either by taking money but not producing, or by not repaying the banks after they produce. Third, liquidity risk, that is, some agents face uncertain liquidity needs, and their premature liquidation results in low return. At this point, financial intermediaries provide five fundamental functions or mechanisms (risk diversification, liquidity management, screening and monitoring) in order to eliminate these risks as far as possible.

Furthermore, financial intermediaries transform savings into investments by reducing information and transactions costs. It is possible to explain this by using three main factors. The first one is the economies of scale that the information and transactions costs per dollar of investment decrease as the size of transactions increases. The second one is developing expertise that financial intermediaries specialize in acquiring legal advice and related technology. As a result, they would have a cost advantage on providing financial services. In other words, learning-by-doing plays a significant role in decreasing information and transactions costs. The third and last one is the long-term relationships that financial intermediaries build-up over time which make it easier to screen out good from bad credit risks, thereby decreasing information and transactions costs.

Overall, financial intermediaries pool funds from savers and allocate credits to investors and accumulation of capital through investments is vital to economic growth. Thus, a financial system that is more effective at channeling savings to investment can profoundly affect economic development.

2.2.3   Improving the Allocation of Resources

Increasing savings level and channeling these savings to the investments are important factors in promoting economic activities. However, improving quality of the allocation of resources is also an important factor in economic growth. In previous sub-section we emphasize the importance of channeling savings to investments. In this sub-section we will emphasize on another important factor that how this channeling activity creates a more efficient resource allocation.

Financial intermediaries improve resource allocation through five fundamental mechanisms. These are; (1) funds pooling, that is, creating funds for projects; (2) risk diversification, that is, overcoming a complex structure of risk by holding diversified portfolios; (3) liquidity management, that is, providing liquidity to investment projects; (4) screening, that is, gathering and evaluating information on projects to lower the probability of investing in bad production processes; (5) monitoring, that is, disciplining borrowers' performance to make sure they fulfill their commitments. By doing so, financial system can improve resource allocation through these mechanisms.

Some early works is more general about the effects of financial development on the efficiency of investment. However, recent studies are more specific how financial intermediation activities promote economic growth through increasing efficiency of investments. Greenwood and Jovanovic (1990), Levine (1991, 1992a), Saint-Paul (1992), and Obstfeld (1994) emphasize on how the financial system improve resource allocation. These studies indicate that by more efficiently diversifying investors' portfolios, financial intermediaries improve capital productivity. Bencivenga and Smith (1991) and Levine (1991, 1992a) highlight importance of liquidity management. Improvement in liquidity management would provide financial intermediaries with more productive investment choices. Additionally, Greenwood and Jovanovic (1990), Levine (1992a), and King and

Levine (1993a) examine the importance of project evaluation. According to these studies financial intermediaries channel savings into most profitable projects through evaluating different projects and investors.

In another theoretical approach, some authors stress the connection between the real interest rates and investment efficiency. Galbis (1977) argues that financial deepening would cause real interest rates to increase which in turn shifts current resources from low-return projects to high return projects. In other words, high real interest rates and the consequent increase in financial intermediation are growth- promoting because the latter plays a positive role in transferring resources from the unproductive to the productive sector. As a result, all these studies conclude that financial development increases capital productivity and has a positive effect on the economy's long-run rate of growth.

A recent line of research emphasizes the role of indirect finance as well as direct finance, particularly in developing countries. In existing literature most of the studies focus on banks' financial intermediation activities. However, some economists examine the stock market activities recently. Most important ones can be given as Levine (1991), Devereux and Smith (1994), Obstfeld (1994), Levine and Zervos (1996) ,Singh (1997) and more recently Beck and Levine (2002). These studies emphasized important role of stock markets in improving capital allocation, providing liquidity and a greater risk diversification through connecting international markets. As a result, stock markets also promote economic activities as well as banks. Therefore, in this study we also include stock market activity into the model besides banking activity.

In summary, in this section a review of theoretical contributions on the role of financial intermediation in economic growth is given. In a well functioning financial system, financial intermediaries increase savings level and create funds for investment then channel these funds to the most efficient investments and projects by fulfilling five main functions (funds pooling, risk diversification, liquidity provision, screening and monitoring). In absence of such a system, the absence of financial intermediation services and therefore capital obviously has negative effects on growth. The fact that financial intermediation appears to be an important factor in

economic processes has important implications for the financial policies in developing countries.

2.3 THE CAUSAL RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

In this sub-section we will examine the casual relation between financial development and economic growth. Up to this point, we examine the relation between financial development and economic growth and draw a broad theoretical framework. According to this framework I generally analyze the relation on how financial sector promote economic growth and try to connect links through five transmission mechanisms and three channels which financial intermediaries stimulate economic growth. On the other hand, another possibility also exists that economic growth can also promote financial development.

Recent growth literature deals with this causal relationship along three lines: (I) financial deepening stimulates economic growth; (2) economic growth promotes the development of the financial sector, and (3) a simultaneous relationship in which financial development and economic growth affect each other. In the following, I study these three types of causal relationships.

2.3.1 Financial Development Causes Economic Growth

Some studies emphasize on the casual relationship between financial development and economic growth. First Patrick (1966) defined two concepts, supply-leading and demand-following. The supply-leading hypothesis suggests that deliberate creation of financial institutions and markets increases the supply of financial services. The financial sector increases savings, mobilizes resources, and allocates them to productive investments. Accordingly, financial development can stimulate economic development. In this view, financial development precedes the demand for financial services and therefore has an important impact on growth.

Many studies both in theoretical and empirical manner support the supply-leading hypothesis. See for example King and Levine (1993a), McKinnon (1973), Shaw (1973) and Bencivenga and Smith (1991). These studies conclude that

financial intermediaries development have an impact on economic growth. Particularly, King and Levine (1993a) examine a cross-section of 80 countries for the period 1960-1989 with different financial indicators and find that "finance seems importantly to lead economic growth" (p.730).

2.3.2 Economic Growth Causes Financial Development

In contrast to the leading role of the financial sector in the supply-leading hypothesis, the demand-following hypothesis constructs the direction of causality from economic growth to financial development. In the demand-following hypothesis financial development occurs as a result of economic development which means financial intermediation does not promote economic activity. In other words, financial system only improves itself as a response to the financing needs of the real sector and fits in with its autonomous development. As a result, under the demand following hypothesis financial intermediation only plays a rather passive role in the growth process.

Some studies support the demand-following hypothesis. Gurley and Shaw (1967) argue that economic growth causes financial development and Goldsmith (1969) also indicates a feedback effect of economic growth on financial sector. Additionally, Berthelemy and Varoudakis (1996) indicate that the direction of the causality run from per capita income to financial development. According to these studies the lack of financial institutions in some developing countries is simply an indicator of the lack of demand for their services.

In another perspective growth of the real sector not only cause financial sector to diversify and growth, but also cause overall economy to grow. At this point of view, defining financial development just as a response to economic growth, would probably so simple to describe the relation. In fact, real economic activity would probably affects the financial development in terms of creating incentives to develop through demanding financial services. However, this would not change the fact that real economic sectors strictly need financial services.

Some studies have examined how economic growth causes financial development. For example, Levine (1992b) argue that economic development would affects only the existing financial intermediation systems. In particular, as the income level of the economy increases, financial intermediation activities become more sophisticated. In another study, Patrick (1966) hypothesizes that financial development promotes economic growth during the early stage of economic development, and the direction reverses to demand-following as the economy becomes more developed. Supply-leading finance dominates the early stage of economic development because it makes possible the efficient financing of investments which embody technological innovations. Once the economic development process reaches maturity, demand-following finance becomes dominant.

2.3.3 Reciprocal Relationships

Apart from supply-leading and demand-following hypothesis a third possible causal link between finance sector and real economic sector has also exist. Both of the views only indicate one-way direction of causality. The third possibility indicates that there would be a reciprocal relation.

According to the this point of view, economic development would create a demand for financial intermediaries and makes it profitable and in turn financial intermediaries' services promote economic growth or facilitate economic activities through specializing in pooling funds, diversifying risks, liquidity management, project evaluation and monitoring. At the same time, technological efficiency of the financial sector increases through economies of scale and learning by doing effects. As a result financial sector and real economic sectors influence each other in a positive manner. In fact, the financial and real sectors would be in an interaction regardless of the stages of development. In contrast with Patrick (1966), in every stage of development, a bidirectional relationship between financial development and economic growth exists.

Some studies have examined the reciprocal causal relation between finance and economy. For example, Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Levine (1991, 1992b) and Greenwald and Stiglitz (1986) indicate a

bidirectional causality. They argue that financial system improve efficiency of investment projects and on the other hand economic growth facilitate the creation and expansion of the financial system through stimulating higher participation.

In examining reciprocal relation between finance sector and economy, understanding threshold effect would be beneficial. According to this point of view, economies can only develop different types of financial intermediaries after crossing a certain income threshold, and only after this point they can derive benefits from financial system. In other words, high level of income supports adequate development of financial system, which in turn gives added impetus to growth. Some literature has studied the threshold effects in financial development and economic growth. For example, Greenwood and Jovanovic (1990) conclude that economies have to grow rich enough before they choose to pay the sunk costs needed to set up financial systems. Similarly, Greenwood and Smith (1997), Levine (1992b), and Saint-Paul (1992) also argue that only after economies reach this threshold do financial intermediaries emerge to improve the allocation of resources, and therefore propel growth.

Overall, we have introduced the theoretical framework of the theory in a detailed way through examining each of the transmission mechanisms, how these mechanisms improve efficiency of investments and promote economic growth, and finally we introduced another important issue of the relation, direction of causality. In the next sub-section we discuss whether a market based system or a bank based system is better.

2.4 BANK BASED SYSTEMS VERSUS MARKET BASED SYSTEMS

Apart from debates concerning the role of financial intermediaries in economic growth, the comparative importance of bank-based and market-based systems is also another debate among economists. Some economists argue that banks are the fundamental suppliers of the financial services and their contributions are more beneficial than the stock markets, while others defends market base system through criticizing banks because of their huge influence over firms which probably manifest itself in negative ways. we will discuss them briefly in following sections.

2.4.1 Bank-Based Systems

The bank-based theory emphasizes the significant role of banks in economic development through providing financial intermediation activities in a more efficient way and also emphasizes on shortcomings of market-based financial systems. According to the theory, in developing countries bank-based financial intermediation activities are more efficient due to weak institutional background. In the early stages of development and in the case of state owned banks, market failures would be prevented and allocation of savings can be undertaken strategically (Gerschenkron, 1962). Some studies also indicate shortcomings of market based system such as agency problem, adverse effects of high liquidity and myopic investor climate. For example, Levine (2002 and 2004), Beck and Levine (2004), Stiglitz (1985) and Singh (1997) discuss in a deeper manner.

The bank-based view also stresses the shortcomings of market-based systems. Market based systems reveal information publicly, so reduce incentives for investors to seek information. Information asymmetry is also another important problem in market-based rather than in bank-based financial systems because managers as insiders know more than outsiders. Banks can ease distortions emanating from asymmetric information through forming long-run relationships with firms, and, through monitoring, contain moral hazard (Stiglitz, 1985). The liquidity of stock markets may also have some harmful effects on resource allocation. Liquid equity markets may facilitate takeovers that while profiting the raiders may actually be socially harmful (Shleifer and Summers, 1988). Moreover, liquidity may encourage a myopic investor climate. In liquid markets, investor can inexpensively sell their shares, so that they have fewer incentives to undertake careful – and expensive – corporate governance (Bhide, 1993). As a result, bank-based arrangements can produce better improvement in resource allocation and corporate governance than market-based institutions.

2.4.2 Market-Based Systems

In contrast with the bank-based theory, market-based theory emphasizes the advantages of well functioning markets in promoting successful economic

performance, and highlights the problems in bank-based financial systems. The case for a market-based system is a kind of counterattack which focuses on problems of bank-based systems. Big, liquid and well-functioning markets foster growth and profit incentives, enhance corporate governance, and facilitate risk management, diversification and the customization of risk management devices (Levine, 2002, and Beck and Levine, 2004). Bank-based systems distort competitive environment in favor of their customers. In particular, once banks acquire important, inside information about firms, they can extracts rents from firms. Moreover, firms must pay for their greater access to capital. Market-based financial systems reduce these inefficiencies associated with banks and enhance economic development in more efficient way. A good example on how banks have a great influence on firms and managers is given by Wenger and Kaserer (1998) for the case of Germany and this also a good example how bankers distort corporate governance through acting on their own interests. In Germany, bank managers voted the shares of a larger number of stock holders. For example, in 1992 bank managers exercised 61 % of voting rights for 24 largest companies on average.

Some studies examine the efficiency of market-based systems through different stages of development. For example, Boyd and Smith (1988) argues that countries become more market-based as development proceeds and also in a study of World Bank (2001: 7) it is argued that "the complexity of much of modern economic and business activity has greatly increased the variety of ways in which insiders can try to conceal firm performance. Although progress in technology, accounting, and legal practice has also improved the tools of detection, on balance the asymmetry of information between users and providers of funds has not been reduced as much in developing countries as it has in advanced economies—and indeed may have deteriorated".

According to financial-services theory, financial services are crucial to new firm creation, industrial expansion and economic growth. This theory is actually consistent with both the bank-based and the market-based views, and rejects the importance of distinguishing financial systems. According to the financial services

view, the exact composition of the financial system is of secondary importance. In addition, financial services view also argues that banks and markets are different components of the financial system and provide complementary services. For instance, stock markets may positively affect economic development even though not much capital is raised through them. Specifically, stock markets may play a prominent role in facilitating custom-made risk management services and boosting liquidity. In addition, stock markets may complement banks. For instance, by spurring competition for corporate control and by offering alternative means of financing investment, securities markets may reduce the potentially harmful effects of excessive bank power. Thus, these two complements of the financial system would act as complements during the development process.

CHAPTER 3

EMPRICAL EVIDENCE ON FINANCE AND GROWTH

In addition to the theoretical work discussed in previous chapters, there is a large empirical literature on the impact of financial development on economic growth. In this chapter some of them would be reviewed.

As a corner stone of the empirical literature Goldsmith (1969) studied the financial structures in 35 industrial and developing countries during 1860-1960 through time series econometric methods. He used the ratio of total financial assets to total real assets in an economy to measure the size of the financial sector, and the ratio of different financial institutions' assets to total financial assets to measure the importance of these institutions in the country's total financial sector. Goldsmith (1969) showed that all countries seemed to have followed more or less the same path of financial development through time. Evidence of a strong correlation between financial development and economic growth, led him to conclude that a well-developed and better functioning financial system supports faster economic growth. However, he could not establish the causal direction between them.

In the early 1990s, King and Levine (1993a,b,c) follow the path that Goldsmith (1969) opened and study 80 countries over the period 1960-1989. In their study they employed cross-section analysis to investigate the relation between financial development and economic growth. They use different measures of financial development to capture various services provided by financial intermediaries. For example, they use M2 divided by GDP to approximate the liquidity management role of financial intermediaries, and use the ratio of credit to the private sector to GDP to capture funds pooling, risk diversification, screening and monitoring. They find that these measures are positively correlated with real GDP growth rates even after controlling for initial conditions, education, government spending, inflation, political stability, and some other policy measures. Moreover, King and Levine (1993a) provide strong evidence that the financial sector affects the growth rate of the

economy both through its effect on the productivity of investment and through its effects on the overall level of savings and investment. Furthermore, King and Levine (1993b) show that subsequent growth rates are positively correlated with measures of initial financial development. This result can be interpreted as evidence that financial development causes growth, but it may also reflect a buildup in anticipation for future growth.

Using similar econometric methods, Ghani (1992) explicitly analyzes the influence of the initial level of financial development on economic growth for 50 developing countries and concludes that countries which start with a more developed financial structure have higher growth prospects since such a financial structure contributes to more efficient allocation of financial resources.

De Gregorio and Guidotti (1995) also provide important empirical evidence on financial development and long-run growth through a cross-section study of 98 countries during 1960-1965. They use the ratio of bank credit to the private sector to GDP as the financial development indicator. Their findings indicate that financial development has a positive impact on economic growth in general. In particular, they find that this proxy is positively correlated with growth, but its impact changes across countries and the positive effect more prominent in the middle- and low-income countries, and argue that the weak relationship observed in high-income countries is due to the fact that financial development occurs to a large extent outside the banking system, while their proxy of financial development focuses on banking sector development Additionally, they also indicate that the relationship is stronger in the 1960s than in the 1970s and 1980s.

Kwan et al. (1998) study on three Asian countries, South Korea, Taiwan and Hong Kong and it was the first study that investigate the relationship between financial deepening and economic growth for South Korea from 1962 to 1994, for Taiwan 1961 to 1994 and for Hong Kong from 1967 to 1995 through exogenity analysis and use the ratio of money supply to GDP as financial development indicator. They find that for three types of exogenity (weak, strong and super) the null hypothesis cannot be

rejected in all the economies examined, suggesting the existence of a robust unidirectional influence of financial deepening on growth. Moreover, the present work indicates that the coefficient of the financial-sector size variable in the output growth equation is structurally invariant to policy interventions in these economies.

Beck and Loayza (2000) evaluates the empirical relation between the level of financial intermediary development and (1) economic growth, (2) total factor productivity growth, (3) physical capital accumulation, and (4) private savings rates. They use a pure cross-country instrumental variable estimator to extract the exogenous component of "financial intermediary development, and a new panel technique that controls for biases associated with simultaneity and unobserved country-specific effects. They use four different data sets in examining each of the relation and the description of each data set as follows; (1) cross-country sample for GDP, capital and productivity growth 63 countries from 1960 to 1994, (2) panel sample for GDP, capital and productivity growth 77 countries from 1960 to 1995, (3) cross-country sample for private saving 61 countries from 1971 to 1995, (4) panel sample for private saving 72 countries from 1974 to 1995. The study concentrates on banking activity and uses liquid liabilities (ratio of M3 to GDP), commercial bank assets to central bank assets and the ratio of private credits to GDP. They find an economically large and statistically significant relation between financial intermediary development and both real per capita GDP growth and total factor productivity growth. Specification tests indicate that the robust, positive relation between financial development and both growth and productivity growth are not due to simultaneity bias or country-specific effects. This result is robust to the use of different estimation procedures, conditioning information sets, and indicators of financial development. This paper's results support the view that better functioning financial intermediaries improve resource allocation and accelerate total factor productivity growth with positive repercussions for long-run economic growth.

Jaffee and Levonian (2001) study on 23 transition countries through panel analysis with "Barro"-regressions and finds significant and positive relationship between banking sector development, reforms and economic growth. Similarly,

Drakos (2002) studies on 21 transition countries through the same econometric methodology and finds that banking sector competition has a positive effect on economic growth and also indicates that as the market imperfections reduced real GDP growth.

Trabelsi (2002) study with a set of cross-sectional and pooled cross-section time-series regressions by using the IMF International Financial Statistics (1997). It has been carried out for a sample made of 69 developing countries from 1960 to 1990 and the ratio of the money stock M3 to nominal GDP is used as indicator of financial development. The main results are : (i) financial development is a significant determinant of economic growth, as it has been shown in cross-sectional regressions; (ii) financial markets cease to exert any effect on real activity when the temporal dimension is introduced in the regressions. The paradox may be explained, in the case of developing countries, by the lack of an entrepreneurial private sector capable to transform the available funds into profitable projects; (iii) the effect of financial development on economic growth is channeled mainly through an increase in investment efficiency.

Calderon and Liu (2002) study on pooled data of 109 developing and industrial countries from 1960 to 1994 and examine the direction of causality between financial development and economic growth. Findings of the study can be summarized as follows (1) financial development generally leads to economic growth; (2) the Granger causality from financial development to economic growth and the Granger causality from economic growth to financial development coexist; (3) financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries; (4) the longer the sampling interval, the larger the effect of financial development on economic growth; (5) financial deepening propels economic growth through both a more rapid capital accumulation and productivity growth, with the latter channel being the strongest.

Mehl and Winkler (2003) study the link between financial deepening and economic development through growth accounting regressions and use cross-section

and panel analysis. They use a data set which consists eight transition economies of South Eastern Countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, FYR Macedonia, Serbia and Montenegro, Moldova and Romania) for the period from 1993 to 2001. Their study indicates that financial depth did not have a significant impact on SEE countries growth performance over 1993-2003 due to the socialist legacy and partly to the ill-conceived financial sector reforms of the early 1990s.

McCaig and Stengos (2004) examine the relationship between financial intermediary development and economic growth using different instruments. This paper examines whether the exogenous component of financial intermediary development influences economic growth using cross-country differences in a number of different variables such as religious composition, the fraction of years of independence since 1776, absolute latitude, European settler mortality rates and ethnic fractionalization used as instruments to explain financial development. GMM regressions of economic growth on indicators of financial intermediary development using the above mentioned instruments confirm the results found in an earlier study by Levine (1998, 1999) and Levine et al. (2000) for a strong positive effect on growth when financial intermediation is measured by Liquid Liabilities and Private Credit as ratios to GDP. The results of the link between finance and growth are considerably weaker when financial intermediation is measured as the ratio of Commercial to Central Bank assets, something that may indicate that the latter variable is not a very good proxy for financial development.

Ghirmay (2004) examines the long-run causal link between the level of financial development and economic growth in 13 sub-Saharan African countries. These countries are: Benin, Cameroon, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Rwanda, South Africa, Tanzania, Togo, and Zambia. The empirical methodology is based on the theory of co-integration and error-correction representation of cointegrated variables and financial development is represented by the level of credit to the private sector by the financial intermediaries. The results of the co-integration analysis provide evidence of the existence of a long-run relationship between financial development and economic growth in almost all of the

countries. With respect to the direction of long-term causality, the results show that financial development plays a causal role on economic growth, again in eight of the countries (Benin, Cameroon, Ethiopia, Kenya, Malawi, South Africa and Tanzania). At the same time, evidence of bidirectional causal relationships is found in six countries (Benin, Ethiopia, Kenya, Malawi, Mauritius, South Africa and Tanzania). The findings imply that African countries can accelerate their economic growth by improving their financial systems.

Habibullah and Eng (2006) examines the causal relationship between financial development and economic growth from panel data perspectives using the GMM technique developed by Arellano & Bover (1995) and Blundell & Bond (1998) by conducting causality testing analysis. The panel data sets involve 13 Asian developing countries: Bangladesh, India, Indonesia, South Korea, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippine, Singapore, Sri Lanka and Thailand for the period 1990–1998 and use the ratio of domestic credit to GDP as financial development indicator. Their result suggests that the supply-leading growth hypothesis indicates that financial intermediation promotes economic growth in the nine Asian developing nations for the period 1990–1998. It implies that financial development promotes growth, thus, supporting the old Schumpeterian hypothesis and Patrick's supply-leading hypothesis.

The above studies have tended to proxy financial sector development by a single financial indicator at a time, and have generally studied on banking sector. However, as I mentioned above another important debate among financial economists is that whether market-based or bank-based system is better and three points of views are generally discussed, market-based view, bank-based view and financial services view. Therefore, there are good reasons to study the relationship between long-run economic growth and the operation of equity markets. First, as stressed above, theoretical debate exits on whether larger, more liquid equity markets exert a positive or negative influence on economic growth, capital accumulation, and productivity growth. Second, some theories focus on the competing roles of banks and markets in funding corporate expansion, while others stress that banks and markets may arise, coexist, and prosper by providing different financial functions to the economy, and still other theories stress complementarities between banks and markets. Thus, simultaneously

considering the potential roles of banks and markets permits one to distinguish among competing theories and provide evidence to policy makers on the independent roles of markets and banks in the process of economic growth.

Levine and Zervos (1998) studied the empirical relationship between various measures of stock market development, banking development, and long-run economic growth. They use the ratio of stock market capitalization to GDP and turnover ratio for stock markets and the ratio of bank loans to private enterprises to GDP for banking sector. In their analysis, they used pooled cross-section time series data averaged over the 1976-1985 and 1986-1993 for 49 countries. They find that after controlling for many factors associated with growth, stock market liquidity and banking development are both positively and robustly correlated with contemporaneous and future rates of economic growth, capital accumulation, and productivity growth. This result is consistent with the view that a greater ability to trade ownership of an economy's productive technologies facilitates efficient resource allocation, physical capital formation, and faster economic growth. Additionally, since measures of stock market liquidity and banking development both enter the growth regressions significantly, the findings suggest that banks provided different financial services from those provided by stock markets. Thus, to understand the relationship between the financial system and long-run growth more comprehensively, this study also indicates a necessity for a theory in which both stock markets and banks arise and develop simultaneously while providing different bundles of financial services to the economy. As a summary, this paper finds a strong, positive link between financial development and economic growth and the results suggest that financial factors are an integral part of the growth process.

Fink and Haiss (1999) investigate the impact of the credit, bond and stock segments in nine EU-accession countries over early years of transition from 1996 to 2000 and compare these to mature market economies and to countries at intermediate stage. They find positive link between banking sector development and economic growth. However, for stock markets and bond markets they can not find satisfactory evidence.

Rousseau and Wachtel (1999) examines dynamic relationships, by applying recent developments in the analysis of panels with a small time dimension to estimate vector auto-regressions for a set of forty-seven countries with annual data over the 1980-1995 period and

stresses the roles of stock markets as 1) providing an exit mechanism to venture capitalists, 2) offering liquidity to investors that encourages international diversification and portfolio flows, 3) providing firms with access to permanent capital which can then be placed in large, indivisible projects, and 4) generating information about the quality of potential investments. Results of the study indicate that stock exchanges have been key institutions in promoting economic activity in recent years, and suggest that the occasional setbacks that appear to be consequences of rapid market development are perhaps best viewed in light of the more optimistic longer-term role for stock markets posited here.

Kularatne (2001) examines the impact of financial deepening on long run economic growth in South Africa over the period 1954-92. Two models are developed using the Johansen VECM structure. The first model investigates whether the financial system has a direct or indirect effect on per capita output via the investment rate. The second model attempts to investigate the possibility of feedback effects between the financial and real sectors. Both Model I and Model II estimated in the study support the conclusion that financial deepening in the economy promotes economic growth in South Africa. Additionally, both models find that neither financial intermediation nor the level of stock market liquidity directly affects per capita GDP. Both these dimensions of the financial system are found to indirectly affect per capita output via the investment rate.

Beck and Levine (2002) investigates the impact of stock markets and banks on economic growth using a panel data set of 40 countries for the period 1976–1998 and applying recent generalized-method-of moments (GMM) techniques developed for dynamic panels. The results of the study strongly reject the notion that overall financial development is unimportant or harmful for economic growth. Using three alternative panel specifications, the data reject the hypothesis that financial development is unrelated to growth. Stock market development and banking sector development jointly enter all of the system panel growth regressions significantly using alternative conditioning information sets and alternative panel estimators. This paper also assessed the independent impact of both stock market development and bank development on economic growth. In general, they find across different estimation procedures and across different control variables that both stock markets and banks enter the growth regression significantly. These findings suggest that stock markets provide different

financial services from banks, or else multicollinearity would produce jointly significant results but would not produce results where stock market and bank indicators each enter the growth regression significantly. On balance, the study conclude that stock markets and banks positively influence economic growth and these findings are not due to potential biases induced by simultaneity, omitted variables or unobserved country-specific effects.

Platek (2002) studies on 26 transition countries through cross-section analysis with Barro-regressions and conclude that banking sector development and stock market development are both significantly and positively correlated with economic growth. Similarly, Fink et al. (2004, 2006) study on 9 transition countries (Central and East European countries) through growth accounting regressions by using cross-section and panel analysis and they find that banking sector and bond markets stimulate economic growth while stock markets seem not to have played a major role.

Mohtadi and Agarwal (2004) examine the relationship between stock market development and economic growth for 21 emerging markets over 21 years from 1977 to 1997, using a dynamic panel method. The empirical relationship between stock market development and the long-run growth remains strong even after controlling for lagged growth, initial level of GDP, Foreign Direct Investment, and Secondary School Enrollment, and Domestic Investment. The paper suggests that stock market development contributes to economic growth both directly and indirectly. Following the direct channel, they show that market liquidity (turnover ratio) has a positive impact on growth. Indirectly, market size (capitalization ratio) affects investments which, in turn, affect growth. The empirical results do support the theoretical literature (e.g., Levine, 1991), in suggesting that the stock market development leads to higher growth because it reduces both liquidity and productivity shocks.

Ndikumana (2005) has examined two related but different questions about the links between financial intermediation and domestic investment through employing both cross-section and panel analysis by using a sample of 99 countries including developing and developed countries for the period from 1965 to 1997. The

first question is whether higher financial development induces higher domestic investment. The second is whether the structure of the financial system (bank-based vs. stock-market based) matters for domestic investment. The evidence shows that the various indicators of financial development are positively related to domestic investment. This implies that financial development facilitates domestic investment to the extent that it is accompanied by an increase in the supply of funds to investors. Additionally, the results in this study also indicate that for a given level of financial development and controlling for country-specific factors, the structure of the financial system has no incremental impact on domestic investment. The results are inconsistent with claims that either bank-based or stock-market-based financial systems are better at promoting investment. The evidence is consistent with the view that banks and stock markets are complementary.

Luintel et al. (2007) examines whether financial structures matters for economic growth through analyzing 14 low and middle-income countries using both time series and Dynamic Heterogeneous Panel methods. They find evidence of significant cross-country heterogeneity in the relationship between financial development, financial structure and economic growth and for the majority of sample countries, financial structure and financial development appear significant in explaining output levels; this holds under both time-series and panel estimates. Additionally, they also find very limited support for the previous assertion that the effect of financial development on growth tapers off as countries become economically more developed (King and Levine, 1993). Furthermore, study also tests various hypotheses regarding the prospective role of financial development and financial structure when countries develop both economically and financially. The tests indicate mixed results which reinforce those arguments of a heterogeneous relationship cross countries. Overall findings imply that financial structure and financial development matter for output levels and economic growth.

Hasan, Wachtel and Zhou (2007) investigate three facets of institutional development: financial sector development, development of legal institutions and the introduction of political pluralism through studying on 31 Chinese provinces for the

period 1986–2002 and using panel data analysis. The first facet is represented by measures of financial deepening. They find that only capital market depth has a strong influence on growth while the impact of bank lending is not significant and sometimes negative. A broad measure is simply the size of the private sector in the economy, which they find to have a strong influence on growth. They also identify direct measures of institutional development which are proxies for the awareness of property rights and for the rule of law. There is modest support with our proxy measures for the influence of institutional development on growth. Finally, the third facet is the development of political institutions, which they measure by the degree of political pluralism. Overall results suggest that institutional development is strongly associated with economic growth. Higher growth rates are found with more rule of law, more property rights awareness and protections, more active capital markets and a more open political environment.

Hagmayr, Haiss and Sümegi (2007) examine whether the development of financial markets has played a significant role for real GDP per capita growth in Southeastern European (SEE) countries through applying a panel data approach to five acceding and candidate countries for the period from 1995 to 2005. They find that segments of financial markets that include public finance (especially bond markets) contributed to economic development, whereas private credit and stock market capitalization had no significant influence on growth. Additionally, they also conclude that along the law-and-finance-view that financial market segments can only contribute positively if the legal and supervisory frameworks works properly.

Fink et al. (2008) examine the influence of financial market segments (credit, bond, stock) and whether this influence varies across different stages of economic development. By applying a panel data approach to 9 transition countries, 5 (cohesion) countries at intermediate stage of development, and 13 mature market economies for the 1996–2000 period. Findings of the study indicate that the transfer mechanisms differ over the stages of development, going from (public sector-driven) bond markets in accession countries to educational attainment in intermediate (cohesion) countries to labor participation in mature market economies. These results

indicate that the financial sector can support stability and growth in transition countries, at least in the short run. However, findings about the role of different sectors of the financial markets differ from the expectations that free stock markets are a major driver of economic development: bond markets and total domestic credit expansion stimulated economic growth, whereas private credit and stock market capitalization had no significant influence on growth during the early years of transition. In particular, for transition economies, financial funds channeled through the combination of public and private sectors seem to provide stronger growth triggers than those channeled solely through the private sector in the intermediate stage of development. In summary, this study concludes that the transfer mechanisms differ over the development cycle and that financial market segments with links to the public sector contributed to stability and growth in transition economies.

Akinlo A. and Akinlo O. (2008) examine the long run and causal relationship between stock market development and economic growth for seven countries in sub-Saharan Africa by using the autoregressive distributed lag (ARDL) bounds test for the period from 1980 to 2004. The study finds that the stock market development is cointegrated with economic growth in Egypt and South Africa. Moreover, this test suggests that stock market development has a significant positive long run impact on economic growth. Granger causality test based on vector error correction model (VECM) further shows that stock market development Granger causes economic growth in Egypt and South Africa. However, Granger causality in the context of VAR shows evidence of bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, there is a weak evidence of growth-led finance using market size as indicator of stock market development. Based on these results, the paper argues that stock markets could help promote growth in Africa. However, to achieve this goal, African stock markets need to be further developed through appropriate regulatory and macroeconomic policies.

Literature on financial development and growth for Turkey is limited. Kar and Pentescot (2000) examine the causal relationship between financial development and economic growth in Turkey. Five alternative proxies for financial development are developed and Granger causality tests applied using the co-integration and vector error correction methodology (VECM). The empirical results show that the direction of causality between financial development and economic growth in Turkey is sensitive to the choice of indicator used for financial development. There can therefore be no 'wholesale' acceptance of the view that 'finance leads growth' just as there can be no 'wholesale' acceptance of the view that 'finance follows growth' in Turkey. The results do however; imply that the strength of the causality between financial development and economic growth is much weaker than that between economic growth and financial development.

Unalmis (2002) investigates the direction of the causal relationship between the financial development and economic growth in Turkey. The Granger non-causality tests are applied for two different conditions; non-stationary and non-cointegrated variables, and non-stationary and cointegrated variables, using five different proxies for financial development. In the empirical analyses, time-series data was used for the period 1970-2001. The empirical results show that, except for one of the proxies, financial development significantly causes economic growth in the short-run, and in the long-run, there is a bidirectional relationship between financial development and economic growth. In other words, the Turkish case supports the supply-leading phenomena in the short-run and both the supply-leading and the demand-following cases in the long-run.

Halıcıoğlu (2007) investigates the validity of the demand-pulling and the supply-leading hypotheses using annual data from 1968 to 2005. The bounds testing approach to co-integration is conducted to establish the existence of a long-run relationship between financial development and economic growth. An augmented form of Granger causality analysis is implemented to identify the direction of causality among the variables both in the short-run and the long-run. The empirical

findings suggest unidirectional causation from financial development to economic growth.

Acaravcı A., Ozturk and Acaravcı K. S. (2007) examine the casual relationship between financial development and economic growth for the period from 1986 to 2006 quarterly through dynamic time series analysis. The main findings of the paper can be summarized as follows: (1) one-way causality from financial development to the economic growth, (2) no evidence of a long-run causal relationship between financial development and economic growth. In summary, Granger causality test results show that financial development leads to economic growth and support the supply leading hypothesis for Turkey. Thus, the domestic credit provided by banking sector and healthy banking sector has been assumed to contribute to the growth of the Turkish economy.

Ozturk (2008) investigate the causality between financial development and economic growth in Turkey for the period 1975-2005. The empirical investigation is carried out in a vector autoregression (VAR) framework based on the theory of co-integration and error-correction representation of cointegrated variables. Overall finding of the study can be summarized as follows, (1) of one-way causality from economic growth to the financial development, (2) no evidence of a long-run causal relationship between financial development and economic growth in Turkey.

Table 6. Summary of Empirical Literature

Author (Year)	Country		Bank	Stock Market	Overall System	Causality		Author (Year)	Country		Bank	Stock Market	Overall System	Causality	
	I	D				F -G	G-F		I	D				F-G	G-F
Goldsmith (1969)	*	*	+	n.a	+	n.a	n.a	Kularatne (2001)		*	+	+	n.a	n.a	n.a
King and Levine (1993 a,b,c)	*	*	+	n.a	+	n.a	n.a	Beck and Levine (2002)	*	*	+	+	n.a	n.a	n.a
De Gregorio and Guidotti (1995)	*	*	+	n.a	n.a	n.a	n.a	Platek (2002)		*	+	+	n.a	n.a	n.a
Kwan, Wu and Zhang (1998)		*	n.a	n.a	+	*		Fink et al. (2004, 2006)		*	+	0	n.a	n.a	n.a
Beck, Levine and Loayza (2000)	*	*	+	n.a	+	n.a	n.a	Mohtadi and Agarwal (2004)		*	n.a	+	n.a	n.a	n.a
Trabelsi (2002)		*	n.a	n.a	+	n.a	n.a	Ndikumana (2005)	*	*	+	+	n.a	n.a	n.a
Jaffee and Levonian (2001)		*	+	n.a	n.a	n.a	n.a	Luintel et al. (2007)		*	+	+	n.a	n.a	n.a
Calderon and Liu (2002)		*	+	n.a	n.a	*	*	Hasan, Wachtel and Zhou (2007)		*	0	+	n.a	n.a	n.a
Mehl and Winkler (2003)		*	0	n.a	0	n.a	n.a	Hagmayr, Haiss and Sümegi (2007)		*	0	0	+	n.a	n.a
McCaig and Stengos (2004)		*	0	n.a	+	n.a	n.a	Fink, Haiss and Vuksic (2008)	*	*	0	0	+	*	
Ghirmay (2004)		*	+	n.a	n.a	*	*	Akinlo A. Enisan and Akinlo Olufisayo (2008)		*	n.a	+	n.a	*	*
Habibullah and Eng (2006)		*	+	n.a	n.a	*		Unalmis (2002)		*	+	n.a	+	*	*
Levine and Zervos (1998)	*	*	+	+	n.a	n.a	n.a	Halıcıoğlu (2007)		*	n.a	n.a	+	*	
Rousseau and Wachtel (1999)	*	*	n.a	+	n.a	n.a	n.a	Acaravcı A., Ozturk and Acaravcı K. S. (2007)		*	+	n.a	+	*	
Fink and Haiss (1999)		*	+	0	n.a	n.a	n.a	Ozturk (2008)		*	+	n.a	n.a		*

Note: In Table 4, "I" represents industrialized countries and "D" represents developing countries in country column. "*" indicates the existence in Country and Causality columns. "n.a" represents not availability of that topic in the related study. "F-G" and "G-F" represents the direction of the causality, "Finance to Growth and Growth to Finance".

In summary, this subsection reviewed a number of empirical studies on financial development and growth; most studies find various measures of financial development to be positively correlated with growth. In Table 4, a brief summary of the review is given. In the light of the information given we can conclude that (1) causality issue is not studied in many of the studies and in the studies which causality issue is studied, the results indicate that direction of causality exists in a unidirectional manner from financial development to economic growth in general, (2) studies generally indicates that financial development promotes economic growth. However, this relation is not as clear as in all countries and in all kinds of financial intermediaries. In particular, all most all studies indicate a positive relation when the relation studied with the measures of monetization such as the ratio of M2 or M3 to GDP and with measures of banking activity such as the ratio of private credits to GDP. On the other hand, stock markets role is not so clear especially in developing countries. (3) In large scale studies, results indicate that both the banking sector and stock markets are positively related which supports the financial-services theory that financial services provided by banks and stock markets are complements. However, some studies also indicate that stock markets are more efficient in industrialized countries while banking sector play a major role in developing countries.

All in all, the relation between financial development and economic growth is clear almost in all of the studies regardless of the sample they study on and econometric methodology they employed.

CHAPTER 4

DATA AND METHODOLOGY

In this chapter, we first introduce the data set, its formation and the justification of variable selection. In the second part, we describe the econometric methodology and its implications.

4.1 DATA

In this study we divide sample into two sub-groups and these two sub-groups include 29 EU member and two candidate countries. Dividing the sample into two sub-groups is important since legal and economic differences are significant between two groups. The first group includes developed EU members, EU 15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom). The second group includes the developing countries and/or transition countries (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, and Slovenia) and candidate countries (Croatia and Turkey). Both data sets include the same variables, which are domestic credits to private sector as a percent of GDP and market capitalization of listed companies as a percent of GDP, for the period 1993-2007.

The WDI (World Development Indicators), the IMF-IFS (International Monetary Fund- International Financial Statistics) and Beck, Kunt-Demirgüç and Levine (2000) are the main sources of the data set. We tried to use the same data source for each variable. However, it is very difficult to collect them for all 29 countries and especially for transition countries. As a result, dataset that we use in this study includes 3 variables for 29 countries from 1993 to 2007 and from three data sources.

To asses the relation between economic development and both stock market and banking development we need empirical indicators of stock market and banking development. As it is stated above, two measures are used in order to measure the financial development in banking sector and stock market. These are domestic credits provided by banking sector to private sector as percent of GDP and market capitalization of listed companies as percent of GDP.

Market capitalization equals the value of listed shares divided by GDP. The assumption behind this measure is that overall market size is positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis. Although market capitalization ratio is criticized in many studies, it is still the most common indicator that used in examining the role of stock market on economic development. The most important critic about this ratio is that it only measures the size of the stock market. However, it also represents the change in total activity. As a result, in this study we use market capitalization ratio in order to examine the role of stock markets in economic development.

Banking sector development indicator is more specific and indicates the direct link between the intermediation activities of banks and real economic activity that domestic credits provided by banking sector to private sector as percent of GDP. By observing the size of credits provided by banking sector, it is possible to make interpretations about the role of banking sector in economic development. In this study, we do not investigate the overall activity of the financial system, as many of the other studies, in order to investigate stock market activity and banking sector activity separately, and also comparing their roles in developed and developing countries. The last variable used in this study is per capita GDP as an indicator of economic development. Table 5 and Table 6 present some summary statistics for financial and economic development indicators. Table 5 reports the statistics for developed countries, EU 15, and Table 6 reports for developing and/or transition and candidate countries.

In Table 5 the first variable is GDP per capita and it is possible to see that there is no variation among countries and for almost all countries except Greece, Portugal, Spain and Luxemburg, mean value of per capita GDP is around the mean value of the group per capita GDP. The second variable is domestic credit provided by banking sector as percent of GDP and again variation among countries is limited. The average value of domestic credit provided by banking sector as percent of GDP is about 115 % for the group and almost for all of the countries except Finland and Greece the value is around the average. On the other hand, for the last variable, market capitalization, variation among countries is very high. The average value is about 70 % for the group. However, for some countries the average value of market capitalization is less than half of the average value while for some others it is more than the double of the average value of market capitalization.

In Table 6, the same statistics are given for transition and candidate countries. The first variable is per capita GDP and the average variable is about 5400 dollar which is about quarter of the average value of developed group and variation among countries is also greater than that of developed group. The same situation also exists for the second and third variables. The average value for the domestic credit provided by banking sector as percent of GDP is about 60 % and it is about half of the average developed group. The last variable is market capitalization and the average value is about 20 % which is about one third of the developed group average.

As a result, regardless of the econometric estimates it is possible to conclude that all of the financial development indicators are greater in developed group than developing group on average. Additionally, variation for almost all variables are also higher in developing group.

Table 7. Summary statistics for developed group (EU 15 countries)

		EU 15	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxemburg	Netherlands	Portugal	Spain	Sweden	United Kingdom
GDP Per Capita	Mean	23316	23946	22493	29805	23719	22357	22916	13907	25436	19003	45887	23768	10733	14423	27351	24821
	Median	23371	24300	22725	30104	24109	22850	23263	13757	26370	19379	47281	24290	11016	14780	27501	24975
	Max.	53490	25935	24389	32488	27660	23932	24474	16684	30787	19630	53490	25669	11201	16027	31189	27611
	Min.	9503	21608	20221	27176	19532	20148	21212	11633	18042	17685	36775	21046	9503	12319	23656	21774
	Standard Dev.	8164	1363	1312	1565	2463	1267	998	1716	4216	723	5478	1414	589	1221	2410	1938
Domestic Credit Provided by Banking Sector (% of GDP)	Mean	114,5	124,1	126,3	116,3	67,1	105,5	134,7	80,1	110,7	100,2	107,4	147,3	121,5	125,2	112,1	140,6
	Median	112,4	123,6	122,5	144,8	65,5	103,6	137,1	81,6	107,4	97,3	95,1	147,6	133,2	115,2	112,2	133,4
	Max.	207,7	130,4	149,3	207,4	85,2	123,3	145,4	94,5	198,8	129,4	195,8	207,7	174,2	193,6	134,6	193,7
	Min.	48,8	120,1	102,8	52,9	54,9	99,8	115,5	65,8	48,8	89,2	76,7	105,1	77,8	96,3	49,7	113,6
	Standard Dev.	33,9	3,0	17,9	60,4	10,2	6,6	9,6	8,4	43,4	10,5	35,2	32,1	32,5	30,2	19,1	23,7
Market Capitalization of Listed Companies (% of GDP)	Mean	69,9	23,4	70,8	59,1	129,4	78,0	48,1	55,4	64,4	45,5	154,5	117,7	41,6	74,9	112,8	152,2
	Median	81,8	16,0	72,9	57,2	107,2	75,6	44,2	51,0	62,3	45,7	158,8	114,4	39,2	76,9	109,3	150,3
	Max.	267,2	59,4	100,6	83,9	267,2	108,9	66,9	132,3	85,0	70,0	191,8	169,0	54,7	108,0	149,4	200,0
	Min.	12,7	12,7	43,5	38,9	49,1	37,6	27,5	15,1	46,9	20,5	109,1	88,6	21,0	39,0	73,6	118,6
	Standard Dev.	47,5	14,6	18,2	12,1	68,1	23,1	12,7	31,1	12,1	13,8	27,8	30,9	10,9	19,1	23,3	23,2

Table 8. Summary statistics for developing group (transition and candidate countries)

		Transition And Candidate Countries	Bulgaria	Croatia	Cyprus	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovak Republic	Slovenia	Turkey
GDP Per Capita	Mean	5405,9	1695,2	4365,6	13297,5	5775,3	4545,5	4844,1	3.643,0	3644,7	9491,9	4453,7	1889,9	4008,5	10002,1	4026,0
	Median	4445,2	1611,0	4212,8	13617,8	5602,6	4272,2	4796,5	3.445,0	3380,4	9764,0	4496,0	1793,5	3845,5	9999,7	3958,8
	Max.	14704,8	2251,4	5489,6	14704,8	7056,5	6921,0	6107,3	5.695,2	5277,5	10322,3	5561,7	2437,8	5201,1	12340,8	4890,1
	Min.	1351,7	1351,7	3336,8	11870,3	5100,4	2986,0	3811,9	2.364,1	2561,0	8259,7	3411,3	1615,9	3174,2	7975,1	3549,4
	Standard Dev.	3261,1	292,2	666,0	1028,4	621,0	1235,9	783,8	1.049,8	877,2	646,3	648,5	268,7	572,9	1382,7	398,4
Domestic Credit Provided by Banking Sector (% of GDP)	Mean	61,3	49,2	60,9	206,0	56,5	41,5	66,8	37,2	24,0	127,9	36,9	20,4	54,1	44,4	36,3
	Median	46,4	35,4	52,9	233,2	54,6	35,4	63,2	23,3	16,3	131,0	37,2	18,7	53,3	41,7	39,3
	Max.	280,3	133,1	100,9	280,3	75,9	93,4	97,0	94,8	61,1	141,5	46,8	35,7	70,3	74,6	54,1
	Min.	11,4	15,3	44,9	141,8	42,3	12,1	49,1	11,6	11,4	108,2	30,1	13,0	43,1	31,9	19,1
	Standard Dev.	51,8	38,0	17,0	47,6	11,8	24,7	14,7	28,0	15,3	10,8	4,3	6,2	7,7	13,4	11,9
Market Capitalization of Listed Companies (% of GDP)	Mean	20,5	8,2	22,3	43,6	23,9	30,6	24,4	7,9	16,5	38,0	17,7	8,2	7,8	16,5	23,1
	Median	17,2	5,2	17,0	37,4	21,7	32,5	26,6	7,4	12,5	36,2	15,8	4,1	8,1	13,6	23,5
	Max.	86,6	32,6	67,6	86,6	34,0	52,1	37,1	15,8	34,2	70,6	43,6	27,0	10,5	39,8	45,3
	Min.	0,0	0,0	3,1	22,6	15,1	9,4	5,4	0,2	2,1	4,7	3,3	0,2	4,3	1,5	8,5
	Standard Dev.	15,9	9,3	16,3	20,4	5,9	11,4	9,5	4,5	10,1	21,7	11,6	8,8	2,0	11,2	10,4

4.2 METHODOLOGY

In this study, both static and dynamic panel models are employed in order to investigate both the relation and direction of causality between financial development and economic growth.

4.2.1 Static Panel Model

In our static model we do not employ the lagged variables. Therefore, in the first step, we investigate the relation through a simple static model. There are two main panel data regression models, namely fixed effects and random effects methods. In the fixed effects approach takes α_i to be a group specific constant term in the regression model. On the other hand, the random effects approach specifies α_i as a group specific disturbance similar to ε_{it} except that for each group, there is a single draw that enters the regression identically in each period. The Hausman test is applied, to decide appropriate model.

The panel regression model used in this study is specified as follows:

$$GDP_{it} = \alpha_i + \beta BNK_{it} + \theta MRC_{it} + \varepsilon_{it} \quad i = 1,...,N \quad t = 1,...,T \quad (1)$$

In this model GDP represents per capita GDP, BNK represents domestic credits provided by banking sector as percent of GDP and MRC represents market capitalization of listed companies as percent of GDP. The i subscript, therefore denotes the cross-section dimension whereas t denotes the time-series dimension.

4.2.2 Dynamic Panel Model

We also use the dynamic panel data model to investigate the relationship between economic growth and financial development. A difference GMM estimator proposed by Arellano and Bond (1991) in order to address the issue of omitted variables, unobserved country specific effects, and simultaneity bias.

Dynamic panel model used in this study is specified as follows:

$$GDP_{i,t} = \alpha_i + \lambda GDP_{i,t-1} + \beta BNK_{i,t} + \theta MRC_{i,t} + \varepsilon_{i,t} \tag{2}$$

Where, GDP represents per capita GDP, BNK represents domestic credits provided by banking sector as percent of GDP and MRC represents market capitalization of listed companies as percent of GDP. The i subscript, therefore denotes the cross-section dimension whereas t denotes the time-series dimension. In addition, α is an unobserved country specific effect.

To eliminate country-specific effects we take the first difference of each variable in the regression model. The regression model in first difference is specified as follows:

$$(GDP_{i,t} - GDP_{i,t-1}) = \lambda(GDP_{i,t-1} - GDP_{i,t-2}) + \beta(BNK_{i,t} - BNK_{i,t-1})$$
$$+ \theta(MRC_{i,t} - \theta MRC_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \tag{3}$$

Although the problem arising from unit heterogeneity effects is solved, a new problem arises due to the correlation between an explanatory variable and error term in the differenced equation. The use of instruments is required to deal with (1) the likely endogeneity of the explanatory variables, and, (2) the problem that by construction the new error term, $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$, is correlated with the lagged dependent variable, $(GDP_{i,t} - GDP_{i,t-1})$. Under the assumptions that (a) the error term, ε, is not serially correlated, and (b) the explanatory variables are weakly exogenous (i.e., the explanatory variables are assumed to be uncorrelated with future realizations of the error term), the GMM dynamic panel estimator uses the following moment conditions:

$$E[GDP_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \qquad \text{for } s \geq 2; \ t = 3,...,T, \tag{4}$$

$$E[BNK_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \qquad \text{for } s \geq 2; \ t = 3,...,T, \tag{5}$$

$$E[MRC_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \qquad \text{for } s \geq 2; \ t = 3,...,T. \tag{6}$$

We refer to the GMM estimator based on these conditions as the difference estimator.

Consistency of the GMM estimator depends on the validity of the instruments. In order to test the validity of the instruments we employ Sargan test which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The null hypothesis of the Sargan test is that the instruments are not correlated with the residuals.

4.2.3 Cointegration Analysis

Before proceeding to the identification of a possible long run relationship we need to verify that all variables are integrated in the same order.

4.2.3.1 Testing for integration

Recent literature suggests that panel-based unit root tests have higher power than unit root tests based on individual time series. While these tests are commonly termed "panel unit root" tests, theoretically, they are simply multiple-series unit root tests that have been applied to panel data structures (where the presence of cross-sections generates "multiple series" out of a single series). In this study we perform the Im, Pesaran and Shin (1997) (henceforth, IPS) test to detect non-stationarity features in our panels since it allows for heterogeneity not only in the intercepts, but also in the autoregressive term of the standard Dickey-Fuller regression[2]. The tests have been performed on the levels and the first differences of per capita GDP, domestic credits provided by banking sector as percent of GDP and market capitalization of listed companies as percent of GDP.

Im, Pesaran, and Shin (1997) begin by specifying a separate ADF regression for each cross section:

$$\Delta y_{i,t} = \alpha y_{i,t-1} + \sum_{j=1}^{\rho_i} \beta_{i,j} \Delta y_{i,t-j} + X_{i,t}^{'} \delta + \varepsilon_{i,t} \tag{7}$$

---

[2] Note that the panel unit root tests previously proposed by Levin and Lin (1992) and Quah (1994) allowed only for heterogenous intercepts.

The null hypothesis may be written as,

$H_0 : \alpha_i = 0$, for all i

while the alternative hypothesis is given by:

$H_1 : \alpha_i = 0$, for $i = 1,2,...,N_1$

$H_1 : \alpha_i < 0$, for $i = N+1, N+2,..., N$

(where the i may be reordered as necessary) which may be interpreted as a non-zero fraction of the individual processes is stationary. After estimating the separate ADF regressions, the average of the *t*-statistics for α_i from the individual ADF regressions, $\iota_{iT_i}(\rho_i)$:

$$\bar{\iota} = \left(\sum_{i=1}^{N} \iota_{iT_i}(\rho_i) \right) / N \tag{8}$$

is then adjusted to arrive at the desired test statistics.

In the case where the lag order is always zero ($\rho_i = 0$ for all i) simulated critical values for $\bar{\iota}_{NT}$ are provided in the IPSpaper for different numbers of cross sections N, series lengths T, and for test equations containing either intercepts, or intercepts and linear trends[3].

In the general case where the lag order in Equation (7) may be non-zero for some cross-sections, IPS show that a properly standardized $\bar{\iota}_{NT}$ has an asymptotic standard normal distribution:

$$W_{\bar{\iota} NT} = \frac{\sqrt{N}\left(\bar{\iota}_{NT} - N^{-1}\sum_{i=1}^{N} E(\bar{\iota}_{i,T}(\rho_i))\right)}{\sqrt{N^{-1}\sum_{i=1}^{N} Var(\bar{\iota}_{i,T}(\rho_i))}} \rightarrow N(0,1) \tag{9}$$

The IPS test statistic requires specification of the number of lags and the specification of the deterministic component for each cross-section ADF equation.

---

[3] The exact critical values of the t-bar statistic are given in IPS (1997).

4.2.3.2 Testing for cointegration

The Engle-Granger (1987) cointegration test is based on an examination of the residuals of a spurious regression performed using I(1) variables. If the variables are cointegrated then the residuals should be I(0). On the other hand if the variables are not cointegrated then the residuals will be I(1). Pedroni (1999, 2004) and Kao (1999) extend the Engle-Granger framework to test involving panel data.

Pedroni (1999) studies the properties of spurious panel regressions and proposes tests for the null hypothesis of no cointegration for homogeneous and heterogeneous panels. The tests are devised for the *simple* null hypothesis of no cointegration, without tackling the problem, which becomes relevant when dealing with more than one regressors, of how many cointegrating vectors exist and how they can be normalized. As pointed out by Pedroni (1999), the interest is in knowing whether the variables are cointegrated and it is implicitly assumed that the researcher has in mind a particular form of normalization. Therefore, the main aim of panel cointegration techniques is to pool information on common long run relationships but, at the same time, allow for short-run dynamics and fixed effects to be heterogeneous across the different members of the panel. The null hypothesis of the test is that for each member of the panel the variables are not cointegrated and the alternative hypothesis is that there is a single cointegration vector which may differ across individuals.

Pedroni (1999) proposes several tests for cointegration that allow for heterogeneous intercepts and trend coefficients across cross-sections. Consider the following regression:

$$y_{i,t} = \alpha_i + \delta_i t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2i,t} + \ldots + \beta_{mi} x_{mi,t} + \varepsilon_{i,t} \qquad (10)$$

for $t = 1, \ldots, T$; $i = 1, 2, \ldots, N$; $m = 1, 2, \ldots, M$ where y and x are assumed to be integrated of order one, *e.g.* I(1). The parameters α_i and δ_i are individual and trend effects, which may be set to zero if desired.

Under the null hypothesis of no cointegration, the residuals $\varepsilon_{i,t}$ will be I(1). The general approach is to obtain residuals from (10) and then to test whether residuals are I(1) by running the auxiliary regression,

$$\varepsilon_{i,t} = \rho_i \varepsilon_{i,t-1} + u_{i,t} \tag{11}$$

or

$$\varepsilon_{i,t} = \rho_i \varepsilon_{i,t-1} + \sum_{j=1}^{\rho_i} \psi_{i,j} \Delta \varepsilon_{i,t-j} + u_{i,t} \tag{12}$$

for each cross-section. Pedroni describes various methods of constructing statistics for testing for null hypothesis of no cointegration ($\rho_i = 1$). There are two alternative hypotheses: the homogenous alternative, $\rho_i = \rho < 1$ for all i (which Pedroni terms the within-dimension test or panel statistics test), and the heterogeneous alternative, $\rho < 1$ for all i (also referred to as the between-dimension or group statistics test).

The Pedroni panel cointegration statistic $t_{N,T}$ is constructed from the residuals from either Equation (11) or Equation (11). A total of eleven statistics with varying degree of properties (size and power for different N and T) are generated.

Pedroni (1999) shows that the standardized statistic is asymptotically normally distributed,

$$\frac{t_{N,T} - \mu \sqrt{N}}{\sqrt{u}} \Rightarrow N(0,1) \tag{13}$$

where μ and u are Monte Carlo generated adjustment terms.

In this study, we apply the parametric version of the test, for both within-dimension (panel cointegration statistics) and between-dimension (group mean panel statistics). In both cases, the null hypothesis is that the first autoregressive coefficient of the residual series is equal to unity; under the alternative hypothesis, in the case of the *within*-dimension tests the same coefficient is strictly less than one and equal for

all members of the panel. In the case of the between dimension test, the autoregressive coefficient is less than unity but may differ across individuals.

4.2.4 Causality Analysis

In this last section we will examine the casual relation between financial development and economic growth through two different approaches. The first one is the Granger causality approach and the majority of the studies reviewed earlier employed this method. The second one is a newly developed GMM technique for panel data to conduct the causality test.

4.2.4.1 Granger causality

Our task is to determine the causal direction between the three variables in question. Does financial development lead economic growth or otherwise? The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. y is said to be Granger-caused by x if x helps in the prediction of x, or equivalently if the coefficients on the lagged x's are statistically significant. Additionally, two-way causation is frequently the case; x Granger causes y and y Granger causes x.

Following Granger (1969), we estimate the following vector autoregression (VAR) system to test the Granger non-causality:

$$GDP_{i,t} = \alpha_{1,i} + \sum_{j=1}^{p_{1,i}} \beta_{1,i,j} GDP_{i,t-j} + \sum_{j=1}^{p_{1,i}} \delta_{1,i,j} BNK_{i,t-j} + \sum_{j=1}^{p_{1,i}} \gamma_{1,i,j} MRC_{i,t-j} + \varepsilon_{1,i,t} \quad (14)$$

$$BNK_{i,t} = \alpha_{2,i} + \sum_{j=1}^{p_{1,i}} \beta_{2,i,j} GDP_{i,t-j} + \sum_{j=1}^{p_{1,i}} \delta_{2,i,j} BNK_{i,t-j} + \sum_{j=1}^{p_{1,i}} \gamma_{2,i,j} MRC_{i,t-j} + \varepsilon_{2,i,t} \quad (15)$$

$$MRC_{i,t} = \alpha_{3,i} + \sum_{j=1}^{p_{1,i}} \beta_{3,i,j} GDP_{i,t-j} + \sum_{j=1}^{p_{1,i}} \delta_{3,i,j} BNK_{i,t-j} + \sum_{j=1}^{p_{1,i}} \gamma_{3,i,j} MRC_{i,t-j} + \varepsilon_{3,i,t} \quad (16)$$

α is a constant term; β, δ and γ denote coefficients to be estimated; the index i $(i = 1,...,N)$ denotes the country, the index t $(t = 1,...,T)$ the period, j the lag, and

$p_{1,i}$, $p_{2,i}$ and $p_{3,i}$, indicate the longest lags in the system. The null hypotheses of Granger non causality from financial development to economic growth are; BNK to GDP and MRC to GDP represented through $\delta_{1,i} = 0$ and $\gamma_{1,i} = 0$ respectively. The null hypotheses of Granger non causality from economic growth to financial development are; GDP to BNK and GDP to MRC represented through $\beta_{21,i} = 0$ and $\beta_{3,i} = 0$ respectively.

4.2.4.2 Dynamic Causality

Since the influential work of Granger and Newbold (1974) and Engle and Granger (1987), on the treatment of integrated time series data, many studies have been conducted employing the cointegration methodology in order to avoid the spurious regression problems, particularly in causality testing. The cointegration approach provides a way in which the long-run information of the integrated series in levels is conserved into equations that comprise stationary components (called the error correction model) that give valid statistical inferences. The majority of the studies reviewed earlier employed this method. However, in the present study, we apply a newly developed GMM technique for panel data to conduct the causality test.

To illustrate, we assume the endogenous variables are generated by a time stationary VAR (*m*) process in a panel data context (see Holtz-Eakin *et al.*, 1989). The following equations are ready for estimation, with growth of output per capita as the dependent variable in equation (17) while the financial development indicators are the dependent variable in equation (18) and (19), as follows

$$GDP_t = \alpha_0 + \sum_{j=1}^{m} \alpha_i GDP_{t-j} + \sum_{j=1}^{m} \beta_i BNK_{t-j} + \sum_{j=1}^{m} \theta_i MRC_{t-j} + \mu_i + \varepsilon_{i,t} \qquad (17)$$

$$BNK_t = \delta_0 + \sum_{j=1}^{m} \delta_i GDP_{t-j} + \sum_{j=1}^{m} \phi_i BNK_{t-j} + \sum_{j=1}^{m} \lambda_i MRC_{t-j} + \eta_i + v_{i,t} \qquad (18)$$

$$MRC_t = \lambda_0 + \sum_{j=1}^{m} \lambda_i GDP_{t-j} + \sum_{j=1}^{m} \omega_i BNK_{t-j} + \sum_{j=1}^{m} \vartheta_i MRC_{t-j} + \upsilon_i + u_{i,t} \qquad (19)$$

$$i = 1,...,N \; ; \quad t = 1,...,T$$

where i and t denote countries and time respectively. For example, the test of whether *BNK* causes *GDP* is simply a test of the joint hypothesis that $\beta_1 = \beta_2 = ... = \beta_m$ are all equal to zero. If this null hypothesis is accepted, then it means that *BNK does* not cause *GDP*. To account for the individual effects, the intercept is often allowed to vary with each unit in a panel analysis, which is represented as μ_i, η_i and υ_i in the above equations. The error terms $\varepsilon_{i,t}$, $v_{i,t}$ and $u_{i,t}$ are assumed to be independently distributed across countries with zero mean, but may be heteroskedastic across time and countries. Arellano & Bond (1991) point out that they can be either serially uncorrelated or moving average.

Although including lagged dependent variables in the panel enables the examination of the dynamics between the variables in study, Nickell (1981) shows that this leads to biased estimation, especially when N is much larger than T, like in this study. To overcome this problem, the standard procedure is to eliminate the individual effects by a first difference transformation (see, Anderson and Hsiao, 1981). Indicating with the first difference operator, equation (17), (18) and (19) become equation (20), (21) and (22) respectively as follow

$$\Delta GDP_t = \alpha_0 + \sum_{j=1}^{m} \alpha_i \Delta GDP_{t-j} + \sum_{j=1}^{m} \beta_i \Delta BNK_{t-j} + \sum_{j=1}^{m} \theta_i \Delta MRC_{t-j} + \mu_i + \varepsilon_{i,t} \quad (20)$$

$$\Delta BNK_t = \delta_0 + \sum_{j=1}^{m} \delta_i \Delta GDP_{t-j} + \sum_{j=1}^{m} \phi_i \Delta BNK_{t-j} + \sum_{j=1}^{m} \lambda_i \Delta MRC_{t-j} + \eta_i + v_{i,t} \quad (21)$$

$$\Delta MRC_t = \lambda_0 + \sum_{j=1}^{m} \lambda_i \Delta GDP_{t-j} + \sum_{j=1}^{m} \omega_i \Delta BNK_{t-j} + \sum_{j=1}^{m} \vartheta_i \Delta MRC_{t-j} + \upsilon_i + u_{i,t} \quad (22)$$

$$i = 1,...,N \; ; \quad t = 1,...,T$$

Focusing on the growth of output per capita (equation (17), if the errors are serially uncorrelated, they will be moving average of order one in equation (20). In general, if the errors are moving average of order k in the model at levels, they will be moving average of order $k+1$ in the model in first differences. Therefore, the errors in equation (20) are correlated with some of the explanatory variables, and

consistent estimation of the parameters requires some instrumental variables method as suggested by Anderson and Hsiao (1981).

The instrumental variable estimator as proposed by Anderson and Hsiao (1981), however, does not necessarily yield efficient estimates, since it does not make use of all the available moment conditions, and also does not account for the differenced structure of the new error terms. In this study, therefore, we employ the GMM-System estimator proposed in Arellano and Bover (1995) and Blundell and Bond (1998). This estimator combines in a system the transformed equations (17), (18) and (19) and the level equations (20), (21) and (22), and estimates the parameters by exploiting two sets of GMM-style instruments: one for the differenced equations and one for the level equations. Thus, the system consists of the stacked regressions in differences and levels, with the moment conditions:

$$E[y_{i,s}\varepsilon_{i,t}] = E[x_{i,s}\varepsilon_{i,t}] = E[z_{i,s}\varepsilon_{i,t}] = 0 \text{ for } s < t, \ i = 1,...,N$$

applied to the first part of the system, the regressions in differences, and the moment conditions:

$$E[y_{i,t-1}(\mu_i + \varepsilon_{i,t})] = E[x_{i,t-1}(\mu_i + \varepsilon_{i,t})] = E[z_{i,t-1}(\mu_i + \varepsilon_{i,t})] = 0 \ i = 1,...,N$$

applied to the second part, the regressions in levels. Here, the set of endogenous variables includes the growth of output per capita (y) measured by real GDP per capita, and the financial development indicators (x) measured using the domestic credit provided by banking Sector (% of GDP) and (z) measured using the market capitalization of listed Companies (% of GDP) observed for N countries over T periods.

Given that lagged levels are used as instruments in difference regressions, only the most recent difference is used as an instrument in the level regressions. Using Monte Carlo experiments, Blundell and Bond (1998) show that the GMM-System estimator reduces the potential biases in finite samples and asymptotic imprecision associated with the difference estimator. The key reason for this improvement is the inclusion of the regression in level, which does not eliminate cross-country variation or intensify the strength of measurement error.

The consistency of the GMM estimator depends both on the validity of the assumption that the error term, ε, does not exhibit serial correlation and on the validity of the instruments. To check the correct specification of instruments we perform, the Sargan test of over-identifying restrictions. Full details on these tests and the estimation procedure may be found in Arellano and Bond (1991), and Arellano and Bover (1995).

CHAPTER 5

EMPRICAL RESULTS

This section presents our empirical findings and organized under three sub-sections. The first sub-section gives the regression results of static and dynamic models for developed group (EU 15 countries) and developing group (transition and candidate countries). The second sub-section summarizes the cointegration analysis' result. Finally, in the third sub-section results of Granger causality and dynamic causality analyses are presented.

5.1 REGRESSION RESULTS

5.1.1 Static Model

Table 7 and 8 present the fixed effects OLS results from the estimation of the effects of financial development on economic growth where the dependent variable is per capita GDP and the explanatory variables are the domestic credit provided by banking Sector (% of GDP) and the market capitalization of listed Companies (% of GDP).

Table 9. Panel data regression results for the EU 15

Variable	Coefficient	t-Statistic	Prob
Constant	8.420	39.231	0.000
BANK	0.128	2.553	0.011
STOCK MARKET	0.235	7.614	0.000

In Table 7, a regression result for developed group is given. The results indicate that both stock market and banking activities have positive effect on economic growth. All of the coefficients are statistically significant and their signs are appropriate with the economic theory. Since all the variables are in natural logarithm coefficients represent percentage change. Therefore, a 10 percent increase in the domestic credit provided by banking Sector (% of GDP), would lead a 1.2

percent increase in per capita GDP and a 10 percent increase in the market capitalization of listed Companies (% of GDP), would lead a 2.3 percent increase in per capita GDP.

Our results for this regression also indicate that stock markets' activity promote economic growth more than banking activity. Theoretically, in the early stages of economic development we expect that banking activity stimulate economic growth more than stock market activity. For example, Boyd and Smith (1988) argue that countries become more market-based as development proceeds. Additionally, Gerschenkron (1962) indicates that in the early stages of development and in the case of state owned banks, market failures would be prevented and allocation of savings can be undertaken strategically through banks instead of stock markets. Therefore, our results support this idea and regression results indicate that when there is a same amount increase occurred both in stock market and banking activity, stock markets promote economic growth almost twice than banks in developed countries.

Table 10. Panel data regression results for transition and candidate countries

Variable	Coefficient	t-Statistic	Prob
Constant	7.346	0.064	0.000
BANK	0.258	0.019	0.000
STOCK MARKET	0.068	0.008	0.000

In Table 8 regression results for developing group is given. According to the results both stock market and banking activities have positive effect on economic growth. All of the coefficients are statistically significant and their signs are appropriate with the economic theory. Since all the variables are in natural logarithm coefficients represent percentage change. Therefore, a 10 percent increase in the domestic credit provided by banking Sector (% of GDP), would lead a 2.5 percent increase in per capita GDP and a 10 percent increase in the market capitalization of listed Companies (% of GDP), would lead a 0.6 percent increase in per capita GDP.

Regression results for developing countries also support the idea that banking activities in developing countries stimulate economic activity more than the stock markets. Some other studies also find out similar results for transition economies. For example, Fink and Haiss (1999) and Hagmayr and Haiss (2007) both studies on transition countries and indicate that banking sectors have a positive and significant role on economic growth while stock markets role is very little.

In the light of these two static model regression results, it is possible to infer that both stock markets and banking development have positive and significant effects on economic growth and our findings in both of the fixed effects OLS results support the idea that in the early stages of development banks are more efficient than stock markets, while in developed or advanced economies stock markets have greater influence than banks.

5.1.2 Dynamic Model

Table 9 and 10 present dynamic panel difference GMM estimation results for developed and developing countries respectively. Furthermore, the Hausman test favored the fixed effects model over the random effects model as consistent and efficient, again throughout the analysis. In our dynamic model, again, the dependent variable is per capita GDP and the explanatory variables are the domestic credit provided by banking Sector (% of GDP) and the market capitalization of listed Companies (% of GDP). We also use the Sargan test of over-identifying restrictions to check the correct specification of instruments.

Table 11. GMM estimation results for the EU 15

Variable	Coefficient	t-Statistic	Prob
GDP (-1)	0.946	267.892	0.000
BANK	1.675	3.243	0.002
STOCK MARKET	4.415	4.038	0.000
Nb. Observations:	142		
Sargan test (Statistic S):	13.28		
Instrument Rank:	14		

In Table 9, the GMM estimation result for developed group is given. The results indicate that both stock market and banking indicators enter the growth regression positively and significantly. Our result, again, indicate that stock markets' activity stimulate economic growth more than banking activity in developed countries. As it is stated above we use Sargan test in order to check the correct specification of the instruments. We run the test under the null hypothesis that the over-identifying restrictions are valid, the Sargan statistic is distributed as a $\chi(p-k)$, where k is the number of estimated coefficients and p is the instrument rank. The critical values for 1%, 5% and 10% are 19.68, 24.73 and 31.26 respectively. Since the value of our Sargan test statistic is smaller than all of the critical values we do not reject the null hypothesis that over-identifying restrictions are valid in all significance level.

Table 12. GMM estimation results for transition and candidate countries

Variable	Coefficient	t-Statistic	Prob
GDP(-1)	1.036801	512.2210	0.0000
BANK	0.834382	8.201573	0.0000
STOCK MARKET	1.743505	38.14671	0.0000
Number of Observations	148		
Sargan test (Statistic S)	13.28		
Instrument Rank	15		

In Table 10, the GMM estimation result for developing group is given. The results indicate that both stock market and banking indicators enter the growth regression positively and significantly. However, for developing countries our results do not support the idea that banking activity stimulates economic growth more than stock market activity in developing countries. The critical values for 1%, 5% and 10% are 21.03, 26.22 and 32.91 respectively. Since the value of our Sargan test statistic is smaller than all of the critical values we do not reject the null hypothesis that over-identifying restrictions are valid in all significance level.

In this sub-section we examined regression results of static and dynamic models and both of the models indicate that financial development promotes economic growth. However, there is an important difference between static and dynamic model results. According to static model results banking activity is more efficient in developing countries while stock market activity is more efficient in developed countries. However, according to dynamic model results for both of the groups stock markets are more efficient.

5.2 COINTEGRATION

In this section we will examine the long-run relationship between financial development and economic growth. As we mentioned earlier, before examining the long-run relation, we first need to verify that all variables are integrated of order one in levels. In this study we perform the Im, Pesaran and Shin (1997) (henceforth, IPS) test which is based on augmented Dickey-Fuller (ADF) statistic.

5.2.1 Unit Root Tests

We test for the null hypothesis of non-stationarity versus the alternative that the variable is stationary. Table 11 and 12 summarize the unit root test results for developed and developing group respectively. The variables used in the subsequent work include: per capita GDP, domestic credit provided by banking Sector (% of GDP) and the market capitalization of listed Companies (% of GDP). For each variable, we test the null hypothesis that variables in level are non-stationary. If the null is rejected, the variables identified as integrated order of 0, I(0). Otherwise, we apply the test to the first difference of the variables. If the null is rejected, the variables identified as I(1). In the case of non rejection, the differencing process continues until each variables becomes stationary.

Table 13. IPS unit root test for the EU 15

	Levels		First Differences	
GDP	-0.023	0.49	-4.4	0.000
BANK	4.683	0.999	-3.738	0.000
STOCK MARKET	-0.768	0.221	-4.28	0.000

Table 11 reports the unit root test results for developed group. It is observed that, for all of the variables, the null hypothesis of a unit root cannot be rejected for the variables in level. As a result, all the variables are I(1) since the null hypothesis can be rejected for each variable in first differences. After we identified that all the variables are I(1), in the next step, we proceed to test GDP, BANK and STOCK MARKET for cointegration to determine if there is long-run relationship.

Table 14. IPS unit root test for transition and candidate countries

	Levels		First Differences	
GDP	8.171	0.999	-4.144	0.000s
BANK	3.303	0.999	-5.326	0.000
STOCK MARKET	-1.038	0.149	-10.442	0.000

Table 12 reports the unit root test results for developing group and it is again observed that, all the variables are I(1) since the null hypothesis can be rejected for each variable in first differences.

5.2.2 Cointegration Tests

In the next step, we employ Pedroni (1997, 1999) cointegration approach in examining long run relation between financial development and economic growth which is based on a residual based ADF test. The tests are devised for the simple null hypothesis of no cointegration, without tackling the problem, which becomes relevant when dealing with more than one regressors, of how many cointegrating

vectors exist, and how they can be normalized. This is the main advantage of this approach in observing long-run relation in panel data analysis.

As we mentioned before, the main purpose of panel cointegration techniques is examining the common long run relationships and additionally allow for short run dynamics and fixed effects to be heterogeneous across the different members of the panel. In this study, we employ the parametric version of the test for both within dimension (panel cointegration statistics) and between dimension (group mean panel statistics). Pedroni (2000, 2001) emphasizes the important advantages of using between-dimensioned group mean based estimators for panels such as the present one in which the cointegrating vectors may be heterogeneous, and one is interested in comparing properties of the distribution of individual parameters to group mean values. Other studies such as Pesaran and Smith (1995) have also advocated the importance in general of using group mean estimators in the presence of parameter heterogeneity among panel members.

Table 13 and 14 report the results for the group-ADF and the panel-ADF statistics of developed and developing groups respectively. The tests are calculated allowing for a lag length up to 5 years in order to check whether the results are robust with respect to different dynamic structures. In particular, we consider two classes of statistics. The first class of statistics is based on pooling the residuals of the regression along the within dimension of the panel, whereas the second class of statistics is based on pooling the residuals of the regression along the between dimension of the panel. Both of the test statistics indicate a long run relation between financial development and economic growth both in developed and developing country group.

Table 15. Panel cointegration test for the EU 15

	Within-Dimension	
Panel ADF-Statistic	-5.423	0.000
	Between Dimension	
Group ADF-Statistic	-5.022	0.000

The test statistics are distributed as N(0,1) under the null hypothesis of no cointegration.

In Table 13 panel cointegration test results are presented for developed group. As we mentioned above, we employ the parametric version of the test and both panel ADF-statistic and group ADF-statistic are highly significant. Therefore, it is possible to reject null hypothesis of no cointegration in all significance level.

Table 16. Panel cointegration test for the transition and candidate countries

	Within-Dimension	
Panel ADF-Statistic	-4.249	0.000
	Between Dimension	
Group ADF-Statistic	-3.202	0.000

The test statistics are distributed as $N(0,1)$ under the null hypothesis of no cointegration.

In Table 14 panel cointegration test results are presented for developing group. Panel ADF-statistic and group ADF-statistic are highly significant again and we reject the null hypothesis of no cointegration in all significance level.

5.3 CAUSALITY

In financial development literature, the importance of the direction of the causality is one of the most outstanding issues. Since, the preliminary study of Patrick (1966), two important concepts introduced on the direction of causality issue. In examining casual relation between financial development and economic growth, we probably ask these questions. Does financial development promote economic growth? and Does economic growth promote financial development? These hypotheses have been respectively referred to in the literature as supply-leading or demand-following relationships, proposed first by Patrick (1966), who introduces the concepts to describe the two possible directions of causality between financial development and economic growth.

The supply-leading hypothesis posits a causal relationship from financial development to economic growth, which means deliberate creation of financial institutions and markets increase the supply of financial services and thus leads to real economic growth. Numerous theoretical and empirical writings on this subject have shown that financial development is important and causes economic growth.

For example, the findings in McKinnon (1973), Shaw (1973), Gupta (1984), Bencivenga and Smith (1991), and King and Levine (1993a, b, c) support the supply-leading phenomenon.

The other view, the demand-following hypothesis, postulates a causal relationship from economic growth to financial development. In this pattern, causation is reversed with the financial sector responding passively to growth in the real economy. In other words, as the real sector grows, increased demand for financial services induces expansion in the financial sector. Gurley and Shaw (1967) and Goldsmith (1969) support this hypothesis. According to this view, the lack of financial institutions in some less developed countries is simply a manifestation of the lack of demand for their services. Apart from these two competing hypotheses, Patrick (1966) proposes the stage of development hypothesis. Patrick (1966) argues that financial development promotes economic growth during the early stages of economic expansion, and the situation reverses to demand- following as the economy becomes more developed. In the early stages of economic development, supply-leading financial development can induce real capital formation. The innovation and development of new financial services opens up new opportunities for investors and savers and, in so doing, inaugurates self-sustained economic growth. As financial and economic development proceeds, the supply-leading characteristics of financial development diminish gradually and are eventually dominated by demand- following financial development.

We also examine the casual relation between financial development and economic growth through both Granger causality approach and dynamic causality approach. In the previous sub section we examine the lung run relation through cointegration test results which indicate a long run relation between financial development and economic growth. In the next step, we will examine the direction of the causality.

5.3.1 Granger Causality

Table 15 and 16 report the Granger causality test results for developed and developing countries respectively. In our model we employ two financial development indicators for banks and stock markets and test the direction of causality under the null hypotheses of financial development does not Granger cause economic development and economic development does not Granger cause financial development, respectively.

Table 17. Granger causality tests results for the EU 15

H_0 : No Causality	F-Statistic	p-value
GDP to BANK	0.555	0.645
BANK to GDP	0.935	0.425
GDP to STOCK MARKET	6.585	0.000
STOCK MARKET to GDP	1.525	0.209

In Table 15, causality tests results are presented for developed group. According to the results, there is no causal relation between financial development and economic growth in banking sector. However, when we examine the direction of causality for stock markets and economic development, our findings indicate that stock markets Granger cause economic development. In other words, there is only a unidirectional casual relation from economic growth to stock markets.

Table 18. Granger causality tests results for the transition and candidate country group

H_0 : No Causality	F-Statistic	p-value
GDP to BANK	28.724	0.000
BANK to GDP	2.720	0.046
GDP to STOCK MARKET	1.765	0.156
STOCK MARKET to GDP	3.810	0.011

In Table 16 causality tests results are presented for developing group. According to the results, causal relation between financial development and economic growth in banking sector is bidirectional. However, while the direction of

causality from economic growth to banking sector is significant in all levels, causality from banking sector is only significant in 5 %. When we examine the direction of causality for stock market operations and economic development, our findings indicate that only a unidirectional causality exists that stock markets Granger cause economic development and only statistically significant at 5%.

Our findings partially support the idea that financial development promotes economic growth during the early stages of economic development, while the situation reverses to demand- following as the economy becomes more developed. In Table 15, we observed that there is no casual relation between banking sector and economic growth and there is a unidirectional causality between stock markets and economic growth from economic growth to stock market activity, namely financial development.

First, many studies such as Levine (2002 and 2004), Beck and Levine (2004), Stiglitz (1985) and Singh (1997) argue that in the early stages of economic development banking sector plays a significant role in economic development while stock markets are more efficient in developed countries in terms financial intermediary activities. Thus, our findings in causality analysis support this argument.

Second, as it is stated above direction of causality in developing economies is from finance sector to economy while in developed economies from economy to finance. Our findings for developing economies also support the theory partially that the casual relation bidirectional in banking sector while the direction of the causality between stock market operations and economy is unidirectional, from stock markets to economic growth. As a result, our findings through Granger causality analysis supports the argument that Supply-leading finance dominates the early stage of economic development because it makes possible the efficient financing of investments which embody technological innovations.

5.3.2 Dynamic Causality

In this sub-section we examine the causal relationship between financial development and economic growth by using the GMM technique developed by Arellano and Bover (1995) and Blundell and Bond (1998) by conducting causality testing analysis.

Apart from avoiding the problem of a short span of time series data for a causality type study for several countries, a GMM panel data analysis has several advantages over cross-sectional or time-series in the following ways: (a)working with a panel, we gain degrees of freedom by adding the variability of the time series dimensions; (b) in a panel context, we are able to control for unobserved country-specific effects and thereby reduce biases in the estimated coefficients; (c) the panel estimator controls for the potential endogeneity of all explanatory variables by using lagged values of the explanatory variables as valid instruments (see Levine *et al*., 2000); (d) the small number of time-series observations should be of no concern given that all the asymptotic properties of the GMM estimator rely on the size of the cross-sectional dimension of the panel (Beck *et al*., 2000); and (e) when the number of cross-sectional units is much larger than the number of time-series periods, the non-stationarity problem commonly seen in time-series data can be reduced (Holtz-Eakin *et al*., 1988).

In this study, we choose a lag length of three years as suggested by the Holtz-Eakin *et al*. (1988) that the lag length should be less than one-third of the total time period to avoid the over-identification problem as a result of incorrect estimates of the covariance matrix. Using three lags structure, after differentiation, five observations per individual unit are available[4]. As to the specification tests: the Sargan test of over-identifying restrictions accepts the validity of instruments. Therefore, the choice of instruments seems to be correct.

---

[4] Longer lag structures would reduce too much the time dimension of the data, and the resulting estimates would be unreliable as warned by Holtz-Eakin *et al*. (1988, 1989).

To infer causality between financial development and economic growth, the Wald test is used to test the null hypothesis that the estimated coefficients, say β_i, in equation (17) are all zero.

Table 17 and 18 report the results of the causality test between financial developments (measured domestic credit provided by banking Sector (% of GDP) and the market capitalization of listed Companies (% of GDP)) and economic growth (per capita GDP) for developed and developing groups respectively.

Table 19. GMM estimates of panel causality tests for the EU 15

	DEPENDENT VARIABLE			
	GDP	BANK	STOCK MARKET	
CONSTANT	227.702 (0.000)	5.671 (0.014)	3.771 (0.365)	
GDP(-1)	16083.44 (0.000)	153.318 (0.205)	352.735 (0.108)	
GDP(-2)	4937.011 (0.090)	-65.596 (0.576)	302.067 (0.233)	
GDP(-3)	-5074.734 (0.035)	-46.81322 (0.646)	-534.183 (0.006)	
BANK(-1)	4.700106 (0.968)	2.171181 (0.769)	-5.367 (0.666)	
BANK(-2)	-408.338 (0.027)	7.025939 (0.341)	11.039 (0.474)	
BANK(-3)	-156.198 (0.410)	3.935 (0.598)	-5.689 (0.544)	
STOCK MARKET(-1)	128.806 (0.397)	-4.375 (0.470)	39.659 (0.000)	
STOCK MARKET(-2)	-131.526 (0.438)	2.886 (0.672)	-45.895 (0.000)	
STOCK MARKET(-3)	-258.560 (0.050)	-1.068 (0.848)	-1.284 (0.945)	
CAUSALITY WALD TEST	Direction of causality	F-stat	Direction of causality	F-stat
	BANK to GDP	1.642 (0.64)	GDP to Stock Market	7.26 (0.06)
	GDP to BANK	5.38 (0.14)	Stock Market to GDP	8.98 (0.02)

Note: p-values are in parentheses.

In Table 17 causality tests results are given for developed countries. According to the results, there is no causal relation between financial development and economic growth in banking sector. However, when we examine the direction of causality for stock markets and economic development, our findings indicate that casual relation is bidirectional. Direction of causality from economy to stock markets is statistically significant only at 10 % and from stock markets to economy at 5 %. As a result, dynamic causality analyses indicate that casual relation only exists between stock market operations and economic activity for developed group.

Table 18. GMM estimates of panel causality tests for the transition and candidate countries

	DEPENDENT VARIABLE			
	GDP	BANK	STOCK MARKET	
CONSTANT	164.745 (0.000)	2.375 (0.158)	6.4 (0.021)	
GDP(-1)	1272.811 (0.0684)	79.828 (0.017)	22.328 (0.682)	
GDP(-2)	344.055 (0.640)	-24.767 (0.485)	-34.431 (0.552)	
GDP(-3)	-831.042 (0.198)	-63.931 (0.0401)	-55.670 (0.272)	
BANK(-1)	458.4483 (0.033)	8.723 (0.396)	-25.552 (0.130)	
BANK(-2)	357.8265 (0.011)	16.7207 (0.014)	25.927 (0.019)	
BANK(-3)	-181.350 (0.1483)	5.537 (0.357)	8.823 (0.369)	
STOCK MARKET(-1)	71.560 (0.135)	1.252 (0.587)	3.823 (0.308)	
STOCK MARKET(-2)	-111.3 (0.018)	-1.425 (0.527)	1.397 (0.704)	
STOCK MARKET(-3)	-35.768 (0.098)	-1.375 (0.184)	-2.258 (0.183)	
CAUSALITY WALD TEST	Direction of causality	F-stat	Direction of causality	F-stat
	BANK To GDP	9.479 (0.02)	GDP to Stock Market	9.668 (0.02)
	GDP to BANK	14.284 (0.002)	Stock Market to GDP	1.762 (0.62)

Note: p-values are in parentheses.

In Table 18 causality tests results are given for developing group. According to the results, causal relation between financial development and economic growth in banking sector is bidirectional and statistically significant. When we examine the direction of causality for stock market operations and economic development, our findings indicate that only a unidirectional causality exists from stock markets to economy.

CONCLUSION

This thesis has examined the link between financial development and economic growth and the empirical analysis is conducted on a panel data set of 29 European Union member and candidate countries except FYR Macedonia. We divide the data set into two sub-groups. The first group includes developed countries Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom which also named as EU 15. The second group is the developing group and includes Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, and Slovenia as well as candidate countries; Croatia and Turkey.

This thesis takes both theoretical and empirical approach to study the relationship between financial development and economic growth. In theoretical part of the study, we examined the development and the motivations behind the theory and analyze the model, which explains the link between finance sector and economic activity. In empirical part of the study, we examine the relation using static and dynamic regression analysis, panel cointegration analysis and causality analysis.

First, in regression analyses we utilize static fixed effects OLS estimators and GMM dynamic panel estimators to expose relationship between financial development and economic growth. The results of static model regression indicate that both of the financial development indicators for banks and stock markets enter the growth regression significantly and positively. Regression results for developed countries indicate that stock markets activities promote economic activity more than financial intermediary activities of banking sector. On the other hand, regression results for developing countries indicate that banking activities promote economic activity more than stock market activity.

The results of dynamic model regression suggest that coefficients of the financial development indicators are also statistically significant and have positive signs. However, for both developed and developing countries stock market activity

promote economic growth more than banking activity. As a result, our findings through static and dynamic regression analyses both indicate that financial development positively affect economic development. Static model regression results support the hypothesis that in the early stages of development, financial intermediary activities mainly fulfilled by banking sector and countries become more market-based as development proceeds, while dynamic regression results do not support.

Second, we examined the lung-run relation between financial development and economic growth through cointegration analysis and we employed Pedroni (1997, 1999) cointegration approach. Cointegration test results indicate that a long-long run relation between finance and economy exists for both developed and developing countries.

Finally, we examined the direction of causality between financial development and economic growth using both Granger causality and dynamic causality approaches. Determining direction of causality is very important in financial development literature. Theoretically there are three possible casual relations. The first one is called as demand following, views the demand for financial services as dependent upon the growth of real output. The second causal relationship between financial development and economic growth is termed supply leading. Creation of financial institutions and markets increase the supply of financial services and thus leads to real economic growth. The third one came after emergence of the so-called new theories of endogenous economic growth that is the bi-directional relationship between economic growth and financial development.

First, we examined the casual relation between finance and economy for the EU 15. Both Granger causality and dynamic causality tests results indicate that there is no casual relation between financial development and economic growth in banking sector. On the other hand, results of the Granger causality analysis and dynamic causality analysis differ when we examine stock markets. According to Granger causality approach there is only a unidirectional causality between economic growth

and stock market development, from economic growth to financial development. However, dynamic causality analyses indicate a bidirectional relation.

Second, our results for transition and candidate countries are also similar. Both Granger causality and dynamic causality analyses indicate that there is a bidirectional casual relation between banking development and economic growth. However, when we examine stock markets, both of the tests indicate a unidirectional casual relation. According to Granger causality analysis direction exists from economic growth to stock market activity, while direction of causality exists from stock market activity to economic growth in dynamic causality analysis.

As a result, both Granger causality and dynamic causality analyses give similar results, but Granger causality analyses are more appropriate with our expectations through financial development theory.

REFERENCES

Akinlo A. Enisan and Akinlo O. Olufisayo, 2008 , *Journal of Economics and Business, Volume 61, Issue 2, March-April 2009, Pages 162-171*

Anderson, T.W. & Hsiao, C. (1981) Estimation of dynamic models with error components, Journal of the American Statistical Association, 76, pp. 589–606.

Ali Acaravci, Ilhan Ozturk and Songul Kakilli Acaravci, 2007, Finance – Growth Nexus: Evidence from Turkey, International Research Journal of Finance and Economics, Issue 11, 30-40

Arellano, M. and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", Review of Economic Studies, 58: 277-297.

Arellano, M. and O. Bover (1995), "Another Look at the Instrumental-Variable Estimation of Error-Components Models", Journal of Econometrics, 68: 29-52.

Bagehot, Walter (1873), "Lombard Street: A Description of the money Market", New York: Scribner, Armstrong and Co.

Beck, T. and R. Levine (2002), "Industry Growth and Capital Allocation: Does Having a Market- or Bank-Based System Matter?", Journal of Financial Economics, 64: 147-180.

Beck, T., Levine, R., 2004. Stock markets, banks and growth: panel evidence. Journal of Banking and Finance 28, 423–442.

Beck, T., R. Levine and N. Loayza (2000), "Finance and the Sources of Growth", Journal of Financial Economics, 58: 261–300.

Bencivenga, V. R., and B. D. Smith. 1991. "Financial Intermediation and Endogenous Growth," The Review of Economic Studies 58 (2), pp. 195-209.

Berthelemy, Jean-Claude, and Aristomene Varoudakis. 1996a. Financial Development Policy and Growth, OECD Development Center.

Bemanke, Ben. 1983. "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review,* pp. 257-76.

Bhide, A., 1993. The hidden costs of stock market liquidity. Journal of Financial Economics 34 (1), 1–51.

Blundell, R. W. & Bond, S. R. (1998) Initial conditions and moment restrictions in dynamic panel data models, Journal of Econometrics, 87, pp. 29–52.

Boyd, J.H., Smith, B.D., 1998. The evolution of debt and equity markets in economic development. Economic Theory 12, 519–560.

Calderon, Cesar & Liu, Lin, 2003. "The direction of causality between financial development and economic growth," Journal of Development Economics, Elsevier, vol. 72(1), pages 321

Devereux, Michael B., and Gregor W. Smith. 1994. "International Risk Sharing and Economic Growth," International Economic Review 35 (4), pp. 535-50.

De Gregorio, Jose, and Pablo E. Guidotti. 1995. "Financial Development and Economic Growth," *World Development* 23, No.3, pp. 433-48.

Diamond, D. W. 1984. "Financial Intermediation and Delegated Monitoring," Review of Economic Studies 51 (3), pp. 393-414.

Diamond, D. W., and P. H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity," Journal of Political Economy 91, pp. 401-19.

Drakos, K., 2003. Assessing the success of reform in transition banking 10 years later: an interest margins analysis. Journal of Policy Modeling 25, 309–317.

Economic Research Europe Ltd., 1996. A study on the effectiveness and impact of internal market integration on the banking and credit sector. European Commission. Engle, R. and Granger, C. (1987) 'Cointegration and error correction: representation, estimation and testing', Econometrica, 55, 251-276.

Fink et al., 2008,"Contribution of Financial Market Segments at Different Stages of Development: Transition, Cohesion and Mature Economies Compared" Journal of Financial Stability, 2008.

Fink, G., Haiss, P., 1999. Central European financial markets from an EU perspective: theoretical aspects and statistical analyses. IEF Working Paper No. 34. EuropaInstitut WU-Wien.

Galbis, Vicente. 1977. "Financial Intermediation and Economic Growth in Less-Developed Countries: A Theoretical Approach," Journal of Development Studies 13 (2), pp. 58-72.

Ghani, Ejaz. 1992. "How Financial Markets Affect Long-Run Growth: A Cross Country Study," *The World Bank Policy Research Working Papers* No. 843. Washington, DC.

Ghirmay, Teame. 2004 "Financial Development and Economic Growth in Sub Saharan African Countries: Evidence from Time Series Analysis" African Development Bank 2004.

Gerschenkron, A. (1962). *Economic Backwardness in Historical Perspective. A Book of Essays.* Cambridge: Harvard University Press.

Goldsmith, Raymond W. 1969. Financial Structure and Development, New Haven, CN: Yale University Press.

Granger, C. W. J. 1969. "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods," *Econometrica* 37, pp. 424-38.

Granger, C.W.J. (1988). "Some Recent Developments in a Concept of Causality", Journal of Econometrics, 39, 199-211.

Granger, C. and Newbold, P. (1974) 'Spurious regressions in econometrics', Journal of Econometrics, 2, 111-120.

Greenwood, Jeremy, and Boyan Jovanovic. 1990. "Financial Development, Growth, and the Distribution of Income," Journal of Political Economy 98 (5), pp. 1076-107.

Gurley, John, and Edward Shaw. 1955. "Financial Aspects of Economic Development," American Economic Review, pp. 515-38.

Gurley, John, and Edward Shaw. 1960. Money in a Theory of Finance, Washington, DC:Brookings Institutions.

Gurley, John, and Edward Shaw. 1967. "Financial Structure and Economic Development," Economic Development and Cultural Change 34 (2), pp. 333-46.

Habibullah, Muzafar Shah and Eng, Yoke-Kee(2006)'Does Financial Development Cause Economic Growth? A Panel Data Dynamic Analysis for the Asian Developing Countries',Journal of the Asia Pacific Economy,11:4,377 — 393

Hagmayr, B., Haiss, P., 2007. Financial sector development and economic growth—evidence for Southeastern Europe. In: Altzinger, W., Petkova, I. (Eds.), Impacts of Foreign Direct Investments on Banking Sectors in South East European Countries. Economic Policy Institute, Sofia, pp. 7–29.

Hasan, I. et al., 2007," Institutional development, financial deepening and economic growth: Evidence from China", J. Bank Finance, doi:10.1016/j.jbankfin.2007.11.016

Holtz-Eakin, D., Newey, W. & Rosen, H.S. (1989) The revenue-expenditures nexus: evidence from local government data, *International Economic Review*, 30(2), pp. 415–429.

Im, K.S., M.H. Peseran and Y. Shin, "Testing for unit roots in heterogeneous panels", mimeo, Department of Applied Economics, University of Cambridge, 1997.

Jaffee, D., Levonian, M., 2001. The structure of banking systems in developed and transition economies. European Financial Management, (2), 161–181.

King, Robert G., and Ross Levine. 1993a. "Finance and Growth: Schumpeter Might Be Right," Quarterly Journal of Economics 108 (3), pp. 717-38.

King, Robert G., and Ross Levine. 1993b. "Finance, Entrepeneurship and Growth: Theory and Evidence," *Journal of Monetary Economics* 32, pp. 513-42.

King, Robert G., and Ross Levine. 1993c. "Financial Intermediation and Economic Development," in C. Mayer and X. Vives, eds., *Capital Markets and Financial Intermediation* (Cambridge University Press, Cambridge).

Kularatne, Chandana (2001); "An Examination of the Impact of Financial Deepening on Long -Run Economic Growth: An Application of a VECM Structure to a Middle Income Country Context", Trade and Industrial Policy Strategies, Annual Forum 2001

Kwan, Andy C. C., Wu, Yangru and Zhang, Junxi (1998) 'An exogeneity analysis of financial deepening and economic growth: evidence from Hong Kong, South Korea and Taiwan', The Journal of International Trade & Economic Development, 7:3, 339 – 354

Levine, R., 2002. Bank-based or market-based financial systems: which is better? Journal of Financial Intermediation 11 (4), 398–428.

Levine, R., 2002. Bank-based or market-based financial systems: which is better? Journal of Financial Intermediation 11 (4), 398–428.

Levine, R., 1997, Financial Development and Economic Growth, Journal of Economic Literature, 688-726

Levine, R., and Sara Zervos. 1996. "Capital Control Liberalization and Stock Market Development," The World Bank Policy Research Working Papers No. 1622.

Levine, R, and Sara Zervos. 1998. "Stock Markets, Banks, and Economic Growth," American Economic Review 88 (2), pp. 537-58.

Levine, R, Finance and Growth: Theory and Evidence(September 2004). NBER Working Paper No. W10766. Available at SSRN: http://ssrn.com/abstract=592145

Levine, R. 1991. "Stock Markets, Growth, an Tax Policy," The Journal of Finance 46, pp. 145-65.

Levine, R. 1992a. "Financial Intermediary Services and Growth," Journal of the Japanese and International Economies 6, pp. 383-405.

Levine, R. 1992b. "Financial Structures and Economic Development," The World Bank Policy Research Working Papers No. 849, Washington, DC.

Lucas, R. E. (1988), "On the Mechanics of Economic Development", Journal of Monetary Economics, 22: 3-42.

Luintel, Kul B. & Khan, Mosahid & Arestis, Philip & Theodoridis, Konstantinos, 2007. "Financial structure and economic growth," Journal of Development Economics, Elsevier, vol. 86(1), pages 181-200

McCaig, Brian & Stengos, Thanasis, 2005. "Financial intermediation and growth: Some robustness results," Economics Letters, Elsevier, vol. 88(3), pages 306-312, September.

McKinnon, Ronald I. 1973. Money and Capital in Economic Development, Washington, DC: The Brooking Institution.

Mehl, A.,Winkler, A., 2003. The finance-growth nexus and financial sector environment: new evidence from Southeast Europe. Paper Presented at the 9th Dubrovnik Economic Conference Croatian National Bank.

Miller, M. H. (1998), "Financial Markets and Economic Growth", Journal of Applied Corporate Finance, 11: 8-14.

Mohamed TRABELSI, 2002, "Finance and Growth : Empirical Evidence from Developing Countries, 1960-1990", Center for Interuniversity Research in Quantitative Economics (CIREQ), number 13.

Mohtadi, H. & Agarwal, S. (2004) Stock Market Development and Economic Growth: Evidence from Developing Countries.

Ndikumana, 2005, Financial development, financial structure, and domestic investment: International evidence Journal of International Money and Finance 24, 651-673.

Nickell, S. (1981) Biases in dynamic models with fixed effects, Econometrica, 49, pp. 1417–1426.

Obstfeld, Maurice. 1994. "Risk-Taking, Global Diversification, and Growth," American Economic Review 84 (5), pp. 1310-29.

Ozturk, 2008, " Financial Development And Economic Growth: Evidence From Turkey", Applied Econometrics and International Development, Vol. 8-1.

Patrick, H. T. 1966. "Financial Development and Economic Growth in Underdeveloped Countries," Economic Development and Cultural Change 14, pp. 174-89.

Platek, M., 2002. Financial Sector Development and Economic Growth in Transition Countries. Difo-Druck, Bamberg.

Pedroni, P., Panel cointegration, asymptotic and finite sample properties of pooled time series tests, with application to the PPP hypothesis: new results; working paper, Indiana University, 1997.

Pedroni, P., "Critical values for cointegration tests in heterogeneous panels with multiple regressors", *Oxford Bulletin of Economics and Statistics*, 1999, 61, pp. 653-70.

Pedroni, P. ,2000, "Fully modified OLS for heterogeneous cointegrated panels", *Advances in Econometrics,* 15, 93–130.

Pedroni, P. ,(2001) Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time Series Tests, with an Application to the PPP Hypothesis+ Revised working paper, Indiana University.

Pedroni P. (2004), "Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time series Tests, With an Application to the PPP Hypothesis," *Econometric Theory*, 20, 597- 625.

Rousseau P.L and Wachtel P., 2002, " Inflation thresholds and the finance–growth nexus" Journal of International Money and Finance, 21, pp. 777–793

Saint-Paul, Gilles, 1992. Technological Choice, Financial Markets and Economic Development," European Economic Review 36 (4), pp. 763-81.

Schumpeter, J. A. (1911), "The Theory of Economic Development: An Inquiry into Profits, Capital, Interest, and the Business Cycle," Cambridge, MA: Harvard University Press.

Shaw, Edward S. 1973. Financial Deepening in Economic Development, New York: Oxford University Press.

Shleifer, A. and L. Summers (1988), "Breach of Trust in Hostile Takeovers", In: Corporate Takeovers: Causes and Consequences, Ed.: A. Auerbach, Chicago: University of Chicago Press: 33-56.

Stiglitz, J.E., 1985. Credit markets and the control of capital. Journal of Money, Credit and Banking 17 (1), 133–152.

Stiglitz, Joseph, and Andrew Weiss. 1981. "Credit Rationing in Markets with Imperfect Information," American Economic Review, pp. 393-410.

Trabelsi (2002),   Finance and Growth : Empirical Evidence from Developing Countries, 1960-1990Center for Interuniversity Research, Quantitative Economics (CIREQ), under number 13-2002.

Teame Ghirmay, 2004, "Financial Development and Economic Growth in Sub-Saharan African Countries: Evidence from Time Series Analysis, African Development Bank

Ünalmis, D., 2002. The causality between financial sector development and economic growth: the case of Turkey. Research DepartmentWorking Papers of the Central Bank of Turkey 3/2002.

Wenger, E. and C. Kaserer (1998). German banks and corporate governance: A critical view. The State of the Art and Emerging Research, pp. 499–536. Oxford: Clarendon Press.

World Bank. 2001. *World Development Report,* Oxford University Press, New York, NY.