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ESSAYS ON FINANCIAL DEVELOPMENT IN EMERGING MARKETS

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ABSTRACT

ESSAYS ON FINANCIAL DEVELOPMENT

IN EMERGING COUNTRIES

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Financial development plays a part in the enhancement of growth, and its goal is to decrease poverty. If a country develops its financial system, it will improve its functions by improving public services, productivity, wealth, and increasing savings, and access to credits. In the first chapter of this dissertation, financial development and its determinants are explained in detail. It is discussed why financial development is important for emerging countries, and how it can be accomplished and sustained.

In the second chapter, the association between financial development and financial openness is analyzed by using panel data regression for 27 emerging countries from 1996 to 2016. The second Chapter especially emphasizes three different financial openness measures which are trade, capital account and stock market openness. This issue is particularly important for emerging markets trying to improve their financial system to raise much-needed capital for investment projects. The financial development variable is measured by three different ratios: stock market capitalization/GDP, liquid liabilities/GDP, and private credits/GDP. Alternative measures are also employed for trade and capital account openness. Moreover, capital flow-based and valuation-based variables used in this chapter for measuring stock market openness have not been employed to explain financial development in the literature before. Empirical results suggest that openness to trade and openness to the capital account are the key factors for accomplishing financial development. These outcomes are also robust to the use of alternative financial development and financial openness variables and after controlling for institutional quality and its sub-components. The results of this chapter will have implications for policymakers in

emerging markets who endeavor to raise the depth of their financial markets for easier and cheaper access to funds.

In Chapter Three, the long-run association between financial development and economic growth is investigated by performing the Johansen-Fisher panel cointegration method for 27 emerging countries between the years 1980 to 2018. The Vector Error Correction Method (VECM) is also applied to determine the direction of a causal relationship between economic growth and financial development The two components of the overall financial development index developed by Svirydzenka (2016) (financial institutions index and financial markets index) are used to discover through which channels economic growth has a long-term association with financial development. This multi-dimensional variable explains the nature of financial development more inclusively than other alternative measures. This chapter's empirical outcomes suggest that there is a significant long-run relationship between economic growth, the overall financial development index, and its sub-indices. Likewise, outcomes from panel VECMs display a unidirectional causality between economic growth and the overall financial development index whereas bidirectional causality occurs among economic growth, financial institutions and financial markets indices. These outcomes are also robust to the use of Pedroni and Kao panel cointegration tests. The outcomes reveal that both financial markets and financial institutions have a significant effect on economic growth in the long run. Hence, the results of this chapter have implications for policymakers in emerging markets who try to develop economic growth.

Key Words: Financial Development, Financial Openness, Economic Growth, Cointegration, VECM

ÖZ

GELİŞMEKTE OLAN ÜLKELERDE FİNANSAL GELİŞME ÜZERİNE ÇALIŞMALAR

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Finansal gelişme, özellikle gelişmekte olan ülkelerin ekonomik büyümesinde oldukça önemli bir role sahiptir. Bir ülke finansal gelişimini arttırabilirse, o ülkedeki tasassruf birikiminin, kredilere erişiminin, üretkenliğinin ve dolayısıyla zenginliğinin olumlu yönde etkilenmesi beklenmektedir. Bu tezin birinci bölümünde, finansal gelişmenin tanımı ve belirleyici faktörleri anlatılmıştır. Ayrıca, finansal gelişmenin ekonominin çeşitli yönleri üzerindeki etkileri nedeniyle, nasıl gerçekleştireleceğini ve sürdürülebileceğini kavramak oldukça önemli olduğundan, gelişmekte olan ülkeler için finansal gelişmenin neden gerekli olduğuna da değinilmektedir.

İkinci bölümde ise, finansal açıklık ve finansal gelişme arasındaki ilişki panel veri regresyonu kullanarak 27 gelişmekte olan ülke için 1996-2016 yılları arasında analiz edilmektedir. Özellikle sermaye hesabı açıklığı, menkul kıymetler piyasa açıklığı ve ticaret açıklığı olmak üzere üç farklı finansal açıklık ölçüsü üzerinde durulmaktadır. Bu konu, yatırım projeleri için çok ihtiyaç duyulan sermayeye daha kolay erişmeyi ve finansal sistemlerini güçlendirmeyi hedefleyen gelişmekte olan ülkeler için oldukça önemlidir. Çalışmada, finansal gelişme üç farklı rasyo kullanılarak hesaplanmaktadır; piyasa kapitalizasyonu / GSYİH, likidite yükümlülükleri / GSYİH ve özel krediler / GSYİH. Aynı zamanda bu bölümde, sermaye hesabı ve ticaret açıklığı değişkenleri için alternatif ölçütler de kullanılmaktadır. Bu bölümün literatüre katkısı ise menkul kıymetler piyasası açıklığını ölçmek için kullanılan sermaye akışına dayalı ve değerlemeye dayalı değişkenlerin daha önce finansal gelişmeyi açıklamaya çalışan literatürde kullanılmamış olmasıdır. Amprik sonuçlar, ticaret ve sermaye hesabı açıklığının finansal gelişmeyi etkileyen temel faktörler olduğunu göstermektedir. Bu sonuçlar alternatif finansal açıklık ve finansal gelişme değişkenlerinin kullanılmasına

ve kurumsal kalite ile onun alt bileşenlerinin etkilerinin kontrol edilmesine karşı duyarlı değildir. Bu bölümün sonuçları, fonlara daha kolay ve daha ucuz erişim için finansal piyasalarının derinliğini arttırmaya çalışan gelişmekte olan piyasalardaki karar vericiler için önemli bulgular içermektedir.

Üçüncü bölümde, yine 27 gelişmekte olan ülke için Johansen-Fisher panel eşbütünleşme yöntemi kullanılarak, ekonomik büyüme ile finansal gelişme arasındaki uzun dönem ilişkisi incelenmektedir. Ekonomik büyüme ve finansal gelişme arasındaki nedensellik ilişkisinin yönü de araştırılmaktadır. Finansal gelişmenin ölçülmesinde Svirydzenka (2016) tarafından geliştirilen finansal gelişme endeksi ve ayrıca bu endeksin iki alt bileşeni kullanılmaktadır; finansal kurumlar endeksi ve finansal piyasalar endeksi. Bu sayede ekonomik büyümenin finansal gelişme ile hangi kanallar aracılığı ile uzun vadede ilişkisi olduğunun bulunması hedeflenmiştir. Bu yeni çok boyutlu değişken, finansal gelişmenin daha kapsamlı bir şekilde tanımlanmasını sağlamaktadır. Amprik sonuçlar, ekonomik büyüme ile finansal gelişme endeksinin ve alt endekslerinin arasında uzun dönemde önemli bir ilişki olduğunu göstermektedir. Benzer şekilde, panel vektör hata düzeltme modelinden elde edilen sonuçlar, ekonomik büyüme ile finansal gelişme endeksi arasında tek yönlü bir nedensellik olduğunu ancak ekonomik büyüme, finansal piyasalar ve kurumlar endeksleri arasında ise çift yönlü bir nedensellik olduğunu göstermektedir. Benzer sonuçlar Pedroni ve Kao (1999) panel eşbütünleşme testleri ile de elde edilmiştir. Sonuçlar, hem finansal piyasaların hem de finansal kurumların uzun vadede ekonomik büyüme üzerinde önemli bir etkiye sahip olduğunu göstermektedir. Bu nedenle, bu bölümün sonuçları ekonomik büyümeyi arttırmaya çalışan gelişmekte olan ülkelerdeki karar vericiler için önemli çıkarımlar sağlamaktadır.

Anahtar Kelimeler: Finansal Gelişme, Finansal Açıklık, Ekonomik Büyüme, Eşbütünleşme, Vektör Hata Düzeltme Modeli

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Melis Gültekin

İzmir, May 2022

TEXT OF OATH

I declare and honestly affirm that my study, titled "ESSAYS ON FINANCIAL DEVELOPMENT IN EMERGING COUNTRIES" and presented as a Ph.D. Thesis, has been written without applying to any assistance inconsistent with scientific ethics and traditions. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are shown in the text and listed in the list of references.

Melis Gültekin

Signature

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June 17, 2022

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SYMBOLS AND ABBREVIATIONS

ABBREVIATIONS:

FD	Financial Development
FL	Financial Liberalization
SMEs	Small and Medium-sized Enterprises
TO	Trade Openness (Import+Export/GDP)
TO1	Trade Openness (average tariff rate&the ratios of non-oil exports&imports/GDP)
FO	Financial Openness
KAOPEN	Capital Account Openness Index of Chinn-Ito
ACAOPEN	Alternative Capital Account Openness
CAOPEN	Capital Account Openness
SEGM	Segmentation
CTS	Composite Trade Share
FOEL	Foreign Equity Liabilities
INQ	Institutional Quality
LL	Liquid Liabilities
PC	Private Credit
AREAER	IMF's Annual Report on Exchange Arrangements and Exchange Restrictions

DC	Domestic Credit
CC	Control of Corruption
PS	Political Stability&Absence of Violence/Terrorism
RL	Rule of Law
GE	Government Effectiveness
VA	Voice&Accountability
RQ	Regulatory Quality
OLS	Ordinary Least Square
WG	Within Groups Estimator
PSID	The Panel Study of Income Dynamics
FE	Fixed Effect
SIPP	Survey of Income and Program Participation
REM	The Random Effect Model
LMF	Lane and Milesi-Ferretti
RZ	Rajan and Zingales
IFS	IMF's International Financial Statistics Data
WGI	World Government Index
FIBV	The Federation Internationale des Bourses Valeurs
WDI	World Development Indicators
IIS	Bulletin of the International Institute of Statistics

PRS	Political Risk Services
GFDD	World Banks' Global Financial Development Database
SHIW	First, the Survey of Households Income and Wealth
GDN	Global Development Network Growth Database
CPIS	The IMF's Coordinated Portfolio Investment Survey
LABORSTA	International Labor Organization's Database
QEDS	The Quarterly External Debt Database
ICRG	International Country Risk Guide
BIS	The Bank of International Settlements
BOPS	Balance of Payments Statistics
WEO	The IMF's World Economic Outlook
IIP	Nature of The Balance of Payments and International Investment Position
EG	Economic Growth
PUR	Panel Unit Root
UR	Unit Root
JFPC	Johansen-Fisher Panel Cointegration
VECM	Vector Error Correction Model
FI	Financial Institutions Index
FM	Financial Market Index

FDX	Overall Financial Development Index
lnGDPPC	Natural Logaritm of GDP per capita

CHAPTER 1
INTRODUCTION

In the globalizing world, the focus on economic improvement has been on the rise in recent years, and there have been new research contributions about the role of financial systems in economic development. For instance, Huang, (2010), Ahmed (2013), Samargandi, Fidrmuc and Ghosh (2014), Çiftçi, Ispir, and Yetkiner (2017), Younsi and Bechtini (2018) and Asteriou and Spanos (2019) documented a relationship between financial development (FD) and economic growth (EG). For this reason, FD has become quite important for countries, especially in developing ones. FD plays a part in the private sector development strategy, and its goal is to induce EG and decrease poverty. It also aims to overcome the costs generated in the financial system. Moreover, the mechanisms of decreasing costs, obtaining information, completing transactions, and imposing agreements lead to the advent of financial agreements, intermediaries, and markets. (IGI-Global, 2017). In other words, FD helps to produce better information on investments and capital allocation, overseeing firms, trading, diversification, and risk management. It also indicates the mobilization of savings and facilitates the exchange of goods and services.

Hence, FD facilitates the formation and expansion of institutions, tools, and markets and promotes investment and efficient mediation in the growth process (FitzGerald, 2006). Furthermore, FD can also be explained as the advancements in the size, efficiency, and stability of access to the financial system. It eliminates the market distortions by using financial systems in the best way concerning both financial markets' quality and size. Besides, the financial sector is about markets, institutions, and instruments. It also comprises a legal and regulatory framework allowing transactions. Additionally, financial sector development is concerned with overcoming the costs that occurred in the financial system (World Bank (WB), 2017).

The main purpose of this dissertation is to study FD and its impacts in emerging countries. Specifically, it examines what determines FD and whether an emerging country that improves its FD also promotes its EG. Chapter Two explores the

relationship between financial openness (FO) and FD. In particular, Chapter Two especially emphasizes three different FO variables which are openness to trade, capital account, and the stock market. This issue is particularly important for emerging markets trying to improve their financial system to enhance much-needed capital for investment projects. Chapter Three examines the long-run relationship between EG and FD. To calculate FD, a new FD measure introduced by Svirydzenka (2016) is used. Two components of this overall index, which are the index for financial institutions (FI) and the index for financial markets (FM), are used to examine whether and through which channels EG has a long-term association with FD. The results of this study have implications for policymakers in emerging markets who try to enhance EG.

In Chapter Two, panel data regressions are conducted to observe the relationship between financial openness (FO) and FD. Three types of FO measures are used for 27 emerging countries by evaluating annual data between the years 1996 to 2016. These three FO measures are openness to trade, account, and stock market. FD is also measured by three different ratios: stock market capitalization *(SMC)*/GDP, liquid liabilities *(LL)*/GDP, and private credits *(PC)*/GDP. This association is investigated after controlling for the institutional quality variable and its sub-contents separately. Moreover, three different alternative measures for all FO variables are employed in the empirical analysis. The stock market openness is measured with two different variables; capital flow-based and valuation-based, and these variables have not been employed to explain financial development before. The empirical findings show that openness to trade and openness to the capital account are the key factors for accomplishing FD. The results in Chapter Two have implications for policymakers in emerging markets who try to boost their financial markets' depth for easier and cheaper access to funds.

Chapter Three considers the long-run relationship between EG and FD in 27 emerging countries between the years 1980 to 2018. First, to investigate the presence of a long-run relationship, the Johansen-Fisher panel cointegration (JFPC) methodology is used. The panel VECMs analysis is then conducted to analyze the causal direction of this relationship. That is, Chapter Three estimates through which channels EG has a long-term relationship with FD. In this chapter, the overall FD index introduced by Svirydzenka (2016) and its two components, the financial institution index and the financial market index, are used. Finally, Pedroni and Kao's (1999) panel cointegration

method is conducted to test the long-run relation as a robustness check. The results in Chapter Three demonstrate that there is a significant long-run relationship between EG, the overall FD index, and its sub-indices. In the same way, results from panel VECMs display a unidirectional causality between EG and the overall FD index whereas bidirectional causality exists among EG, FM, and FI. Hence, the outcomes of this chapter have implications for policymakers in emerging markets who try to boost EG.

The findings of this study show that trade openness and capital account openness have an important impact on being remarkably successful in FD. Moreover, the empirical findings indicate that both financial markets and financial institutions have a significant impact on EG in the long run.

This thesis contributes to the literature in several ways; first, capital flow-based and valuation-based variables are used to measure stock market openness, and these variables have not been used to explain FD before. Second, this study differs from the other studies in the use of JFPC to examine the relationship between EG and FD in 27 emerging countries. Third, the relationship between EG and the components of the new broad-based FD measure is analyzed to find out in which ways EG and FD have a long-term association.

The remainder of this chapter describes determinants and measures of FD and reviews the relevant literature, while the rest of this dissertation is organized as follows. Chapter Two examines the relationship between FO and FD. Chapter Three investigates the long-run relationship between EG and FD. Chapter Four reaches some conclusions based on the findings.

1.1. Financial Development (FD)

There are five important factors that affect the financial system (Levine, 2005). The first one is composing information about forecasting investments and allocating capital. The second is observing investments and utilizing corporate governance after requiring finance. The third one is alleviating the trading diversification and management of risks. The fourth factor is pooling the savings, and the last one is simplifying the exchange of goods and services.

Financial policies were first mentioned in Keynesian and Structuralist theories of the 1950s and 1960s. These theories supported the idea of restricting the financial system. It was debated that lowering credits and interest rates in the direction of privileged

sectors would cause an increase in growth rates and investment. Thus, many countries followed these restrictive policies toward the financial system. However, over the last few decades, an ever-growing body of studies emerged on the outcomes of FD. Researchers investigated the relation between FD and EG in both emerging and developed countries and the findings documented a positive link between FD and growth (Levine, 1997; Levine, Loayza, and Beck, 2000; Voghouei, Azali, and Jamali, 2011; Valickova, Havranek and Horvath, 2015). This positive relation demonstrates that FD is a significant issue for countries; hence, many policymakers in emerging economies attempt toward financial reforms and focus on the determinants of FD. However, notwithstanding the similarities in the financial policies, there are different results for the level of FD and EG (Voghouei et al. 2011).

On a separate note, many empirical studies also showed that FD and the degree of openness are correlated with EG across countries. If a country improves its financial sector, it can have positive outcomes for its trade balance. Beck (2002) showed these relations between FD and the structure of the trade balance, especially in the manufacturing area, and also noted that FD has a great effect on the level of exports as well as on the trade balance of manufactured goods.

Furthermore, there is a noticeable increase in financial integration in recent years, and countries have increased cross-border holdings. Hence, this makes alterations in the formation of assets and liabilities. Also, external portfolios of countries make fluctuations in exchange rates and asset prices that affect the reallocations of wealth over countries. These huge external imbalances lead to improved interest in the international adaptation mechanism. Besides, exchange rates, which are affected by financial integration, also influence the net capital flows and gains on external holdings (Lane and Milesi-Ferretti, 2007, hereafter LMF). LMF (2007) indicated that financial globalization both in industrial and emerging countries has increased over recent decades, and valuation channel changes are very important for net foreign assets.

To sum up, FD is a significant subject for economic growth, and many economists still try to understand what generates financial development. Moreover, they still examine the reasons that affect FD and try to find out why financial structures differ from one country to another. Moreover, researchers try to figure out the reasons which explain differences in the level of FD in different countries, especially emerging countries or OECD member countries, because these countries have almost identical income levels and geographic conditions (Huang, 2010).

1.2. Why is FD Important?

Many researchers documented that FD plays a substantial role in economic development. FD supports EG through capital savings and technological development (Levine, 1997). Besides, it promotes not only the inflows of foreign capital but also the enhancement of the allocation of capital. Moreover, countries that have advanced financial systems are more likely to develop faster over long periods. On top of that, FD lessens inequality and also poverty by expanding access to finance for the poor and powerless groups and increasing investment and productiveness (WB, 2017).

FD is also critical for small and medium-sized enterprises (SMEs) because they can have access to finance with the help of development. SMEs cumulatively create more jobs than large ones, and they are labor-intensive. In emerging economies, SMEs have an essential function in development. Besides, the global crisis stems from weak financial sector policies and mostly exemplifies potentially harmful results of weak financial sector policies for FD and also their effect on economic consequences. One of the crucial steps for overcoming the crisis is sustainable FD, and the other important step is reassessing financial sector policies after the crisis (WB, 2017).

In the process of economic development, the financial system and economic policies have an essential role because the financial system fulfills the basic services required by a modern economy. For example, the expansion of the industry and agriculture sectors hinges on the presence of financial resources and investments. The amount of investments also depends not only on the availability of funds to finance them but also on the development of mechanisms for raising the funds, which are needed to increase investment opportunities. Moreover, composing the financial sources and providing mobilization have significant effects on the growth rate of the real sector. Besides, the effective use of financial resources is also very important for the development of other sectors. So, the relation between FD and economic development has been discussed for a long time (Ağır, 2010).

1.3. Determinants of FD

A growing number of studies state a strong and positive relationship between FD and EG in developed as well as emerging countries. This link has inspired decision-makers in many emerging countries to take steps toward financial reform and the incentive of FD. Although FD grows fast in some countries, its growth rate can remain

unsatisfactory in others. For instance, let us consider Mexico and the USA. Despite the similar aims of their policymakers, these countries have very different experiences concerning the level of FD, due to their different political institutions. (Voghouei et al. 2011).

Voghouei et al. (2011) propose the following classifications of FD determinants: 1) Legal Traditions, 2) Institutions, 3) Financial Liberalization, 4) Openness Policy, 5) Political Economy Factors and 6) Other Factors.

1.3.1. Legal Traditions

Legal systems, as well as legal traditions, can affect the FD in a country. Legal systems include property rights protection, accounting implementations, contract enforcement, and right treatments for creditors and shareholders. They both are essential for financial development. The question "*Why do some countries have larger capital markets than others?"* intrigued many economists and has become the subject of many studies. For example, the U.S and UK have huge equity markets; on the other hand, Germany and France have smaller. Whereas the U.S has too many companies that went to the public, Italy has fewer companies that did so. These examples show the differences in the nature and effectiveness of financial systems (Pagano et. al, 1995 retrieved from La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1996; 1997, hereafter LLSV). They assumed that these differences in financial systems are because of the differences in the protection of investors, reflected by legal rules and the quality of enforcement. Besides, legal rules which protect investors and enforcements differ from country to country.

LLSV (1998) composed a theory that assigned a significant role to the legal system, showing that enforcement and legal rights mechanisms could ease markets and intermediaries. The authors clarified that a country's legal origin affects its legal treatment of shareholders and creditors as well as its contract enforcement and accounting standard. Moreover, LLSV (1998) analyzed whether dissimilarities in legal tradition demonstrated in shareholders' protection and creditors' rights, produced any cross-country dissimilarities in FD or not. Law differs in each country because of the dissimilarities in their legal origin, and these affect the priority given to preserving the rights of investors such as property and private rights. Thus, creditors, shareholders, and contract enforcement—the fundamental factors of FD are also influenced. (Voghouei et al., 2011).

LLSV (1997) stated that legal systems have been usually inherited from colonial times. Legal rules show differences in countries and also in their accounting systems. As LLSV (1998) explain, there are two types of legal traditions: common law and civil law. Common law has English origins, while civil law is based on Roman law. The civil law tradition comprises three main commercial laws which originated from; i) French, ii) German, and iii) Scandinavian civil traditions. Moreover, civil law is the most effective and widespread tradition, and despite being the oldest, French civil law is generally defined with the French Revolution and Napoleon's codes. It spread to the other countries with Napoleon's codes (La Porta, Lopez-de Silanes, and Shleifer, 2008). On the other hand, common law expanded first to the British colonies and then to many other countries. In addition to the other civil law tradition, socialist law is a subtradition of civil law that is used in Communist states. But, originally, it came from the Soviet Union. Socialist law first expanded to the Soviet republics and later to Eastern Europe. After the Soviet Union collapsed, legal socialists were diminished but some countries such as China, North Korea, Vietnam, and Cuba maintained their model of socialist law (La Porta et al., 2008).

Compared to common laws, civil laws provide weaker legal rights to investors, independent of the level of per capita income. Countries that adopted the common law, provide the strongest protection to their creditors and shareholders while countries that adopted French civil law provide the feeblest. German civil law and Scandinavian countries are generally better than French civil law countries in terms of protection. Furthermore, French civil law countries have inefficient contract enforcement. They have higher corruption and less well-developed financial systems; contrarily, German civil law countries, along with the common law countries, have the highest law enforcement quality (LLSV, 1998). Besides, many other researchers consider that legal traditions differ concerning their ability to conform to unstable conditions. For example, the flexibility process in adaptation could substantially affect FD. The legal system capabilities also support FD more effectively than inflexible legal traditions, and the adaptability of legal systems could justify the variation in financial institution development. Common law can be effective in encouraging both financial institutions and FD because it has a dynamic structure filling the gap between the demands of society and the law (Voghouei et al., 2011).

1.3.2. Institutions

Most economic and financial developments generally depend on government politics. Financial systems need to be well-run. From this point of view, institutions are crucial for effective mechanisms, and regulations of financial intermediaries and of a country. They must perform well for fulfilling contracts and regulations. Institutional factors take a significant role in the process of FD, affecting EG (Arestis and Demetriades 1996, Voghouei et al., 2011). There are many studies about institutions' role, especially in the legal and regulatory environment since these are effects on the functioning of financial markets (Huang, 2010).

Economic institutions in society, such as the structure of property rights and the existence of markets, are essential for economic outcomes. In addition, institutions shape the economic incentives in society because individuals cannot invest in human capital or endorse effective technologies without property rights. Besides, with the help of institutions, a more efficient resource allocation can be obtained. Societies with economic institutions that promote innovation and allocation of resources, while expediting and encouraging factor accumulation, will prosper (Acemoglu, Johnson, and Robinson, 2004).

Many studies mention the significance of institutions for FD and growth but the most substantial theories about institutions were presented by Acemoglu et al. 2001, 2004 and Beck, Demirgüç-Kunt, and Levine 2003).

The Endowment theory put forth by Acemoglu et al. (2001) discussed that European people adopted various colonization strategies and institutions. In other words, this theory shows the differences between institutional structures among colonized European countries. Acemoglu et al. (2001) based their theory on three premises. First, colonization strategies that created divergent sets of institutions have different types. One example, the Europeans established and generated institutions that neither fulfill protection for private property of the State nor ensure checks and balances against government expropriation. In this case, the main aim of the state was to shift the resources of the colony to the home countries. Another example, there were European people called "*Neo-Europes*" who migrated and tried to copy European institutions, emphasizing private property and checks against the power of government. The second premise of their theory is the feasibility of settlements that affected the colonization strategy. In unfavorable areas, Europeans showed a tendency to create extractive

states, and the last premise is the persistence of the colonial state and institutions even after having their independence (Acemoglu et al., 2001). They also used the mortality ratios anticipated by the first European settlers and these were used for measurement for institutions. Besides, Acemoglu et al. (2004) alleged that the main factor of the differences in institutions was because of the differences in economic development and indicated that institutions had various advantages for individuals. Societies that have economic institutions facilitate innovation and allocation of resources. Economic institutions can promote EG when political institutions grant power to groups who benefit from broad-based property rights enforcement. In their theory of economic institutions, the authors indicated the effect of political power on institutions, trying to explain why institutions vary across countries.

Conversely, according to Beck et al. (2003), the endowment theory discussed that institutions, which affect FD, are influenced by geographical environment and disease. These also affect the formation of enduring institutions. They tried to clarify the relationship between endowments and finance with the measure of "*Settler Mortality*". The authors showed empirical evidence that institutional endowments are important for FD. They examined the historical determinants of FD and took into account both theories, law and finance (LLSV, 1998) and endowment (Acemoglu et al. 2001). Beck et al. (2003) proposed that the protection of property rights is different in the colonies that follow the French civil law tradition and those that adopt the British common law. In countries with French civil law traditions, levels of FD tend to be lower than those with British common law. In addition, countries that have inadequate geographical endowments have less developed financial institutions, and they do not give enough emphasis on property rights protection (Voghouei et al., 2011).

1.3.3. Financial Liberalization

Financial liberalization (FL) is expressed as the process of opening economies to international capital flows. Through deregulation enforcements, governments have discarded the restrictions and controls on their banking financial system in order to attract developed countries' international financial activities to their own countries. (Ongun, 1993; Selcuk and Durusoy, 2019).

In the 1980s, foreign financing facilities declined due to the debt crisis and because of this decline, emerging countries altered their composition of private capital flows (commercial bank loans and external debt) and shifted it to foreign capital such as

foreign direct investment and portfolios to provide FD and growth (Selcuk and Durusoy, 2019). As a consequence of foreign financing facilities which have declined considerably with the 1980s debt crisis, emerging countries have shifted to foreign capital, changing the composition of private capital flows to provide the capital accumulation they need to realize their development and growth. Therefore, there is a association between financial and capital globalization and debt issues.

The theory of FL provides a theoretical framework for the role of the financial sector in the economic development process in emerging countries. Many of them were faced with the dilemma of the rapid realization of economic development on one side, and on the other, the inadequacy of financial resources for this development. In emerging countries, governments have interventions to achieve their goals by making regulations and constraints not only in the financial sector but also in the economy (Ağır, 2010).

In the financial sector, two types of government interventions that are undesired; the first one is financial repression which is identified by McKinnon and Shaw (1973) as interest rates that are determined apart from market forces and artificially kept lower than inflation (Ağır, 2010). Even though this financial repression is necessary for stabilization, distortions that are made by the government can be important to FD. The second one is government ownership of banks. With government intervention, politicians can control the allocation of credit. Also, state banks that are privatized prohibit credit allocation to enterprises and firms that would induce political interests and FD. That is to say, the independent banking system, privatized banks, deregulation of interest rates, removal of credit controls, and free entrance into the banking sector are primary FL factors (Voghouei et al., 2011).

Another discussion about financial repression in emerging countries is that it enables some entrepreneurs to use loans with lower interest rates while some entrepreneurs cannot, which causes a dual structure in the economy. Loan rationing in the financial sector leads to investments in inefficient areas and deposits with negative effects because high inflation rates render the loans unable to meet the funding needs for investments (Ağır, 2010). This situation encourages the use of other instruments such as foreign exchange, gold, real estate, etc. rather than the financial system as a means of real saving and, this impedes the development of the financial system by inhibiting savings to return to the financial system. Thereby, it lowers the investments below the optimal level.

There are economic and political reasons behind the rise of financial sector intervention, especially low real interest rate policies are popular. Hence, many emerging countries implement negative real interest policies to increase their investments (Galbis, 1977; Fry, 1978). This approach justifies interventionist politics, such as selective credit controls and subsidies, and expresses that the government has a superior knowledge of which policies are to be implemented, supported, and appropriated (Ağır, 2010).

Roubini and Sala-i Martin (1995) clarified the reasons for financial repression as follows:

- Firstly, the government may have to make a law to prevent the occurrence of high interest rates so it can prevent the interest rates from being determined by market forces.
- Secondly, monetary authorities have further control over the tight control and regularization of the banking system over the money supply.
- Thirdly, there has been an opinion that the government has superior knowledge than markets and private banks, and how much the optimum saving allocation will be made and which investments will be made.
- Fourthly, the financial repression that is defined as an interest rate below the interest rates to be generated by the market forces will reduce the cost of the government debt service.

Whatever the causes and reasons are, financial repression policies are severely criticized by McKinnon (1973) and Shaw (1973) and their proposal is to implement liberalization in the financial sector.

Meanwhile, other researchers have different ideas about liberalization. Liberalization of interest rates might not compulsorily cause financial deepening by the reason of information asymmetries (Schiantarelli, Atiyas, Caprio, Harris and Weiss, 1994). Stiglitz (1994) debated that financial restraints lessen some problems such as moral hazard and adverse selection. Also, limiting the incentives for banks can decrease risky bank portfolios by investing in assets that would facilitate gambling and thus lessen risky bank portfolios.

1.3.4. Openness Policies

In recent years, openness has become important in emerging countries for their EG, and for that, they need foreign investors. So, growth in trade and capital account

liberalization has a significant place in emerging countries. Moreover, capital flow and international trade openness contribute to the welfare of a country and also foster financial markets. (Voghouei et al. 2011).

There is both empirical and theoretical research on the relationship between FD and openness, especially in emerging countries. In these studies, openness is generally categorized into two groups: Financial Openness and Trade Openness (Hanh, 2010).

Financial Openness such as openness to capital flows, FDI flows, etc. is one of the determinants of FD, and many studies have demonstrated a connection between financial openness and development (Hanh, 2010). Also in the developing world, the liberalization of capital markets can affect how a country's financial system implements inflows as well as outflows of capital. Literature about FO generally mentions the association between EG and capital account. Besides, the internationalization of allocation of resources will be more effective by capital account liberalization (Henry, 2007; as cited in Voghouei et al. 2011).

Developed countries that have capital but lower return rates will transfer resources to emerging countries that are short of capital but have higher return rates, and this transfer of resources decreases the cost of capital in emerging countries. Hereby, this condition contributes to EG in these countries. Furthermore, by decreasing some problems like adverse selection, asymmetric information, moral hazard, and the optimum utilization of capital can be achieved. Besides, transaction costs are another important problem for countries; therefore, reducing them can also alleviate the allocation of capital too. A financial sector that solves such problems can be successful. On the other hand, there are other ways for the development of financial systems, one of which is the liberalization of the capital account (Voghouei et al. 2011).

Chinn and Ito (2006) concentrated on the effect of openness to capital account on FD, for emerging markets. The authors observed that removing capital controls enabled foreign and domestic investors to take part in diversifying international portfolios. Hence, the cost of capital could decrease and borrowers could benefit.

Trade openness (TO) is another determinant of FD which occurred with expansion in world trade. Rajan and Zingales, hereafter RZ, (2003) assumed that TO fosters financial development, both enlarging opportunities and increasing competition in the economy. TO also brings foreign investors to domestic markets. Accessibility of import and export and lower costs of financing can promote entrepreneurs to launch

new projects. Hence, financial development in countries can advance openness to trade. Nevertheless, the amount of trade can also affect the financial sector. If the trade increases, the financial sector will develop (Voghouei et al. 2011).

Foreigners provide market competition, and this is useful for domestic financial development because it can be improved by the costless capital flow across borders. In addition, international capital market openness provides both for the biggest and the healthiest firms to utilize from outside markets to find savings. Free capital mobility affects individual investors who are living in financially repressed countries and who prefer developed countries to invest their funds because their earnings are not reduced by transaction costs. So, the loss of a source of funds for that country force domestic financial institutions to ameliorate their returns in order to keep up with the foreign investment opportunities; therefore, they are obliged to enhance their FD. In short, the main source of FD is foreigners because openness promotes FD (RZ, 2001).

Do and Levchenko (2004) stated that to the range, the financial system of a country is endogenous, FD is inclined by the economic conditions that a country confronts, which also involves trade. TO will also influence the demand for external finance in trading countries. Trade between affluent and poor countries is another important issue for financially dependent sectors. For example, when an affluent country initiates trade with a poor country, it can improve its production as well as the financial system. But in a poor country, this will cause impairment to the financial system and quality. For that matter, such trading not only diminishes the financially intense sectors in poor countries but also their external financial demands.

1.3.5. Political Economy Factor

Political economy factors also have an impact on FD. Voghouei et al. (2011) state that political preference determines the decisive forces that influence the operation and financial system development. In other words, political factors are effective determinants in promoting FD.

Political and financial authorities propose that a country of financial systems with closed and centralized political regulations progress more inadequately than a country with a free voter democracy where a competitive and open government controls the legislative and executive power. Political economic factors directly affect financial development whereas other determinants are more indirect. For instance, an economic institution is one of the determinants that influence FD, but it is an endogenous factor

that is actually determined by political institutions (Beck et al. 2001).

Acemoğlu et al. (2004) debated in their research that divergent economic institutions cause divergent allocation of resources. So, there would be conflicts between individuals and interest groups over economic institutions. For example; the group holding the most political power can design the set of economic institutions and gain the favor of these institutions.

RZ (2001) mentioned that groups that are powerful or elite might or might not promote FD. They also indicated that TO and financial market openness cause competition. Moreover, the authors displayed that incumbents obtain more profit from underdeveloped financial systems with the help of financial development access to markets by foreigners who intend to use fewer resources. Also, more competition as a result of easy access to markets generates fewer profits for incumbent firms. In such a case RZ (2001) claimed that when a country provides TO, its opportunities increase disproportionately in comparison to available resources. Besides, financial repression is a political choice of a country because it discriminates in favor of a political group having access to foreign exchange licenses, investment capital, and corporate control (Voghouei et al. 2011).

Siegle, Weinstein, and Halperin (2004) debated that political freedom and electoral democracy can promote FD and claimed that democracy itself could be defined as a source of development. La Porta, Lopez-de Silanes, and Shleifer, (2002) mentioned that countries that have an electoral democracy system are generally known as more advanced in the financial system. It is because democratic authorities support FD and have little incentive to maintain financial institutions in public ownership.

1.3.6. Other Factors

Population, religion, language, geography, culture, ethnic characteristics, etc. generally are known as determinants of FD. But there are also some macroeconomic parameters such as income level, EG, and inflation that promote FD (Huang, 2010; reported from Voghouei et al. 2011).

Inflation is assumed to have negative effects on FD. If the rate of inflation increases, the real rate of return on assets and money will decrease, which deteriorates credit market conflicts and causes the release of less credit. The allocation of resources becomes inefficient because of fewer loans, which makes a negative effect on FD (Huybens and Smith, 1999).

On the other hand, there has been less research about the effects of culture and geography on FD. Acemoglu et al. (2001) claimed that region might be a primary determinant for institutions. This is because some places like tropical areas were inhospitable disease environments, and they were not suitable for European settlements. So, institutions could not be formed.

Moreover, Easterly and Levine (2003) also debated what affected the formation of institutions, and they mentioned that the natural endowment of tropics, crops, and germs had an impact on establishing institutions.

Jaffee and Levonian (2001) examined 23 transition economies that were involved in banking sector development and found that GDP per capita (GDPPC) and the saving rate, which were measured by assets, employees, numbers, and branches, affected banking system structure positively.

Moreover, Frankel and Romer (1999) said that distance, size, and geographical variables affected trade. Even though geography generally is connected with the demand size of FD by influencing the institution's qualities, it can affect the supply size of FD, too.

Another research about factors is from Stulz and Williamson (2003). They indicated that culture impacts finance in at least three ways. The first one concerns individual and societal beliefs. These beliefs are influential on the country's culture. For instance, religion can change a country's policies, such as charging interest and the rights of creditors and shareholders, because different religions have different opinions. The second one is about how culture influences institutions. For example, religions and some cultural values may also influence the legal system can. And the last one is related to the allocation of resources because culture can determine how a country allocates resources in the economy. Moreover, they mentioned that the effects of culture on FD can be alleviated by natural openness. This is because when a country wants to capitalize on international trade and profit from trade openness, it will inevitably be more exposed to foreign effects. Also, access to international trade will bring in more foreign competition.

Voghouei et al. (2011) prepared a path diagram on the theories of financial determinants and showed the characteristics of the factors that determine FD. The path diagram is shown below.

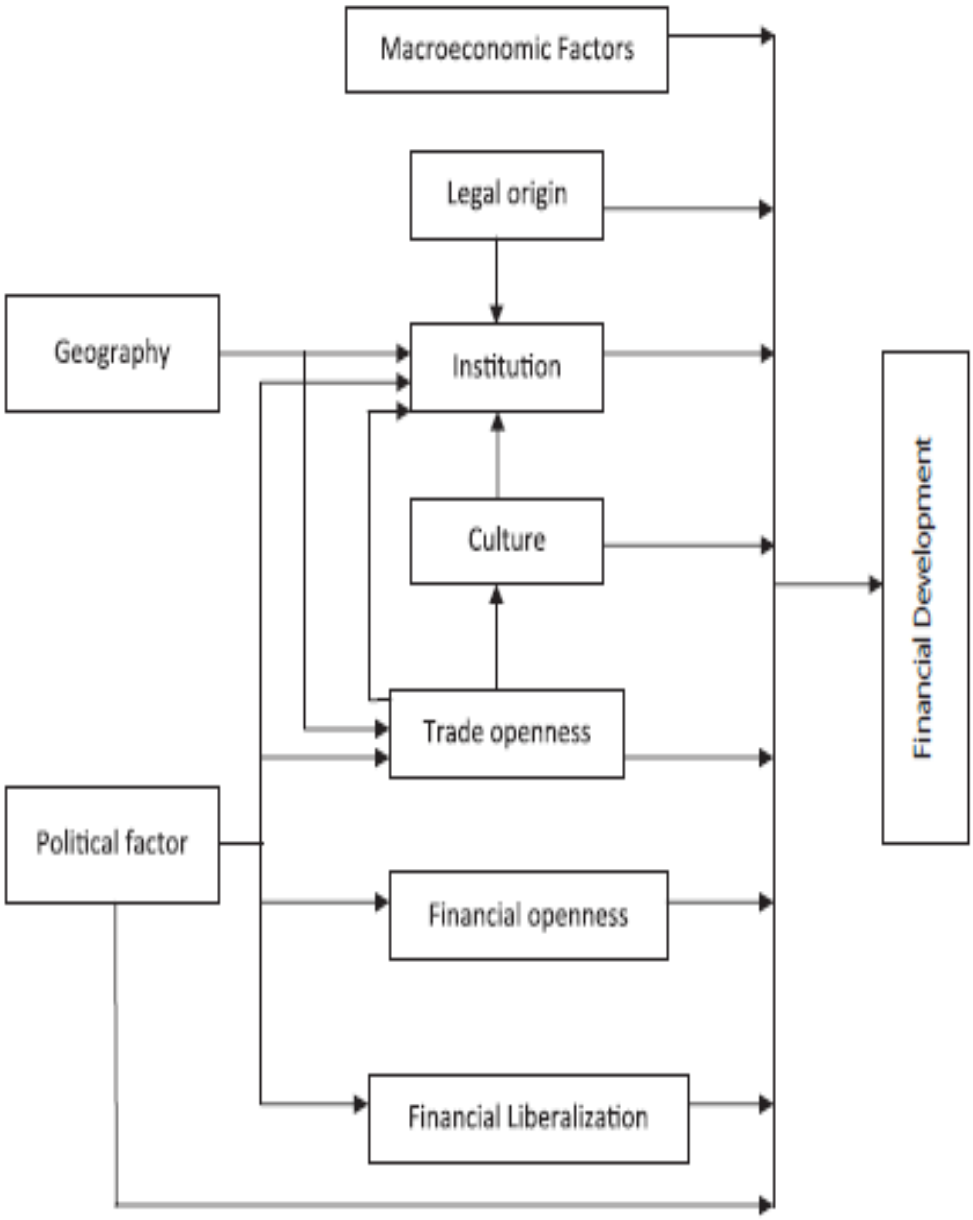


Figure 1.1. Path Diagram of FD

Source: Voghouei et al., 2011

1.4. Measurement of FD

FD is explained as the developments in size, depth, efficiency, and stability of access to the financial system, and also, it is crucial to understand the effects of FD on decreasing EG and poverty. However, it is hard to measure FD due to its huge scope and various dimensions. Researchers confront two main difficulties while documenting the changing levels of FD. One that generally endeavors to correlate FD, both across countries and over time, is about how to measure it. Also, there is no correct method for measuring it. Theoretically, the right measure could be facilitating external funds and adequate returns for companies. The second overwhelming difficulty is collecting dependable historical information sources regarding financial markets (RZ, 2001).

In many empirical studies, it is commonly based on standard quantitative instruments accessible for an extended time series for an extensive range of countries. For example, the ratio of financial institutions' assets/GDP, LL/GDP, and deposits/GDP. However, countries include a diversity of financial institutions, products, and markets, so these are irregular estimations and do not present the overall details of FD. Moreover, The World Bank's Global Financial Development Database (GFDD) developed an extensive conceptive framework to measure FD in worldwide. This framework classifies four sets of proxy variables characterizing a well-functioning financial system: depth, efficiency, access, and stability (WB, 2017).

In their empirical research, Chinn and Ito (2006) examined a series of regressions to measure the FD with SMC, PC, and stock market total value. These variables were measured as a ratio of GDP. Likewise, RZ (2001) used the ratio of SMC to GDP to measure the FD. Besides, Bayar (2016) also used credits which are called domestic credits (DC) to the private sector. Eichengreen, Gullapalli, and Panizza (2009) and Claessens and Laeven (2003) measured FD in their research only with one variable which is private credit. Furthermore, the main measure of FD in Ahlin and Pang's (2006) working paper is credit, which is normalized by GDP, and released to private companies from commercial banks and other financial institutions.

On the other hand, Baltagi, Demetriades, and Law (2007) in their study used banking development measures such as LL, PC, and DC. But in their advanced research, Baltagi et al. (2009) used only two measures; PC and SMC which is the same as Chinn

and Ito (2006). Moreover, the most common study that many researchers took into consideration is Beck (2002) who used the private sector by deposit money banks and other financial intermediaries (% GDP) to measure FD. As it is mentioned before, there are four aspects of FD. Bzhalava (2014) used these four aspects to explain the financial system with financial institutions involving the banking sector, etc., and financial markets involving both stock and bond markets.

Bhattacharyya and Hodler (2010) also measured FD with private credit and stock market capitalization but it differs from the other research because the authors also used commercial and savings bank deposits and money and quasi-money in their measurement. Hanh (2010) and Huang and Temple (2005) again used PC/GDP but they also used LL/GDP to explain FD. Moreover, Huang and Temple (2005) added six more variables to their regression list to measure FD. These are commercial bank assets, the ratio of overhead costs to total bank assets, net interest margin, total value traded, turnover ratio, and market capitalization.

In short, there are alternative measures for FD, and many researchers use several measures for FD but most measures are similar to each other. Table 1 below summarizes the empirical literature on how researchers measure FD.

Table 1.1. Empirical Literature on the Measurement of FD

Study	Variables	FD Variables/Indicators	Studying Period	Source
Chinn, Ito (2006)	-Creditor Protection Level, -Shareholder Protection, -The Legal System Effectiveness in Enforcing Contracts, -The Comprehensiveness of Company Reports, -Log percapita income in PPP, -Inflation, -TO -KAOPEN	-PC Creation -Stock Market Total Value&Turnover	1980 -2000 (108 countries)	- WDI -IFS - Beck, et al. (2000a).
RZ (2001)	-TO -Industrialization and Tariff on Manufactured Goods - Capital Mobility - The Ratio of Deposits /GDP	- SMC / GDP	1913-1999	- FIBV -Mitchell's data until the mid1990s. - IFS - IIS -Financial newspapers i.e: Economist, Deutsche Oekonomiste, etc) -NBER website
Baltagi et al (2007)	- GDPPC - TO	- LL - PC & DC	1980-2003 (42 countries)	- LMF (2006) - Abiad and Mody (2005)

	- CAOPEN indicator from LMF - Institutional Quality - Abiad and Mody's FL Index - Economic Institutions	- Capital market development measure		-Knack and Keefer (1995) - WDI - ICRG – a monthly publication of PRS
Beck (2002)	-Trade-in Manufactured Goods -Set of Conditioning Information -Initial Real GDPPC -The Initial Income Per Capita - Total Population -Black Market Premium -The Growth Rate of Trade	-Private Sector by Deposit Money Banks & Other Financial Intermediaries (% of GDP)	1966–1995 (65 countries)	
Bayar (2016)	-DC the Private Sector -FDI, net inflows -Portfolio Investment All-(% of GDP)	- DC to the private sector	1996-2015 (Eastern European countries)	-WB
Ahlin and Pang (2006)	-Corruption -The Growth Rate of GDP -Industries -Investment Intensity	-PC	1960-2000	-ICRG -Kaufmann et al. (2006) -WDI -Beck et. al. (2000a)

	-Financial Dependence -Industry Growth Rate -Inflation -Government Spending -Population Growth Rate -Trade			- Barro-Lee dataset - La Porta et al. (1999)
Eichengreen et al (2009)	- Industry - Growth - Growth of Real - External Financial Dependence - CAOPEN -Kaopen	-PC scaled by GDP	1980-1989 1990-1999 2000-2004	- Industrial Statistics DataBase - RZ (2003) - IFS - LMF (2007) - IMF (AREAER) - Honohan and Laeven (2005) - Glick-Hutchison
Bzhalava (2014)	- GDPPC -Political Freedom -KAOPEN -TO -Inflation -Tax to GDP -Central Government debt to GDP	- LL/GDP - Bank PC/ GDP	1960-2011 (203 countries)	-GFDD -WB-Database -Chinn and Ito (2006) -Freedom House Survey Index

Bhattacharyya and Hodler (2010)	- Natural Resources Rents - Political Institutions/Democracy - Income per capita - Primary Product Exports/GDP - Foreign Aid - KAOPEN	-PC - Commercial &Savings Bank Deposits - SMC - Money and quasi-money/GDP - Bank assets/GDP - Bank deposits/GDP - SMC/GDP - Bank Returns on Assets/GDP	1970- 2005 (133 countries) 1870- 1940 (31 countries)	- Mitchell (1995) International Historical Statistics - Polity IV database - WDI - Beck et al. (2000a) - WB Adjusted Net Savings Dataset - Freedom House - Boix and Rosato(2001) - ICRG - Wacziarg and Welch (2003) - Barro and Lee (2000) - World Income Inequality Database vs. 2 - Clemens and Williamson (2004) - Chinn and Ito (2006)
Guiso et al (2004)	-Households (demographic, income, consumption, and wealth) -Firms (balance sheet and, income statement) -Local Characteristics (GDP, social capital, etc.)	- Regional Effect	(8000 households, 30,000 Italian nonfinancial firms)	- SHIW -Financial Newspaper: Il Sole 24 Ore - Italian Statistical -Institute (ISTAT) -Centrale dei Bilanci
Baltagi et al	-Economic Institutions Measures	- SMC	1980–2003	- LMF (2006)

(2009)	-Per capita Income -TO - CAOPEN - KAOPEN - Institutional Quality - Abiad and Mody's FL Index	-PC		- Chinn and Ito (2006) - Abiad and Mody (2005) - WDI - ICRG - Beck et al. (2003) - PRS - Knack&Keefer (1995)
Hanh (2010)	-Ratio of total FDI Inflows/GDP -GDPPC -TO -Country Risk -Ratio of Gross Private Capital Flows/GDP -Real Exchange Rate of Country -GDP Growth Rate and per capita	-LL/GDP -PC/GDP	1994-2008 (29 countries	-LMF (2006) - AREAER - Chinn and Ito (2006) - Abiad and Mody (2005) - WDI - ICRG -Beck et al. (2000a)
Huang and Temple (2005)	-Population - Natural Propensity to Trade -TO -GDP per capita -Frankel and Romer Measure of Natural Openness as Trade Share indicator	- LL -Total Value Traded - Commercial Bank Assets to Sum of Commercial Bank Assets&Central Bank Assets - The Ratio of Overhead Costs to Total Bank Assets -Net Interest Margin	1960-1999	-Penn World Table -Financial Structure Database - Beck et al. (2000a) - GDN -Frankel and Romer (1999)

		- PC -SMC -Turnover Ratio		
Claessens and Laeven (2003)	-Property Rights -Patent Rights -Intellectual Property -Accounting -SMC -Human capital -Rule of Law -Origin of The Company Law or Commercial Code -Financial Dependence -European Settler Mortality -The fraction of Sector in Value-Added -Intangible Intensity -Growth (in value-added, in number, in avg. size) -Sales Growth -GDPPC	-PC/GDP	1980- 1999	-Index of Economic Freedom -'*'Special 301''* placements of the Office of the U.S. Trade Representative -Ginarte and Park (1997) -World Economic Forum (2002) - ICRG - La Porta et al. (1999) - RZ (1998) - IFS - United Nations Database on Industrial Statistics - WDI - Fisman and Love (2002) - COMPUSTAT

Waiyaki (2016)	-TO -Democratic Accountability -Remittances -Technology -Institutions (endowment, economic) -Inflation -Financial Depth (private bank credits) -SMC -GDP	-Money supply -DC -Capture the Size, Quality, Credit efficiency of FD	2000-2014	- ICRG - WDI - Central Bank of Kenya - Nairobi Securities Exchange - Communications Commission of Kenya (CCK)
Jaumotte at al (2013)	- Income Inequality - Ratios of Non-Oil Exports& Imports/GDP - KAOPEN - Avg. Tariff Rate &The Ratios of Both Non-Oil Imports-Exports /GDP (TO1) - Ratios of Financial Liabilities/GDP - Technological Development -The Stock of FDI Assets (%of GDP) - Access to Education	- PC/GDP for Domestic FD	1981-2003	-www.chrispapageorgiou.com/ - Chinn and Ito (2006) -WB Povcal Database -World Income Inequality Database, Version 2.0b -Australian Bureau of Statistics -Deutsches Institut für Wirtschaftsforschung -European Commission; Household Inequality Data -Prof. Kyungsoo Choi of the Korea Development Institute

	- Sectoral Shares of Employment			-Hong Kong Census and Statistics -Shirahase (2001) -Family Income and Expenditure Survey by Japanese Statistics Bureau - WEO - WDI - IMF - LMF (2007) - Beck, et. al. (2000) - Jorgenson &Vu (2005) - Barro-Lee (2001) - LABORSTA database - CEIC database - National Bureau of Statistics
Kim and Wu (2008)	- Short Term & Long Term Local Currency Sovereign Debt - Short-Long Term Foreign Currency -Capital Flow -Credit Ratings -FDI	-Equity, Banking and Debt Markets (Turnover ratio, SMC,PC,DC, etc.)	1995-2003 (51 countries)	- WDI - Financial Structure Development Database; Beck, et. al. (2000a) - BIS - S&P
Becerra et al (2010)	-Credit Dependence -Government Policymaking	-Interest Groups - PC /GDP	1965-2003 (37 countries)	- WDI - UNIDO

	Capabilities -TO -Industrialization -GDP	- SMC - LL of Financial Intermediaries		- GDN - RZ (1998) - ICRG
Law et al (2016)	-Financial Inclusion -Public Debt -TO -KAOPEN -Institutional Quality -GDPPC	- Bank &Capital Market based Indicator (%GDP) - GDP - Turnover ratios - DC to The Private Sector	2004-2012	- IMF - WDI - Chinn and Ito - WGI
Motelle (2011)	-Remittances -Inflation -TO -FL (dummy)	- The Ratio of LL/GDP -The Ratio of Demand, Savings & Time Deposits/GDP -The Ratio of The Private Sector/Total Credit		- IFS - Central Bank of Lesotho
Beck at al (2010)	- Size, Efficiency, and Stability of Banks, Non-Bank Financial Institutions, Equity and Bond Markets Indicators -Capital Market	- LL / GDP - PC by Deposit Money Banks & Other Financial Institutions/GDP	1960–2007	- Standard & Poor's Emerging - Financial Development and Structure Database - IFS - Emerging Market Database - BIS Markets Database

LMF **(2007)**	- Foreign Assets - Foreign Liabilities - Capital Flow - IIP - Portfolio Equity Liabilities - Debt Assets & Liabilities - Portfolio Debt - Portfolio Equity Assets - Direct Investment Assets & Liabilities		1970–2004	- IFS and BOPS - CPIS - Frank Warnock based on US Treasury data - IMF's Balance of Payments Statistics -UNCTAD - Bureau of Economic Analysis - GFDD - WEO - QEDS - BIS

CHAPTER 2
FINANCIAL OPENNESS AND FINANCIAL DEVELOPMENT: EVIDENCE FROM EMERGING COUNTRIES

2.1. Introduction

There have been new contributions on the role of financial systems in economic progress. Many studies showed that FD plays a critical role in economic development, and they also specifically focused on the importance of financial openness (FO), since trade and capital account openness can affect the FD of countries. Moreover, these studies demonstrated that FD and the degree of openness are correlated with EG across countries. This relationship also led many researchers to investigate what affects FD, and they tried to find out why financial structures differ from one to another. (Ross and Levine, 1997; Huang, 2010; Voghouei et al.,2011; Valickova etal., 2015). In this chapter, the relationship between FO and FD is investigated in 27 emerging countries by applying panel data regression. In many studies, FO is generally modeled by restriction-based measures such as the *KAOPEN* measure of Chin and Ito (2006) or the trade openness measure, but in addition to these two variables, different from other studies, the stock market openness variable is used to proxy FO. Openness to the stock market can draw foreign investors attention to invest in a country's local financial system and encourage them to fund profitable local projects which cause financial deepening. On the other hand, foreign investors may not prefer to invest in local stock markets because of the political and economic policies of emerging countries. So, it may not matter if the stock market is open for foreign investors or not. To sum up, it is hard to explain whether stock market openness can be considered as significant component of FD. Therefore, it is important to clarify this issue. This chapter tries to fill this gap by using capital flow-based and valuation-based measures to proxy stock market openness. More specifically, the ratio of foreign equity liabilities to market capitalization of the stock exchange, which was proposed by Umutlu, Akdeniz, and Altay-Salih (2010) will be used as a capital flow-based measure, and the degree of segmentation of a stock market with respect to the world market, which was proposed

by Bekaert, Harvey, Lundblad, and Siegel (2011), will be used as the valuation-based measure.

As Umutlu et al. (2010) discuss, restriction-based measures are strong in representing the government's restrictions on cross-border trades but weak in precise quantifying of the degree of restrictions due to the binary system used to calculate the measures. On the one hand, capital-flow-based measures perform better in determining the level of the actual intensity of FO. Consequently, these capital-flow-based and valuation-based measures and their variants have been used in the literature before to analyze their effect on aggregate total volatility, economic growth, market returns, etc. However, its relation with financial development has not been investigated before. Moreover, the robustness of this relation is tested after controlling for the effects of institutional quality and its sub-components.

This issue is especially examined for emerging markets where external capital is very much needed for financing profitable projects. Therefore, examining the impact of foreign portfolio investments on the FD of emerging markets is an interesting research topic, which has not been addressed before, for policymakers in emerging countries. Moreover, four different alternative definitions of FD from the literature are used to check the robustness of the results. Similar results are obtained for a longer sample period, which is constructed by eliminating some alternative variables with fewer time-series observations. Hence, it is expected that the results of our study will provide robust empirical evidence on whether a relation between financial development of financial openness exists or not.

The remainder of the chapter is structured as follows. Section 2.2 surveys the relevant literature review. 2.3 introduces the data and background information. Section 2.4 presents the methodology, specifically panel data regressions. Section 2.5 explains our model specifications, while Section 2.6 discusses the empirical findings. Section 2.7 draws some conclusions from these findings.

2.2. Bibliographical Survey

Financial development became an important issue in emerging countries, because of the positive association between FD and EG. As a consequence, FD determinants are investigated by many researchers through theoretical as well as empirical studies.
De Gregorio and Guidotti (1995) analyzed the link between FD and long-run growth

with two different data sets. Their first dataset is an extended version of Barro (1991) that includes a cross-section analysis for a sample of 100 countries between the years 1960 to 1985. For their second data set, they used De Gregorio's (1992) panel data for 12 Latin American countries and looked at the six-year average data between the years of 1950 to 1985. Moreover, they used the ratio of bank credit to the private sector to GDP for measuring FD. When they used Barro's (1991) data set, they found a positive impact of FD on the long-run growth of real GDPPC. On the other hand, this impact was negative for Latin American countries. Their results also indicated that the impact of FD on growth depended on the efficiency of an investment, rather than its volume. Valickova et al. (2015) also analyzed the relationship between FD and EG with modern meta-analysis techniques which consist of 1334 estimates from 67 studies. They observed a positive link between FD and EG. Levine, Loayza, and Beck (2000) examined the effect of financial intermediary development on EG with two econometric methods; GMM and cross-sectional. Their analysis includes 74 countries between the years of 1961 to 1995, and their data were averaged over non-overlapping five-year periods. For cross-sectional analysis, they used 71 countries which were averaged over the years 1960 to 1995. Both panel analysis and cross-sectional analysis results showed that there is a positive link between financial intermediary development and EG. Assefa and Mollick (2017) studied the potential relationship between FD and EG with the System Generalized Method of Moments (SGMM) approach by using annual data from 1995 to 2010 for 15 African countries. Their findings showed that FD has a positive impact on EG in African countries, except for South Africa. Igwe, Edeh, and Ukpere (2014) studied the effects of financial deepening on EG in Nigeria from 1981 to 2012. Their results showed that financial deepening does not have desirable effects on growth. Thus, to improve the growth and investment in Nigeria, there is a need for the development and increase of easy access to PC.

Law, Chin, and Habibullah (2016) examined the link between financial inclusion and FD by applying Dynamic Panel GMM estimation for 97 countries for the period between 2004 and 2012. Their empirical tests show that financial inclusion is a significant FD determinant. In their study, they used two different factors for FD: market-based indicators such as stocks traded turnover ratio and bank-based indicators such as DC to the private sector. Law et al. (2016) found that GDPPC also has a positively significant link with FD. In contrast, TO is a negatively significant determinant of DC. Besides, their market-based indicator is not a significant

determinant of financial inclusion.

Kim and Wu (2008) examined international capital flows, the sovereign credit rating and financial sector development in emerging countries. They used a dataset of sovereign credit ratings from Standard and Poor's in the period between 1995 and 2003 and used panel data for 51 emerging countries. They found that their sovereign credit rating impacts the development of the financial intermediation sector and capital flows.

Bayar (2016) investigated the interaction between foreign capital inflows which involve and foreign equity investments, FDI inflows, and FD in both Central and Eastern European countries. His dataset includes the years from 1996 to 2015. He used Westerlund-Durbin-Hausman (2008) co-integration test and Dumitrescu and Hurlin (2012) causality test. His results showed that there is no cointegrating association between financial sector developments.

Claessens and Laeven (2003) examined industry growth based on property rights protection and FD by using data on sectoral value-added for 44 countries covering the years 1980 to 1989. Their findings showed that better property rights cause higher growth with the help of enhanced asset allocation. Moreover, quantitatively, the impact of EG is as great as that of enhanced access to finance because of the larger FD.

Besides the above-mentioned studies, several researchers mention the potential association between FD and openness. These studies explain the openness measure with the following factors: capital account openness and trade openness.

Beck (2002) surveyed the connection between FD and the structure of international trade. The author used both cross-country and panel analysis for 65 countries between the years 1966 and 1995. He showed that FD has an impact on the trade-in manufacturing goods. His empirical model is based upon the presumption that goods of manufacture area display higher scale economies than the production of goods or providing services. Beck (2002) also used trade in manufactured goods as an indicator of trade openness and credit to the private sector as the main indicator of FD. His findings displayed that countries that have developed financial systems have better trade balance and export of manufactured goods.

Motelle (2011) studied the impacts of remittances on FD in Lesotho and displayed that both in the short and long run, TO and inflation have important effects on FD. The findings also demonstrated that remittances impact FD merely in the long run. Do and

Levchenko (2004) examined the impact of international trade on FD. They used panel and time-series regressions for 77 countries. Their results showed that TO influences the external finance demand, and so, financial depth in trading countries and TO is interrelated with faster FD in richer countries and slower FD in poorer countries. Huang and Temple (2005) also investigated the association between TO and FD. The authors used both time-series and cross-country variation in openness for 81 countries and also employed panel data over the period 1960 to 1999. Their findings indicated a positive link between the goods market openness and financial depth.

Hanh (2010) examined the possible link between FD and openness measures in 29 emerging Asian countries from 1994-2008. He used Pedroni co-integration technique and the GMM to explain the relationship. Hanh (2010) found bidirectional causality between financial openness/development and TO. Besides, his findings showed that FO and FD are heterogeneous among divergent measures.

Kim, Lin, and Suen (2010) examined the impacts of TO on FD by appliying the Pooled Mean Group (PMG) approach of Pesaran et al. (1999) for 88 countries between the years 1960 to 2005. Their findings displayed that TO has a significant role in supporting the degree of FD. In addition, they found that TO has a positive effect on FD in the long run whereas it has a negative effect in the short run.

Zhang, Zhu, and Lu (2015) studied the effect of trade and financial openness on FD in 30 China states between the years of 2000 and 2009. They used dynamic panel estimation techniques, and their results showed that both openness measures are strongly positively linked with FD.

Law (2009) analyzed the role of capital flows and trade openness on FD in emerging countries covering the years from 1980 to 2003. They used a dynamic panel GMM estimation method. Their findings indicated that trade openness and capital flows are significant elements of FD. Moreover opening both trade and capital accounts at the same time also have positive effects on FD. In addition to this, their results demonstrated that institutional quality and competition channels of a country may improve the level of FD.

Chin and Ito (2006) mentioned the possible relationship between FD and capital account openness in a model which controls for the level of legal/institutional development, specifically in equity markets. The authors employed panel data that

comprises of 108 countries over the period 1980 to 2000. Their results indicated that the level of shareholder protection are significant for FD and creditor protection which affects FD in equity and banking sectors. In short, capital account openness promotes FD in equity markets.

Ahmed (2013) examined the effects of KAOPEN on FD and EG in 21 Sub-Saharan African countries (SSA) between the years 1981-2009 by using dynamic panel GMM estimation techniques. The author found that KAOPEN has a significant effect on FD in SSA countries. Klein and Olivei (2008) studied the relationship between KAOPEN and FD in a cross-section of countries between the years 1986–1995 and 1976–1995. Their findings indicated that countries with no restrictions on capital accounts increased more at the level of FD than countries with restrictions on capital accounts.

RZ (2003) applied panel data regression which includes 24 industrialized countries between the years 1913-1999. The authors designated that opening both trade and capital accounts at the same time are the key factors for being successful in FD. TO boosts FD specifically when there is free mobility for capital flow across countries. The authors also specified that TO without capital account openness is unlikely to promote FD. In light of the findings of RZ (2003) Baltagi et al. (2009) tried to explain the question of whether both openness measures (TO and capital account openness) can collectively clarify the recent progress in FD. They used dynamic panel estimation techniques and their data is from both developing and industrialized countries. The results displayed that both openness measures are statistically significant factors for the development of banking sectors. Furthermore, their empirical results exposed that one openness measure decreases the benefits of the other openness measure. It means that capital account and TO are negatively related to each other. In addition to this, they also indicated that comparatively closed economies benefit more by opening up their capital accounts and/or trade. In spite of being able to accomplish more by opening both trade and capital accounts, these countries that the authors used in their study still obtained gains by opening up one without the other in the banking sector. In other words, Baltagi et al (2009) did not provide any evidence to propose that opening only one openness without the other has a negative impact on the financial sector development.

2.3. Data

This section describes the variables used to measure financial development and explains the methodology for the empirical model.

2.3.1. Measurement of FD

In many empirical studies, it is commonly predicated on standard quantitative variables that are available for many countries such as the ratio of financial institutions' assets/GDP, LL/GDP, PC/GDP, and deposits /GDP. Hence, there is no single indicator to proxy financial development. So, it is hard to measure FD because of its scope which embodies too many determinants together and various dimensions. In this study, three variables are used to measure financial development in emerging countries. These are *PC/GDP, SMC/GDP, and LL/ GDP* ratios.

2.3.1.1. Stock Market Capitalization To GDP

Generally, the SMC/GDP ratio is used for measuring FD and can signal whether an overall market is over/undervalued or not. This measure also involves specific markets or the world market. Mainly, it is calculated as the ratio of SMC to market GDP, multiplied by hundred and thus the result is expressed by the stock market value as % of GDP (Investopedia, 2017).

SMC/GDP displays the relative size of equity markets with respect to the size of the economy. In other words, it is the ratio of the value of listed shares/GDP. This measure can be interpreted as the measure of liquidity that is ensured by stock markets to the economy (Beck et al, 2010). Figure 2.1 displays the rank of SMC as a % of GDP in the top 20 countries.

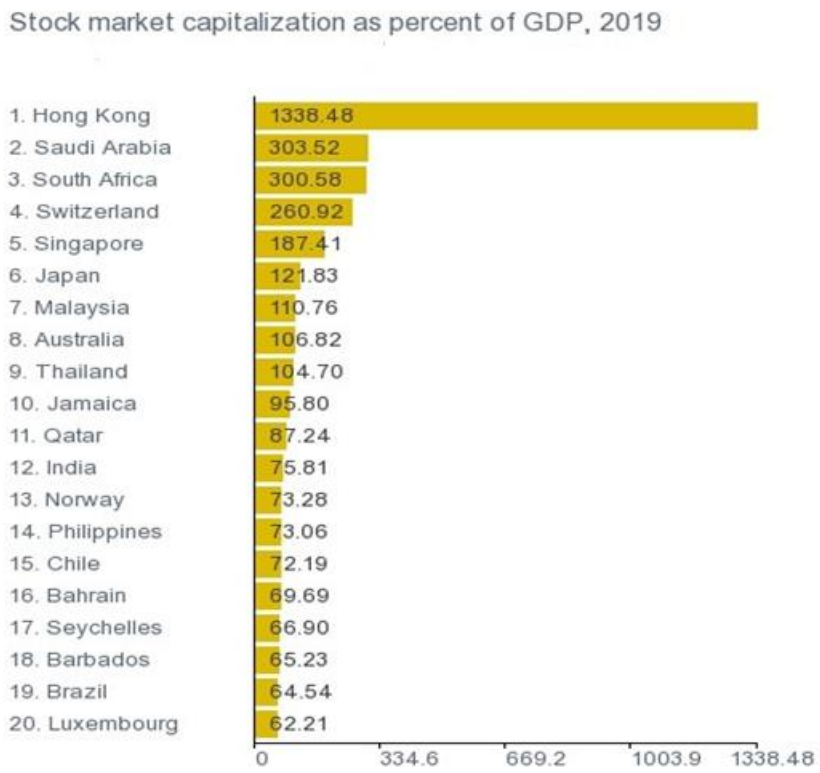


Figure 2.1. SMC as a % of GDP in Top 20 Countries

Source: TheGlobalEconomy.com

2.3.1.2. Liquid Liabilities To GDP

LL, shortly called as broad money, are commonly used for the measurement of financial depth. LL is the sum of deposits and currency in the central bank (M0), added electronic currency and transmissible deposit money (M1), added savings and time deposits, foreign currency transmissible deposits, securities repurchase contracts and certificates of deposit, (M2), added commercial documents, foreign currency time deposits, travelers checks and shares of the market fund or mutual funds (The Global Economy, 2017). Beck et al (2010) also described LL to GDP as currency added interest-yielding liabilities of banks and other financial intermediaries and demand, which is divided by GDP. Figure 2.2 displays the LL of the top 20 countries as a % of GDP.

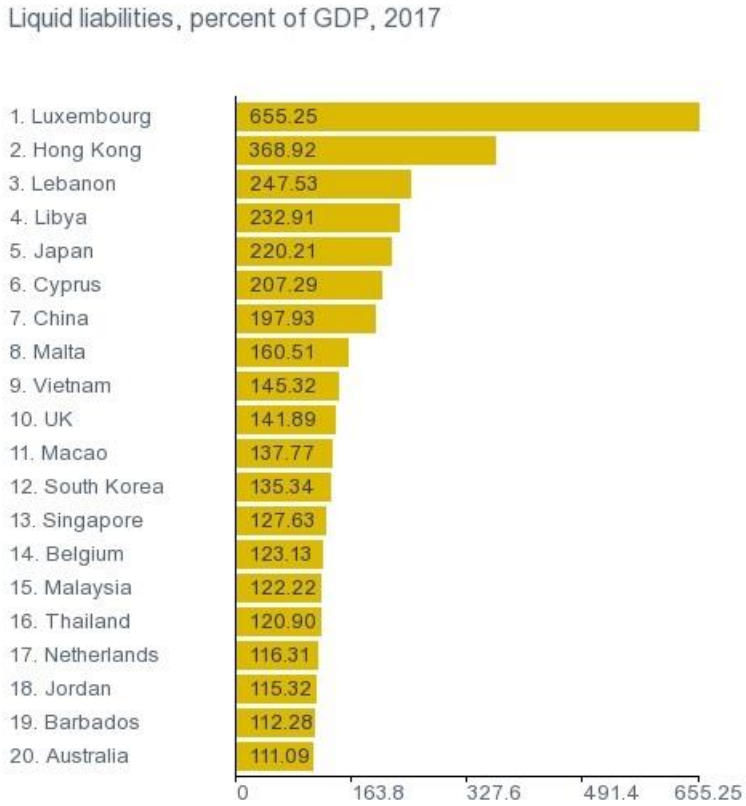


Figure 2.2. LL to GDP in Top 20 Countries

Source: TheGlobalEconomy.com

2.3.1.3. Private Credit To GDP

PC/GDP is generally used to measure financial depth. In this dissertation, the PC/GDP ratio is used as a measure of a country's FD. Contrary to the loans that are given to governments, government institutions, and public enterprises, the PC/GDP ratio separate the loan given in the private sector (Levine et al.,2000). In short, this ratio shows the loans or credits submitted by banks to the private sector and Figure 2.3 below presents Bank Credit to the private sector as a % of GDP in the top 20 countries

Figure 2.3. Bank Credit to the Private Sector as % of GDP

Source: TheGlobalEconomy.com

2.3.2. Data Type And Sources

Annual data is employed for examining FD. All three measures of FD; i) *SMC to GDP*, ii) *LL to GDP*, and iii) *PC to GDP* are taken from GFDD.

Institutional Quality and its six sub-contents are used in the empirical model as control variables. Control of Corruption *(CC)*, Government Effectiveness *(GE)*, Political Stability and Absence of Violence/Terrorism *(PS)*, Regulatory Quality *(RQ)*, Rule of Law *(RL)* and Voice and Accountability *(VA)* are the indicators to measure institutional quality. Each of these six variables exemplifies a different aspect of governance.

Corruption is defined as improper behavior by those who have power, such as government officials. *CC* includes both small and large forms of corruption and acquires apprehensions of how much public power is being used for private gain, comprising the "*seizure*" of the state by personal and elite interests. *GE* covers apprehensions about both civil service and public service quality which is not affected by political oppression. Besides, it also includes the creation and implementation of

policy quality of the government. *PS* shows the political instability of a country and/or violence which is politically supported. *RQ* demonstrates the government's capability for explicating and enforcing regulations and policies which warrant and boost the private sector development. *RL* identifies how society complies with the rules, how society will be bound up with rules, and the enforcement is equal to all members of societies. *VA* designate independence of association and expression as well as free media tools in a country where citizens are able to take part in the election of their government (WGI, 2018). These six control variables data are from the WGI on a scale of -2.5 to +2.5. An average of these variables are taken and named as Institutional Quality *(INQ)* measure.

To sum up, these six variables are used in the analysis both separately and in a combined form as *INQ* in different regression specifications to test whether the results are consistent or not.

2.3.3. Variables For The Base-Case Specification

In this dissertation chapter, the main aim is to find out which openness measure affects FD the most. Three FO measures which are Trade Openness *(TROP)*, Capital Account Openness *(KAOPEN)*, and stock market openness *(SMO)* measured as Foreign Equity Liabilities *(FOEL)* are used and named all of them as base-case variables.

2.3.3.1. Trade Openness

TROP is one of the significant determinants of FD and is used in the empirical model as the first FO variable. *TROP* is measured as the volume of exports and imports of goods and services as a share of GDP. It is computed as the sum of exports and imports of goods & services (BoP, current US$) divided into GDP (BoP, current US$).

$$TROP = \frac{\text{Import+Export}}{\text{GDP}} \tag{2.1}$$

TROP data is taken from WDI.

2.3.3.2. Capital Account Openness

Chinn and Ito (2006) introduced an index named the Financial Openness Index of Capital Account Openness *(KAOPEN)* to proxy financial openness. In this thesis, the normalized version of the *KAOPEN* index that ranges between zero and one is used as a second openness variable and the data is taken from Chinn and Ito (2006). This index is taken from AREAER and based on main components that were taken off divided

capital and current account restriction measures. In detail, the *KAOPEN* is derived from four binary dummy variables which are K_1, K_2, K_3, and K_4 and these four variables are:

K_1: parameter of the multiple Exchange rates across countries

K_2: parameter of the restrictions on current account transactions

K_3: parameter of the restrictions on capital account transactions

K_4: parameter of the necessity of the surrender of export proceeds of goods and services

Chin and Ito (2006) composed the *KAOPEN* index in order to focus on the effect of financial openness and they reversed the values of these four binary measures and when the capital account restrictions do not exist, these variables are equal to one. In addition to this, the authors created a new measure called SHAREk_3 for controls on capital transitions (k_3) and they used the share of a five-year window (comprising period *t* and previous four-years) which capital controls are not effective and the equation of SHAREk_3 is shown below:

$$SHAREk_3 = \frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \quad (2.2)$$

Finally, the authors composed an index for capital openness "*KAOPEN*" which includes standardized primary components of k1t, k2t SHAREk3, k4. If a country is financially more open, *KAOPEN* for that country takes higher values.

2.3.3.3. Foreign Equity Liabilities

LMF (2007) utilized a capital flow-based measure to clarify the degree of FL. This measure showed the sum of foreign equity assets and liabilities and the FDI assets and liabilities of a country as a share of the GDP. Umutlu et al. (2010) advanced this LMF measure that concentrates on the extent of foreign equity liabilities. They introduced a new measure called foreign equity liabilities *(FOEL)* and it defines the ratio of a foreign equity portfolio in a local stock exchange. In other words, *FOEL* is calculated as portfolio equity liabilities divided by market capitalization of the stock exchange which is shown below:

$$\text{FOEL} = \frac{\text{Portfolio Equity Liabilities}}{\text{Market Capitalization of Local Stock Exchange}} \quad (2.3)$$

FOEL indicates the degree of the openness of a local stock exchange to foreign equity investment. So, in the analysis, the *FOEL* measure is used as the third financial openness variable and it shows stock market openness. *FOEL* data is acquired from LMF (2007).

2.3.4. Variables For Alternative Specification

Discovering the measures of FO is quite an important issue for emerging countries. So this chapter tries to explain the link between FO and FD with alternative variables. Three different openness measures are used for the first time to explain FD. The second data group consists of these openness variables. For each base-case variable *(TROP, KAOPEN* and *FOEL),* alternative ones are used, namely, Composite Trade Share *(CTS),* Alternative *CAOPEN (ACAOPEN),* and Segmentation *(SEGM),* respectively, to check the robustness of the results.

2.3.4.1. Composite Trade Share

Several researchers mention potential relationships among FD, *KAOPEN*, and *TROP*. Opening both trade and capital accounts are the key factors for being successful in *FD* and *TROP* is one of the significant determinants for FD. Therefore, an alternative definition of *TROP* is used to check the robustness of the results. Squalli and Wilson (2011) introduced a new measure of *TROP*, which is called Composite Trade Share (*CTS).* The authors combined both dimensions: Trade Share (*TS*) and World Trade Share *(WTS).* The first dimension; *TS* is measured as the volume of exports and imports of goods and services divided by country *i'*s GDP.

The equation of *TS* is shown below:

$$TS_i = \frac{(X+M)_i}{GDP_i} \tag{2.4}$$

Where X is exports of goods and services; M is the import of goods and services. *TS* might be measured in the range of $0 \leq \frac{(X+M)_i}{GDP_i} \leq \infty$.

The second dimension of *CTS* is *WTS*, which shows the volume of exports and imports of goods and services of a country to total world trade.

WTS is calculated as below:

$$WTS = \frac{(X+M)_i}{\sum_{i=1}^{n}(X+M)_i} \quad (2.5)$$

i= country

n= number of countries in the World at year t.

WTS displays country *i's* total trade with respect to total world trade.

Finally, Squalli and Wilson (2011) combined these two dimensions *(TS and WTS)* and composed *CTS.*

CTS can be written as:

$$CTS = \frac{(X+M)_i}{\frac{1}{n}\sum_{i=1}^{n}(X+M)_i} x \frac{(X+M)_i}{GDP_i} \quad (2.6)$$

i= country

n= number of countries in the World at year t.

Squalli and Wilson (2011) believe that *CTS* explains the degree of trade openness more profoundly.

In this chapter, *CTS* is calculated for each year and each country and added to the regression to test its relationship with FD. *CTS* is used as an alternative measure to *TROP*, and the data to construct *CTS* is retrieved from WDI.

2.3.4.2. Alternative CAOPEN

There are some limitations in the capital account openness literature due to restricted access to measures. There are many alternative calculations for specifying capital account openness measure but most of them have limited public availability. For example; Quinn (1997), Rossi (1999), Edison and Warnock (2003), LMF (2001), Miniane (2004) and Chinn-Ito (2006) all construct capital control measure but only Chin-Ito's capital account openness index has public availability. In order to diversify the publicly available measures of capital account openness, an alternative measure of capital account openness *(ACAOPEN)* is calculated.

In this chapter, AREAER is only used for calculating capital account openness as an alternative to the Chinn-Ito's *KAOPEN* index. AREAER is preferred because it categorizes all the information that is needed, and is publicly available on the website of IMF. AREAER shows 13 restrictions for capital accounts, which provides us to monitor overall a country's capital account openness. The average of binary coding for restriction categories is taken. Different from Miniane (2004), the average is subtracted from 1 so that an openness (not restriction) measure can be obtained.

Moreover, the 13 categories for capital restrictions are used whereas the 14th category that is used by Miniane (2004) is dropped. So, the measure *ACAOPEN* is also different from Miniane's measure in the number of restriction categories too.

These 13 sub-categories are shown below:

i. **Controls on Capital Transactions comprise:**
    - Capital market securities
    - Money market instruments
    - Collective investment securities
    - Derivatives & other instruments
    - Commercial credits
    - Financial credits
    - Guarantees, sureties, & financial backup facilities
    - Direct investments
    - Liquidation of direct investment
    - Real estate transactions
    - Personal capital transactions

ii. **Provisions Specific to:**
    - Commercial banks & other credit institutions
    - Institutional investors

In more detail, constructing the Capital Account Restrictions process can be defined as follows; the first step is to assign one if there is a restriction for that category, zero otherwise. Next is to gauge the average of all 13 sub-categories and form the variable that shows the degree of restrictions. After this step, the average is deducted from to indicate the degree of capital account openness, and this variable is named as *ACAOPEN*. Besides, *ACAOPEN* is calculated for all years from 1996 to 2016 and for all countries by manually from the AREAER. On the other hand, *ACAOPEN* can not be constructed before 1996 as the AREAER's have different report formats before this date and do not consist 13 sub-categories.

2.3.4.3. Segmentation

Bekaert et al. (2011) proposed a new measure called a valuation-based measure of the World Equity Market Segmentation *(SEGM).* In other words, a country's segmentation is the opposite of integration, and it is based on the difference between the industry's

earnings yields of each country to the world. *SEGM* is a proxy for stock-market openness. If the market is more segmented, it means that it is less open to foreign investors and vice versa. For this reason, a negative but significant relationship between *SEGM* and FD is expected. Bekaert et al. (2011) identified *SEGM* as the absolute difference between local and global valuation ratios. SEGM also describes both time-series and cross-country variations in segmentation.

SEGM for a country is calculated as:

$$SEGM_{it} = \sum_{j=1}^{N} IW_{i,j,t} \left| EY_{i,j,t} - EY_{w,j,t} \right| \qquad (2.7)$$

i=country
j=industries
t=year
w=global market
N=number of industries in the country i

Where: $IW_{i,j,t}$ signifies the weight of industry j in the country *i* at year *t* and $\left| EY_{i,j,t} - EY_{w,j,t} \right|$ states the absolute value of the difference between earnings-to-price ratio of industry j in the country i and earnings-to-price ratio of industry *j* in Global market portfolio.

SEGM is based on the following idea; industry earnings yield absolute differentials that show us how much countries actually integrated or segmented into the global market. If there is financial integration between countries and global markets, the same industries should ensure equivalent earning yield, so the differentials that we explain above are quite small or approximate to 0 or vice versa. So, *SEGM* shows the degree to which countries are integrated or segmented.

SEGM is calculated in the following way: First, each country, *i*, is treated as an equity consisting of N industries at each year. The weight of industry j in country i is denoted by $IW_{i,j,t}$. Then $EY_{i,j,t}$ is calculated as the inverse of price-earnings ratio as Local Earning to Price Ratio of industry j in country i. Next, $EY_{w,j,t}$ is calculated in the same way for the Global market portfolio. Last, the absolute value of differences between local and global earnings yield are calculated.

The sample of equity industries includes twenty different sectors that are Automobile

& Parts, Banks, Basic Resource, Chemicals, Construction & Mat., Financial Services 3, Financial Services 4, Food & Beverages, Health Care, Inds. Goods & Svs., Insurance, Media, Oil & Gas, Pers. & H/H Goods, Real Estate, Retail, Technology, Telecom, Travel & Leisure and Utilities.

In addition, Stock Market Segmentation, in other words, *SMO,* has not been used to explain FD before, so in this chapter, *SEGM* is calculated for 27 emerging countries over a sample period of twenty years (1996–2016), using annual equity industry data from DataStream, and add to our regression to test its relationship with *FD.*

Trade openness and capital account openness variables *(TROP, CTS, ACAOPEN, KAOPEN,)* have significant roles in financial deepening and are expected to increase FD as well. Therefore, positive signs are expected for these openness measures. In addition, institutional factors are also important for being successful in the process of FD, therefore it is expected a positive relation between *INQ* and FD. *FOEL* signifies the degree of stock market integration; however, *SEGM* shows the opposite of integration, therefore, *FOEL* and *SEGM* to move in opposite directions. It means that *FOEL* is anticipated to have a positive sign whereas *SEGM* is expected to have a negative sign. Table 2.1 shows summary information for all variables comprising the dependent and independent variables applied in the analysis for 27 emerging countries from 1996 to 2016.

Table 2.1. Summary Information

Variables	Mean	Median	Std. Dev.	Max.	Min.	Obs.
SMC	0,4920	0,3391	0,4637	3,2808	0,0001	758
LL	0,4553	0,3745	0,2856	1,9781	0,0575	1282
PC	0,3698	0,2774	0,2749	1,6321	0,0022	1263
TROP	0,6914	0,5669	0,4246	2,5109	0,0908	994
CTS	0,8277	0,4087	1,1692	8,2436	0,0209	939
FOEL	0,2160	0,1369	0,7906	15,8558	0	709
SEGM	0,0776	0,0277	0,1968	1,5997	0,0026	632
ACAOPEN	0,2924	0,2307	0,2484	0,9230	0	567
N_KAOPEN	0,0755	-0,1355	1,5576	2,3599	-1,9104	1141
KAOPEN	0,4650	0,4156	0,3647	1	0	1141

INQ	0,0574	-0,0042	0,5605	1,2870	-1,1782	513

The countries used in the analysis are from 27 emerging economies. These are; Argentina, Bahrain, Brazil, Chile, China, Czech, Egypt, Hungary, India, Indonesia, Israel, Korea, Kuwait, Malaysia, Mexico, Morocco, Oman, Pakistan, Philippines, Poland, Qatar, Russia, South Africa, Thailand, Turkey, UAE, and Vietnam. Emerging markets are used in the analysis because they need foreign investment to boost their economy. For this reason, attracting foreign investors into their economy is a critical issue. It does not matter whichever way foreign investors enter emerging countries' markets; their stock exchange or merchandise markets. In this chapter, the sample period runs from 1996 to 2016 and relies on annual data.

2.4. Methodology

2.4.1. Panel Data Regression Models

Modern econometrics is separated into two sections; micro-econometrics and time series analysis. Micro-econometrics has many elements such as duration models, qualitative dependent variables, limited dependent variables, and count data. All of them mainly include cross-sectional data. Nevertheless, a main classification of micro-econometrics includes longitudinal or panel data that a cross-section is sighted in overtime. So, with the help of computers, it can survey the same units in several different periods (Kennedy, 2003, p. 301).

In time series analysis, the values of one or more variables over a period of time such as the turnover ratio for several years can be examined. But in cross-section analysis, values of one or more variables are gathered for several subjects at one point in time. For instance, turnover ratios are analyzed for 20 countries in the same year. However, in panel data regression, time-series and cross-sectional analysis can be used together. In other words, the same cross-sectional unit is examined over time. It has both space and time dimensions (Gujarati and Porter, 2009, p.591).

Nowadays, Panel Data Regressions are being used progressively in many economic studies. The most prominent examples of panel data sets are:

- **The Panel Study of Income Dynamics (PSID**) was acquired by interviewing several thousand people over and over again through time (Kennedy, 2003, p.

301). PSID was managed by the Institute of Social Research at the University of Michigan. The Institute gathers data on some families about various variables in each year (Gujarati and Porter, 2009, p.591).

- Another survey is managed like PSID by The Bureau of the Census of the Department of Commerce, and it is called "**Survey of Income and Program Participation (SIPP)".** The interview is made four times a year about the economic situation of the respondents (Gujarati and Porter, 2009, p.592).
- **The German Socio-Economic Panel (GESOEP)** analyzed 1761 individuals every year between 1984 and 2002. Many variables such as birth year, marital status, individual labor earnings, life fulfillment, and working hours (annual) were learned from each individual for the period 1984-2002.

Using panel data analysis has many advantages over time series and cross-sectional analysis Baltagi (2005, p.4-7) explained these advantages as:

- Panel data can be used to overcome *heterogeneity* in the units because panel data is associated with firms, countries, states, individuals, etc. over time.
- Panel data estimation techniques can consider such heterogeneity explicitly by warranting for subject-specific variables. The term subject is stated in general to cover micro-units such as individuals, companies, and countries.
- Panel data includes both time series and cross-sectional observations. With the help of this technique, it is possible to ensure "more informational data, more degrees of freedom, more variability and more efficiency but less collinearity among variables".
- Panel data concede better analysis of dynamics of change by examining a repeated cross-section of observations. Moreover, some subjects are easier to analyze with panel data, such as labor mobility, unemployment, and job turnover.
- Panel data can measure and find effects that are not found in pure time-series and cross-sectional analysis.
- With Panel Data analysis, more complicated behavioral models can be examined such as scale economies and technological changes.
- If we cluster firms or individuals into total broad clusters, panel data can minimize the bias that may result in turning data into acquirable for many thousand units.

To sum up; panel data can provide more improved empirical analysis that is not possible with time series and cross-sectional analysis.

A common panel data regression model with k regressors is shown as:

$$Y_{it} = \beta_1 + \beta_{2it}X_{2it} + \cdots + \beta_{kit}X_{kit} + u_{it} \quad (2.8)$$

i=1,2,…,N;

t=1,2,….,T

Where Y shows the dependent variable, X displays the independent variable, β signifies coefficients, i is i^{th} subject and t is the time period for the variables.

It is also presumed that the average of the error term u is zero and constant variance which is shown as: $E(e_{it}) = 0$ and $Var(e_{it}) = \sigma_\varepsilon^2$

There are two kinds of panel data; balanced and unbalanced. The balanced panel is a panel in which each subject such as firms, individuals, etc. has the same number of observations. The unbalanced panel is a panel in which each entity has a different number of observations. In the literature about panel data analysis, there are two terms; short and long panel. In the short panel; the number of cross-sectional subjects, N, is greater than the number of periods T. On the other hand in the long panel; $T > N$. Also techniques for estimating rely on whether there has been a short or long panel, and there are four possibilities (Gujarati and Porter, 2009, p.593).

2.4.2. Pooled Ols Regression or Constant Coefficients Model

In this regression type; all observations are simply pooled and a "grand" regression is estimated, and it is assumed that all the regression coefficients will be the same then equation 2.8 will turn into equation 2.9.

The model is shown as below:

$$Y_{it} = \beta_1 + \beta_{2it}X_{2it} + \beta_3X_{3it} + \cdots . + \beta_kX_{kit} + u_{it} \quad (2.9)$$

Where i is ith subject and t is the time period for the variables. In the Pooled OLS model, coefficients are assumed the same for all subjects. Also, explanatory variables are presumed to be non-stochastic, because if they are stochastic, they will be uncorrelated with error-term. Also, it is presumed that the parameters β of the model do not vary between units and/or time.

Moreover, it is also supposed that the error term $u_{it} \sim iid(0, \sigma_e^2)$ is distributed with

zero mean and constant variance (Gujarati and Porter, 2009 p.594).

2.4.3. The Fixed Effect Least-Squares Dummy Variable (LSDV Model)

A fixed-effect (FE) is used if it is wanted to examine the effect of variables that vary over time. It searches the association between predictor and outcome variables within an entity such as individual, company, country, etc. Each entity might or might not affect the predictor variables because the entity has its own characteristics. For instance, each country has its own political system, and this system could show an impact on trade or GDP. It is presumed that something within the individual might affect or bias the outcome or predictor variables when FE is used, and it is needed to control this situation. This is the logic behind the conjecture of the correlation between predictor variables and the error term. FE eliminates the impact of those time-invariant features; thus, the net impact of the predictor on the outcome variable is measured. These time-invariant features are unique to individuals and should not be correlated with other individual features. This situation is also a significant assumption for FE. As each entity is distinct, the entity's error term and the constant are not assumed to be correlated with the others. If ever the error terms are correlated, then FE is no longer appropriate since inferences might not be correct, and we need to model that relationship (Torres-Reyna, 2007, p.9). The fixed effect model is shown as:

$$Y_{it} = \beta_i X_{it} + \alpha_i + u_{it} \qquad (2.10)$$

Where; α_i (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts), Y_{it} is the dependent variable (i = entity and t = time), X_{it} defines one independent variable, β_i is the coefficient for that independent variable and u_{it} is the error term.

In the FE model, Eq. (2.10) presumes that the coefficients (slope) of the regressors do not vary across time or individuals. So, dummy variable techniques can be used if the FE intercept is wanted to vary between entities (Gujarati, 2003, p.642). Moreover, the LSDV model enables heterogeneity among subjects by allowing each entity to have its intercept value (Gujarati and Porter, 2009, p.596). For estimating the model α_i must be quantified. The solution is creating n dummy variable D_i ,…., D_{ni} . Eq. (2.10) turns into Eq.(2.11) below:

$$Y_{it} = \alpha_1 + \alpha_2 D_{2t} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \beta_2 X_{it} + \cdots + \beta_k X_{kit} + u_{it} \qquad (2.11)$$

Where $D_{2i} = 1$ if i=1 and 0 or else with $D_{3i} = 1$ if i=2 and 0 or else; and so on (Gujarati and Porter, 2009, p.597). In Eq. (2.11), there are only 5 dummy variables to avoid the dummy variable trap.

2.4.4. The Fixed-Effect Within-Group (WG) Estimator

With the help of stating values of the explanatory and dependent explanatory variables for each entity as deviations from their particular mean values, it is estimated that a pooled regression is to omit the FE β_{1i} (Gujarati and Porter, 2009, p.599).

Stock and Watson (2003, p.281) explained that there are two steps to estimate this model; first, the entity-specific average is omitted from each variable. Second, the regression is estimated using "entity-demeaned" variables. It is considered the case of a single regressor in the version of the FE model in Eq. 2.10 and the average of both sides of Eq. 2.10 is taken; then $\overline{Y_{it}} = \beta_1 \overline{X_i} + \alpha_i + \overline{u_i}$, where $\overline{Y_i} = \frac{1}{T}\sum_{t=1}^{T} Y_{it}$ and $\overline{X_i}$ and $\overline{u_i}$ are described similarly. So, Equation 2.10 indicates that $Y_{it} - \overline{Y_i} = \beta_1(X_{it} - \overline{X_i}) + (u_{it} - \overline{u_i})$.

Let $Y_{it} = Y_{it} - \overline{Y_i}$, $X_{it} = X_{it} - \overline{X_i}$ and $u_{it} = u_{it} - \overline{u_i}$; accordingly,

$$\tilde{Y}_{it} = \beta_1 \tilde{X}_{it} - \tilde{u}_{it} \qquad (2.12)$$

So, β_1 is estimated by OLS regression of the "entity-demeaned" variables Y_{it} on X_{it} (Stock and Watson, 2003, p.281).

2.4.5. The Random Effects Model (REM)

If the dummy variables indeed define a lack of information about the model, why not convey this ignorance with the help of the disturbance term? This is the approach proposed by the proponents of the so-called random effects model (REM) (Gujarati and Porter, 2009, p.602). The logic behind REM is that the variation across entities is assumed to be uncorrelated and random with the independent variables involved in the model. For this reason, REM differs from FE model. If it is thought that there can be differences across entities and this can affect the dependent variable, then REM should be employed. Also, there is an important advantage of REM; time-invariant variables can be included (Torres-Reyna, 2007, p. 25).

The REM is shown as below:

$$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it} \qquad (2.13)$$

Where u_{it} represent between-entity error and ε_{it} represent the within-entity error.

As it is mentioned before, REM supposed that the entity's error term is not correlated with predictors warranting for time-invariant variables to play a role as explanatory variables. So, definitions of those individual characteristics that might/might not effect the predictor variables are needed. But the problem with this is that they might not be available and thus cause variable bias in the model. In short, Random Effect allows generalizing the implications beyond the model sample (Torres-Reyna, 2007, p. 26).

2.5. Model Specification

In this chapter, the relationship between *FD* and *FO* is analyzed. The empirical model comprises trade openness, capital account openness, and stock market openness measures for financial openness; *TROP, KAOPEN* and *FOEL* respectively. Besides, the alternative variables for *FO*, which are *CTS, ACAOPEN*, and *SEGM*, are also applied to check the robustness of our results.

Moreover, this relationship will be also tested after controlling for *INQ* and its sub-contents separately. Emerging markets are especially used because they need more external capital for financing the new profitable projects compared to developed countries. To proxy *FD*, three different measures from the literature such as the ratio of *SMC/GDP*, the ratio of *LL/GDP* and *PC/GDP* are used.

The panel data regression analysis, which includes time-series and cross-section dimensions, is performed in this study. The time-series dimension covers the years from 1996 to 2016 and relies on annual data. The cross-sectional dimension includes 27 emerging countries. Hausman's test showed that the best suitable specification for all models is FE. Thus, FE is used to account for the country-specific differences.

The aim of the analysis is to examine whether *FO* has any impact on *FD* in emerging countries.

The first model specification is given below:

$$FD_{it} = \propto + \beta_1 FOEL_{it} + \beta_2 TROP_{it} + \beta_3 KAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.14)$$

The second model specification is:

$$FD_{it} = \propto + \beta_1 FOEL_{it} + \beta_2 TROP_{it} + \beta_3 KAOPEN_{it} + \beta_4 INQ_{it} + \varepsilon_{it} \quad (2.15)$$

i=country, t=year

where;

- *FD* is the financial development level of country *i* at time *t*
- *FOEL* is the ratio of foreign equity liabilities to market capitalization of country *i* at time *t*
- *TROP* is trade openness computed by total trade to GDP
- *KAOPEN* is a the Chinn and Ito index of financial openness
- *CC* is Control of Corruption of *i* country at time *t*
- *GE* is Government Effectiveness of *i* country at time *t*
- *PS* is Political Stability&Absence of Violence/Terrorism of *i* country at time *t*
- *RQ* is Regulatory Quality of *i* country at time *t*
- *VA* is Voice and Accountability of *i* country at time *t*
- *RL* is Rule of Law of *i* country at time *t*
- *INQ* is Institutional Quality of *i* country at time *t.*

It is expected that the results of this study will provide empirical evidence on whether a relationship between FD and FO exists or not.

2.6. Empirical Results

This section presents the results of the estimation of the empirical analysis using Panel data regression to examine the relationship between *FD* and *FO*. The principal focus is on the effect of openness measures on FD. Next, the question of which openness measure has more impact on *FD* is addressed. In addition to these three main openness variables, six control variables, which are *CC, GE, PS, RQ, VA* and *RL*, are also employed to investigate how the effect of FD changes after controlling for institutions and legal systems of countries. Moreover, the empirical results include three different alternative indicators of *FD*, namely, *SMC to GDP*, *LL to GDP*, and *PC by Deposit Money Banks to GDP*. Besides, for each dependent variable, three different regressions are estimated and the empirical results comprise of three parts: with the base-case variables, the alternative variables, and the combination of both.

2.6.1. Results Of The Base-Case Regression Specification

This part presents the empirical results for the base-case variables.

Table 2.3 reports the results of the relation between FO and FD with three alternative

dependent variables (i.e. Panel A, B, C). In the analysis; variables for base-case specifications, which are *TROP*, *KAOPEN*, *FOEL*, *CC*, *GE*, *PS*, *RQ*, *VA* and *RL*, are used.

In each of the following regression specifications, one of the three measures of FD is regressed on the base-case variables of FO in as shown in Eqs. (2.16), (2.17), (2.18):

$$SMC_{it} = \propto + \beta_1 FOEL_{it} + \beta_2 TROP_{it} + \beta_3 KAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.16)$$

$$LL_{it} = \propto + \beta_1 FOEL_{it} + \beta_2 TROP_{it} + \beta_3 KAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.17)$$

$$PC_{it} = \propto + \beta_1 FOEL_{it} + \beta_2 TROP_{it} + \beta_3 KAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.18)$$

i=country, t=year

where:

- *SMC* is Stock-Market Capitalization/GDP.
- *LL* is Liquid-Liabilities/GDP.
- *PC* is Private-Credit by Deposit Money Banks/GDP.

In Table 2.2, the first three columns (1, 2, 3) show the results of regression specifications including openness measures only, and in the fourth column (4), only six institutional quality variables are included. In the last Column (5), all variables enter into the regression specification at the same time. Panel A of Table 2.2 where the dependent variable *FD* is proxied by *SMC to GDP* shows that *FOEL* is an insignificant determinant of *FD* as is seen in Columns 1 and 5. Likewise, *GE* and *VA* are not significant determinants of *FD*. On the other hand, *TROP*, *PS* and *RQ* are positive at 1% significance level, which means they have a positive and strong impact on *FD*. Moreover, *KAOPEN* has a positive coefficient of 0.1318 with a t-statistics of 1.87 at 10% significance level. *RL* is also statistically positive at 5% significance level. Contrarily, *CC* is negative at 5% significance level.

Table 2.2. Panel Regression Results of the Base-Case Variables

	PANEL A: SMC / GDP					PANEL B: LL / GDP					PANEL C: PC / GDP				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
C	0.4853[a]	0,0546	0,3745[a]	0,5141[a]	0,3222[a]	0,5531[a]	0,2178[a]	0,3914[a]	0,4921[a]	0,3931[a]	0,4657[a]	0,1029[a]	0,2977[a]	0,4077[a]	0,2482[a]
	(45,48)	(1,28)	(15,65)	(20,39)	(5,12)	(105,25)	(10,21)	(28,26)	(34,46)	(12,24)	(79,28)	(5,06)	(21,93)	(24,46)	(6,56)
FOEL	-0,0176				-0,0948	-0,0055				0,1215[c]	-0,0047				0,1337[c]
	(-1,28)				(-0,74)	(-0,82)				(1,86)	(-0,62)				(1,73)
TROP		0,6197[a]			0,2050[a]		0,4344[a]			0,1131[a]		0,4700[a]			0,1591[a]
		(10,50)			(2,60)		(14,46)			(2,80)		(16,50)			(3,35)
KAOPEN			0,2429[a]		0,1318[c]			0,2105[a]		0,0880[b]			0,2335[a]		0,1763[a]
			(5,30)		(1,87)			(7,66)		(2,45)			(8,71)		(4,17)
CC				-0,2538[a]	-0,1504[b]				-0,0603[c]	-0,0017				-0,0690[c]	0,0346
				(-3,80)	(-2,00)				(-1,81)	(-0,04)				(-1,78)	(0,76)
GE				0,1594[b]	0,1022				0,3395[a]	0,2120[a]				0,1938[a]	0,0412
				(2,26)	(1,38)				(8,39)	(5,62)				(4,13)	(0,92)
PS				0,0859[b]	0,1093[a]				-0,0848[a]	-0,0579[a]				-0,0298	0,0052
				(2,37)	(2,97)				(-4,04)	(-3,08)				(-1,22)	(0,23)
RQ				0,2262[a]	0,2125[a]				-0,1152[a]	-0,1162[a]				-0,0146	-0,0460
				(3,47)	(3,11)				(-3,04)	(-3,32)				(-0,33)	(-1,12)
VA				-0,0238	-0,0620				-0,1362[a]	-0,0892[a]				-0,1902[a]	-0,1419[a]
				(-0,39)	(-0,92)				(-3,92)	(-2,61)				(-4,71)	(-3,52)
RL				-0,1928[b]	-0,2357[b]				0,1543[a]	0,1254[a]				0,2163[a]	0,1951[a]
				(-2,25)	(-2,50)				(3,14)	(2,61)				(3,80)	(3,44)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6382	0,6802	0,6516	0,8172	0,8324	0,7992	0,6635	0,5700	0,8636	0,9074	0,7374	0,6665	0,5391	0,8038	0,8628
Observation	709	732	729	484	416	706	954	1091	476	413	708	950	1079	480	416
Sample Period	1975-2015	1975-2017	1975-2016	1996-2017	1996-2015	1975-2015	1960-2016	1970-2016	1996-2016	1996-2015	1975-2015	1960-2016	1970-2016	1996-2016	1996-2015

a, b and c show the significance level at 1%, 5%, 10%, respectively.

In Panel B, where *FD* is proxied by *LL to GDP*, the significantly positive effects of *TO* and *KAOPEN* on FD continue. The coefficient of *TROP* is significantly positive at 1% significance level and *KAOPEN* statistically positive at 5% significance level. Besides, *FOEL* has a positive coefficient of 0.1215 with a t-statistics of 1.86 at 10% significance level. Control variables *GE* and *RL* are both statistically positive at 1% significance level. However, *PS, RQ* and *VA* are significantly negative at 1% significance level.

Panel C (Columns 2, 3 and 5) where the dependent variable *PC to GDP* also indicates that all *FO* variables (*TROP, KAOPEN and FOEL*) have a statistically significant and positive impact on *FD*. Moreover, *RL* is positive at 1% significance level whereas *VA* is negative at 1% significance level. On the other hand, the other control variables are insignificant determinants of *FD*.

Panels A, B and C of Table 2.2 show that Institutional Quality measures which are *CC, GE, PS, RQ, VA* and *RL* do not have consistent slopes. Due to the mixed results of these six control variables, the average of these six-control variables are taken and formed one control variable, *INQ*. The outcomes of these specifications are presented in Table 2.3.

The Panel Eqs (2.19), (2.20), (2.21) that are used to produce the results in Table 2.3 are shown below:

$$SMC_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{Pit}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.19)$$

$$LL_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{it}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.20)$$

$$PC_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{it}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.21)$$

i=country

t=year

where *INQ* signifies Institutional Quality of country *i* at time *t.*

Table 2.3. Panel Regression Results of Base-Case Variables Including Combined INQ Measure

	PANEL A: SMC / GDP					**PANEL B: LL / GDP**					**PANEL C: PC / GDP**				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
C	0,4853[a]	0,0546	0,3745[a]	0,5701[a]	0,2704[a]	0,5531[a]	0,2178[a]	0,3914[a]	0,6200[a]	0,4414[a]	0,4657[a]	0,1029[a]	0,2977[a]	0,5185[a]	0,2697[a]
	(45,48)	(1,28)	(15,65)	(56,41)	(4,36)	(105,25)	(10,21)	(28,26)	(96,22)	(13,49)	(79,28)	(5,06)	(21,93)	(72,36)	(7,27)
FOEL	-0,0176				-0,0917	-0,0055				0,1294[c]	-0,0047				0,1430[c]
	(-1,28)				(-0,70)	(-0,82)				(1,87)	(-0,62)				(1,82)
TROP		0,6197[a]			0,2754[a]		0,4344[a]			0,1145[a]		0,4700[a]			0,1500[a]
		(10,50)			(3,46)		(14,46)			(2,72)		(16,50)			(3,15)
KAOPEN			0,2429[a]		0,1803[a]			0,2105[a]		0,1185[a]			0,2335[a]		0,1976[a]
			(5,30)		(2,70)			(7,66)		(3,35)			(8,71)		(4,95)
INQ				0,0365	0,0556				-0,0487	-0,0516				0,0485	0,0768
				(0,51)	(0,69)				(-1,06)	(-1,21)				(0,96)	(1,59)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6382	0,6802	0,6516	0,8043	0,8231	0,7992	0,6635	0,5700	0,8251	0,8955	0,7374	0,6665	0,5391	0,7751	0,8565
Observation	709	732	729	484	416	706	954	1091	476	413	708	950	1079	480	416
Sample Period	1975-2015	1975-2017	1975-2016	1996-2017	1996-2015	1975-2015	1960-2016	1970-2016	1996-2016	1996-2015	1975-2015	1960-2016	1970-2016	1996-2016	1996-2015

a, b and c signify the significance level at 1%, 5%, 10%, respectively.

In Table 2.3, the first three columns (1, 2, 3) show the results of openness measures tested alone, and in the fourth column (4), only the control variable is tested. In the last Column (5), all variables are tested at the same time.

Table 2.3, Panel A (column 5) shows the results of Panel Regression with base-case variables when *SMC* is used as a measure of *FD*. The findings show that *TROP* and *KAOPEN* are positive and significant at 1% level. However, *FOEL* and *INQ* are insignificant determinants of *FD*.

In panel B, the findings (column 5) show that *TROP, KAOPEN* are both significantly positive at 1% significance level. These results show that trade openness and a country's capital account openness are important for a country's *FD.* Besides, *FOEL* has a positive coefficient of 0.1294 with a t-statistics of 1.87 at 10% significance level. However, *INQ* is an insignificant determinant of *FD*.

Panel C (column 5) indicate that *TROP* and *KAOPEN* have a strong impact on *FD* because their coefficients are significantly positive at 1% significance level. Furthermore, *FOEL* has a positive coefficient of 0.1430 with t-statistics 1.82 at 10% significance level. Nevertheless, *INQ* has an insignificant slope.

To sum up, the significance of *TROP, KAOPEN* and *FOEL* remain the same even after several institutional characteristics are combined into one variable *INQ*.

2.6.2. Results of The Alternative Regression Specification

In this section, Table 2.4 and Table 2.5 report the results where *FO* is measured by alternative measures of *CTS, ACAOPEN,* and *SEGM*. Six-control variables are used, which show institutional characteristics properties in Table 2.5, and the combined version *(INQ)* is used as the control variable in Table 2.6.

The panel Eqs. (2.22), (2.23), (2.24) for the results in Table 2.4 are shown below:

$$SMC_{it} = \propto + \beta_1 SEGM_{it} + \beta_2 CTS_{it} + \beta_3 ACAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.22)$$

$$LL_{it} = \propto + \beta_1 SEGM_{it} + \beta_2 CTS_{it} + \beta_3 ACAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it} + \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.23)$$

$$PC_{it} = \propto + \beta_1 SEGM_{it} + \beta_2 CTS_{it} + \beta_3 ACAOPEN_{it} + \beta_4 CC_{it} + \beta_5 GE_{it} + \beta_6 PS_{it} + \beta_7 RQ_{it}$$

$$+ \beta_8 VA_{it} + \beta_9 RL_{it} + \varepsilon_{it} \quad (2.24)$$

i=country;

t=year

Panel A of Table 2.4 presents the results when *SMC* is used as the measure of *FD*. The findings in column 5 show that the coefficient of *CTS* is significantly positive at 1% significance level. In addition, *ACAOPEN* and *SEGM* are also statistically significant at 5 %, 10% respectively. It is also seen It is also seen that *SEGM* has a significantly negative effect on *FD* as expected. *PS* and *RQ* are also significant determinants of *FD*. However, *CC* and *RL* are negatively significant at 5% significance level. The results suggest that under control variables, both three openness measures; *ACAOPEN*, *CTS* and *SEGM* are positive and statistically significant determinants of *FD*.

In Panel B, *LL to GDP* is used as a measure of *FD*. The results (column 5) confirm that *CTS* is positively correlated with *FD*. The coefficient of *CTS* is significantly positive at 1% significance level. Moreover, *GE* and *RL* are also positively significant at 1% significance level. *CC, PS,* and *RQ* are found to have a negative and significant effect on the dependent variable while the coefficients of *SEGM* and *ACAOPEN* are not found significant.

Panel C, where *PC to GDP* is used as the measure of *FD*, demonstrates that the coefficients of *CTS* and *RL* are significantly positive at 1% significance level while the coefficients for *SEG, GE, PS,* and *RQ* are insignificant determinants of *FD*. Besides, the coefficients of *VA* and *CC* are negative at 5%, 10% significance level respectively.

Similar to the results presented in Table 2.2, the results of the six components of *INQ* are again mixed in Table 2.4. Likewise, the results of the specifications where they are exemplified by one single variable are presented in Table 2.5.

Table 2.4. Panel Regression Results of the Alternative Variables

	PANEL A: SMC / GDP					PANEL B: LL / GDP					PANEL C: PC / GDP				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
C	0,5707[a]	0,3568[a]	0,4498[a]	0,5141[a]	0,4463[a]	0,5904[a]	0,4184[a]	0,5872[a]	0,4921[a]	0,5120[a]	0,5122[a]	0,3413[a]	0,4455[a]	0,4077[a]	0,4020[a]
	(35,95)	(24,18)	(21,62)	(20,39)	(13,28)	(77,89)	(60,20)	(42,21)	(34,46)	(29,43)	(58,68)	(48,28)	(29,83)	(24,46)	(18,38)
SEGM	-0,2116				-0,2512[c]	0,0354				-0,0553	-0,0230				-0,0361
	(-1,48)				(-1,78)	(0,49)				(-0,75)	(-0,28)				(-0,39)
CTS		0,1360[a]			0,0755[a]		0,1324[a]			0,0543[a]		0,1148[a]			0,0442[a]
		(11,75)			(5,39)		(21,98)			(7,44)		(18,99)			(4,83)
ACAOPEN			0,3473[a]		0,1694[b]			0,0669		-0,0342			0,2341[a]		0,1700[a]
			(5,15)		(2,14)			(1,48)		(-0,84)			(4,87)		(3,34)
CC				-0,2538[a]	-0,1592[b]				-0,0603[c]	-0,1154[a]				-0,0690[c]	-0,0816[c]
				(-3,80)	(-2,09)				(-1,81)	(-3,02)				(-1,78)	(-1,69)
GE				0,1594[b]	-0,0223				0,3395[a]	0,1773[a]				0,1938[a]	-0,0071
				(2,26)	(-0,29)				(8,39)	(4,54)				(4,13)	(-0,14)
PS				0,0859[b]	0,1123[a]				-0,0848[a]	-0,0515[a]				-0,0298	-0,0042
				(2,37)	(3,12)				(-4,04)	(-2,78)				(-1,22)	(-0,18)
RQ				0,2262[a]	0,2576[a]				-0,1152[a]	-0,0798[b]				-0,0146	0,0274
				(3,47)	(3,75)				(-3,04)	(-2,25)				(-0,33)	(0,61)
VA				-0,0238	-0,0157				-0,1362[a]	-0,0477				-0,1902[a]	-0,0944[b]
				(-0,39)	(-0,24)				(-3,92)	(-1,41)				(-4,71)	(-2,21)
RL				-0,1928[b]	-0,2268[b]				0,1543[a]	0,1206[a]				0,2163[a]	0,1850[a]
				(-2,25)	(-2,48)				(3,14)	(2,62)				(3,80)	(3,18)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6620	0,7004	0,8080	0,8172	0,8470	0,8260	0,7537	0,8125	0,8636	0,9147	0,7682	0,7285	0,7774	0,8038	0,8556
Observation	615	730	532	484	414	602	904	553	476	418	605	900	557	480	422
Sample Period	1975-2017	1977-2017	1996-2016	1996-2017	1996-2016	1973-2016	1977-2016	1996-2016	1996-2016	1996-2016	1973-2016	1977-2016	1996-2016	1996-2016	1996-2016

a, b and c show the level of significance at 1%, 5%, 10%, respectively.

The panel Eqs. (2.25), (2.26), (2.27) for the results in Table 2.6 is shown below:

$$SMC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 ACAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.25)$$

$$LL_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 ACAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.26)$$

$$PC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 ACAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.27)$$

In Table 2.5 specifications 1, 2, and 3 are the same as those in Table 2.4. Only the fourth column is changing. In the fourth column (4), only the control variable is included, and in the last column, all variables are included simultaneously.

In Table 2.5, Panel A (column 5) shows that *CTS* is significantly positive at 1% significance level (t statistics= 6.13), which means that it has a positive and strong impact on *FD. ACAOPEN* has also a positive coefficient of 0.1986 with t-statistics of 2.51 at 5% significance level. Likewise, *SEGM* is found to be significantly negative at 10% significance level (t statistics= -1.71). On the one hand, coefficients of *INQ* are not significant. The results indicate that all three alternative variables are significant determinants of *FD* when *SMC to GDP* is applied as a dependent variable.

In Panel B, the findings (column 5) show that only *CTS* has a strong impact on *FD*. *CTS* has a positive coefficient of 0.0687 with t-statistics of 9.80 at 1% significance level. Contrary to expectations, *INQ* has a significantly negative effect on *FD* measured by *LL to GDP*. Otherwise, *SEGM* is an insignificant determinant of *FD.*

In Panel C, column 5 indicates that *CTS* and *ACAOPEN* are significantly positive at 1% significance level while *SEGM* and *INQ* are insignificant determinants of *FD*. The findings show that *CTS* and *ACAOPEN* have a strong impact on *FD* when *PC by Deposit Money Banks to GDP* is used as a dependent variable.

Table 2.5. Panel Regression Results of the Alternative Variables Including Combined INQ Measure

	PANEL A: SMC/ GDP					PANEL B: LL / GDP					PANEL C: PC / GDP				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
C	0,5707[a]	0,3568[a]	0,4498[a]	0,5701[a]	0,4317[a]	0,5904[a]	0,4184[a]	0,5872[a]	0,6200[a]	0,5521[a]	0,5122[a]	0,3413[a]	0,4455[a]	0,5185[a]	0,4196[a]
	(35,95)	(24,18)	(21,62)	(56,41)	(15,08)	(77,89)	(60,20)	(42,21)	(96,22)	(36,82)	(58,68)	(48,28)	(29,83)	(72,36)	(22,71)
SEGM	-0,2116				-0,2451[c]	0,0354				-0,0417	-0,0230				0,0053
	(-1,48)				(-1,71)	(0,49)				(-0,55)	(-0,28)				(0,05)
CTS		0,1360[a]			0,0815[a]		0,1324[a]			0,0687[a]		0,1148[a]			0,0505[a]
		(11,75)			(6,13)		(21,98)			(9,80)		(18,99)			(5,88)
ACAOPEN			0,3473[a]		0,1986[b]			0,0669		-0,0029			0,2341[a]		0,1845[a]
			(5,15)		(2,51)			(1,48)		(-0,07)			(4,87)		(3,64)
INQ				0,0365	0,0592				-0,0487	-0,0748[b]				0,0485	0,0391
				(0,51)	(0,82)				(-1,06)	(-2,02)				(0,96)	(0,85)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6620	0,7004	0,8080	0,8043	0,8394	0,8260	0,7537	0,8125	0,8251	0,9077	0,7682	0,7285	0,7774	0,7751	0,8508
Observation	615	730	532	484	414	602	904	553	476	418	605	900	557	480	422
Sample Period	1975-2017	1977-2017	1996-2016	1996-2017	1996-2016	1973-2016	1977-2016	1996-2016	1996-2016	1996-2016	1973-2016	1977-2016	1996-2016	1996-2016	1996-2016

a, b and c denote the significance level at 1%, 5%, 10%, respectively.

2.6.3. Results of The Combined Regression Specification

In this part, the empirical results are presented that are acquired by mixing the base-case variables for *FO* with alternative variables. The effects of openness measures on *FD* are the main focus of interest. Alternative variables of *SEGM* and *CTS* for stock market openness and trade openness are included in regression specifications to check the consistency of the results

Chin and Ito (2006)'s *KAOPEN* measure and the control variable (*INQ*) keep staying in the regressions.

The estimated Eqs. (2.28), (2.29), (2.30) whose results are presented in Table 2.6 are as follows;

$$SMC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.28)$$

$$LL_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.29)$$

$$PC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 KAOPEN_{it}+\beta_4 INQ_{it}+\varepsilon_{it} \quad (2.30)$$

i=country t=year

In Table 2.6, the first three columns (1, 2, 3) show the results of openness measures tested alone, and in the fourth column (4), only the control variable is tested. In the last Column (5), all variables are tested at the same time, and Panels A, B, C signify the three different dependent variables; *SMC/GDP*, *LL/GDP*, and *PC by Deposit Money Banks/GDP*, respectively.In Panel A, the results illustrate that *CTS* has a positive coefficient of 0.0792 with a t-statistics of 5.96 at 1% significance level, which further shows that the *CTS* affects *FD* positively when *SMC* is used as a measure. Moreover, the coefficient of *KAOPEN* is significantly positive at 1% significance level (*t* statistics= 5.96) and *SEGM* is statistically significant at 10%. Here it should be noted that the negative sign of *SEGM* implies a positive effect of openness on *FD*. However, *INQ* is not significantly associated with *FD*. The findings in Panel A also show that under the control of *INQ*; three openness variables are positively significant determinants of *FD*

Table 2.6. Panel Regression Results Obtained by Mixing the Base-Case and Alternative Variables

	PANEL A: SMC / GDP					PANEL B: LL / GDP					PANEL C: PC / GDP				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
C	0,5707[a]	0,3568[a]	0,3745[a]	0,5701[a]	0,3976[a]	0,5904[a]	0,4184[a]	0,3914[a]	0,6200[a]	0,5175[a]	0,5122[a]	0,3413[a]	0,2977[a]	0,5185[a]	0,3625[a]
	(35,95)	(24,18)	(15,65)	(56,41)	(11,74)	(77,89)	(60,20)	(28,26)	(96,22)	(28,78)	(58,68)	(48,28)	(21,93)	(72,36)	(16,84)
SEGM	-0,2116				-0,2406[c]	0,0354				-0,0419	-0,0230				0,0099
	(-1,48)				(-1,68)	(0,49)				(-0,56)	(-0,28)				(0,11)
CTS		0,1360[a]			0,0792[a]		0,1324[a]			0,0655[a]		0,1148[a]			0,0454[a]
		(11,75)			(5,96)		(21,98)			(9,35)		(18,99)			(5,41)
KAOPEN			0,2429[a]		0,1809[a]			0,2105[a]		0,0765[b]			0,2335[a]		0,2249[a]
			(5,30)		(3,09)			(7,66)		(2,46)			(8,71)		(6,08)
INQ				0,0365	0,0398				-0,0487	-0,0927[b]				0,0485	0,0110
				(0,51)	(0,55)				(-1,06)	(-2,51)				(0,96)	(0,24)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6620	0,7004	0,6516	0,8043	0,8407	0,8260	0,7537	0,5700	0,8251	0,9091	0,7682	0,7285	0,5391	0,7751	0,8591
Observation	615	730	729	484	414	602	904	1091	476	418	605	900	1079	480	422
Sample Period	1975-2017	1977-2017	1975-2016	1996-2017	1996-2016	1973-2016	1977-2016	1970-2016	1996-2016	1996-2016	1973-2016	1977-2016	1970-2016	1996-2016	1996-2016

a, b and c show the significance level at 1%, 5%, 10%, respectively.

In Panel B, the results show that *CTS* has a positive coefficient of 0.0655 with t-statistics 9.35 at 1% significance level. Furthermore, *KAOPEN* is a statistically significant determinant of *FD*. Its coefficient is significantly positive at 5% significance level. While *SEGM* is not found to have a significant effect, *INQ* has a significantly negative coefficient.

In Panel C, the findings show that both *CTS* and *KAOPEN* have a positive impact on FD (*t* statistics=5.41 and *t* statistics= 6.08 respectively). On the other hand, *SEGM* and *INQ* are insignificant determinants of *FD*.

2.6.4. Robustness Tests

In this section, the regression specification is modified to check the robustness of the results. The time span of the analysis is also extended by removing *ACAOPEN* and *INQ* variables, which have time constraints.

It is not possible to compute *ACAOPEN* for the pre-1996 period as the data for 13 sub-categories do not exist in AREAER. Also, *INQ* data is only available on the WGI official website after 1996. Therefore, the variables *ACAOPEN* and *INQ* have time constraints. These two variables are removed from the regressions and the results for the remaining *FO* variables are reported. In this way, a longer sample period is obtained. Table 2.7 and Table 2.8 show the results with a longer sample with base-case variables and alternative variables respectively. The results are consistent with our base-case specification and the alternative specification estimated before.

Table 2.8 demonstrates the results of panel regression with a longer sample where base-case variables *(FOEL, TROP,* and *KAOPEN)* are used.

The panel Eqs. (2.31), (2.32), (2.33) for Table 2.7 are shown below:

$$SMC_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{it}+\beta_3 KAOPEN_{it}+\varepsilon_{it} \quad (2.31)$$

$$LL_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{it}+\beta_3 KAOPEN_{it}+\varepsilon_{it} \quad (2.32)$$

$$PC_{it}=\propto+\beta_1 FOEL_{it}+\beta_2 TROP_{it}+\beta_3 KAOPEN_{it}+\varepsilon_{it} \quad (2.33)$$

i= country

t= time

When the results with a longer sample are examined that presented in Table 2.7, Panel A shows that both *TROP* and *KAOPEN* are positive at 1% significance level (*t* statistics=9.68 and *t* statistics= 3.25 respectively). In other words, *TROP* and *KAOPEN* both have a positive and strong effect on *FD.* However, the coefficient of *FOEL* is not significant when the *SMC/GDP* is used as the measure of *FD.*

In Panel B, *FOEL* has a positive coefficient with a t-statistics of 4.40, and *TROP* also has a positive coefficient of 0.2555 with a t-statistics of 8.59 Likewise, *KAOPEN* has a positive coefficient of 0.0543 with a t-statistics of 2.39. When *LL/GDP* is used as the measure of *FD* and with no time constraint, our three-openness measures are significantly positive.

In Panel C, *FOEL, TROP and KAOPEN* are both positive at 1% significance level. Results that are presented in Panel C also confirm the results of Panel B. To sum up, three openness measures are found to have a significantly positive effect on *FD* when *PC by Deposit Money Banks/GDP* is used as the dependent variable

Table 2.7. Results from a Longer Sample

	PANEL A: SMC / GDP				PANEL B: LL / GDP				PANEL C: PC / GDP			
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
C	0,4853[a]	0,0546	0,3745[a]	-0,0139	0,5531[a]	0,2178[a]	0,3914[a]	0,3233[a]	0,4657[a]	0,1029[a]	0,2977[a]	0,1543[a]
	(45,48)	(1,28)	(15,65)	(-0,31)	(105,25)	(10,21)	(28,26)	(14,79)	(79,28)	(5,06)	(21,93)	(6,62)
FOEL	-0,0176			0,1140	-0,0055			0,1657[a]	-0,0047			0,1520[a]
	(-1,28)			(1,48)	(-0,82)			(4,40)	(-0,62)			(3,77)
TROP		0,6197[a]		0,5851[a]		0,4344[a]		0,2555[a]		0,4700[a]		0,3277[a]
		(10,50)		(9,68)		(14,46)		(8,59)		(16,50)		(10,32)
KAOPEN			0,2429[a]	0,1498[a]			0,2105[a]	0,0543[b]			0,2335[a]	0,1236[a]
			(5,30)	(3,25)			(7,66)	(2,39)			(8,71)	(5,10)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6382	0,6802	0,6516	0,6954	0,7992	0,6635	0,5700	0,8349	0,7374	0,6665	0,5391	0,8013
Observation	709	732	729	680	706	954	1091	677	708	950	1079	679
Sample Period	1975-2015	1975-2017	1975-2016	1975-2015	1975-2015	1960-2016	1970-2016	1975-2015	1975-2015	1960-2016	1970-2016	1975-2015

a, b and c show the level of significance at 1%, 5%, 10%, respectively.

In table 2.8, alternative variables (*SEGM and CTS*) are used. However, instead of A*CAOPEN*, Chin and Ito (2006)'s Financial Openness Index of Capital Account Openness non-normalized version *(N_KAOPEN)* is used as the third alternative variable.

The estimated panel Eqs. (2.34), (2.35), (2.36) to produce the results in Table 2.8 are shown below;

$$SMC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 N\_KAOPEN_{it}+\varepsilon_{it} \quad (2.34)$$

$$LL_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 N\_KAOPEN_{it}+\varepsilon_{it} \quad (2.35)$$

$$PC_{it}=\propto+\beta_1 SEGM_{it}+\beta_2 CTS_{it}+\beta_3 N\_KAOPEN_{it}+\varepsilon_{it} \quad (2.36)$$

As expected, Table 2.8 shows that *CTS* and *N_KAOPEN* are positive at 1% significance level with three alternative dependent variables as it is seen in the Panels A, B, C (column 4). However, *SEGM* is significant at 5% significance level only when *SMC* is used as a determinant of *FD.*

2.7. Conclusion

The relationship between FO and FD is examined by using both capital flow, valuation, and restrictions based measures of financial openness for emerging markets. This issue is especially important for emerging markets trying to improve their financial system to raise much-needed capital for investment projects. This relationship is also tested after controlling for INQ and its six sub-components.

Capital flow-based measure *FOEL* and valuation based measure *SEGM* have not been employed to explain FD in the previous literature. These variables and their variants have been used before to analyze their effect on aggregate total volatility, EG, market returns, etc. However, their relation with FD is investigated for the first time in this study. Investigating the effect of the measure of stock market openness on FD is an interesting issue for policymakers in emerging markets.

Table 2.8. Results from Longer Sample and Alternative Variables

	PANEL A: SMC/GDP				PANEL B: LL/GDP				PANEL C: PC/GDP			
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
C	0,4853[a]	0,0546	0,4832[a]	0,4547[a]	0,5531[a]	0,2178[a]	0,4855[a]	0,5018[a]	0,4657[a]	0,1029[a]	0,4021[a]	0,4295[a]
	(45,48)	(1,28)	(48,07)	(22,53)	(105,25)	(10,21)	(83,12)	(58,54)	(79,28)	(5,06)	(69,70)	(41,32)
SEGM	-0,0176			-0,3126[b]	-0,0055			-0,0290	-0,0047			-0,0835
	(-1,28)			(-2,27)	(-0,82)			(-0,49)	(-0,62)			(-1,17)
CTS		0,6197[a]		0,1029[a]		0,4344[a]		0,0860[a]		0,4700[a]		0,0743[a]
		(10,50)		(8,09)		(14,46)		(15,57)		(16,50)		(11,31)
N_KAOPEN			0,0568[a]	0,0440[a]			0,0492[a]	0,0048[a]			0,0546[a]	0,0405
			(5,30)	(3,60)			(7,66)	(0,92)			(8,71)	(6,42)
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0,6382	0,6802	0,6516	0,7253	0,7992	0,6635	0,5700	0,8852	0,7374	0,6665	0,5391	0,8314
Observation	709	732	729	571	706	954	1091	577	708	950	1079	580
Sample Period	1975-2015	1975-2017	1975-2016	1977-2016	1975-2015	1960-2016	1970-2016	1977-2016	1975-2015	1960-2016	1970-2016	1977-2016

a, b and c show the significance level at 1%, 5%, 10%, respectively.

The findings of this study can be summarized as follows; first, a statistically significant effect of trade openness and capital account openness on FD is shown in 27 emerging countries over the period of 1996–2016. When all outcomes are examined, the results are similar for the different measures of FD; Trade Openness measures *(CTS and TROP)* and Capital Account Measures (*KAOPEN* and *ACAOPEN)* have a significant and positive impact on FD. Three different specifications are analyzed to make sure that the results and all findings are consistent with each other. Moreover, the other openness measures *SEGM and FOEL* do not have a significant effect on FD in a consistent manner for all specifications. In other words, the *SMO* is not an explanatory indicator of FD even when a longer analysis period is used.

Second, sub-components of the institutional quality measures, which are *CC, GE, PS, RQ, VA* and *RL*, are combined in a single measure because the results from specifications with these sub-contents are inconclusive. Even after combining sub-components into a single variable, Institutional Quality still does not have a strong effect on FD, and it shows heterogeneous effects in different specifications.

Finally, the results provide important insights for policymakers who try to enhance the depth of their financial markets for easier and cheaper access to funds. Opening both trade and capital accounts are the key factors for accomplishing financial development. In other words, opening goods and services markets in emerging markets promote FD. The results also support that opening trade and capital accounts outweigh opening the stock market to boost FD.

To sum up; there is strong evidence that trade openness and capital account openness have substantial relationships with FD, and that will motivate the policymakers to take steps for removing barriers against trade and capital account openness.

CHAPTER 3
ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT: EVIDENCE FROM PANEL COINTEGRATION TESTS IN EMERGING COUNTRIES

3.1. Introduction

The link between EG and FD has been a significant topic of rigorous discussions for a long time. Financial systems lessen transaction costs and information that enable to ease risk control and allocation of resources leading to technological development and capital savings for EG. Besides, it allows intermediaries and markets to mobilize savings (Levine 1997). Countries that develop financial systems are more likely to enhance their economic growth. Earlier research highlighted a significant relationship between growth and FD (Ghani, 1992; King and Levine, 1993; Levine and Zervos, 1996; Levine et al., 2000; Beck et al., 2000b; Christopoulos and Tsionas, 2004), and they concluded that FD fosters EG. However, there have been conflicting views about the role of FD. Ireland (1994); Demetriades and Hussein (1996) supported the view that FD was caused by the economic growth process. For instance, Demetriades and Hussein (1996) applied causality tests by using the time-series method and found out a bi-directional causality between FD and growth. Luintel and Khan (1999) showed evidence of bi-directional causality between FD and EG. Shan, Morris and Sun, (2001) also documented mixed results, they used VAR modeling and to investigate the relationship between FD and EG for 9 OECD countries and China. They inferred that a general outcome should not be made about the direction of causality between FD and EG.

In recent years, there has been plenty of new research about the role of financial systems in explaining EG because developed financial systems can help to boost growth, especially in emerging countries by improving economic conditions, financial

institutions, and markets. Moreover, it is also quite important to understand how to accomplish and sustain financial development because of the critical impacts of FD on various aspects of an economy (Umutlu, Gültekin, and Özkaya, 2020).

Pradhan, Arvin, Bahmani, Hall, and Norman (2017) studied the relationship between EG and FD in ASEAN Regional Forum (ARF) countries between the years 1991 to 2011. They used four different composite indices of FD. They applied the Pedroni panel cointegration test and panel VECMs. Their results indicated that there is unidirectional and bidirectional causality among their variables. Amematekpor (2018) examined the relationship between five FD indicators and EG in 25 SSA countries between the years 1980–2015 by using the new broad-based FD indices. The author used the Westerlund (2005) and Pedroni (1999, 2004) panel cointegration methods to check a long-run relationship. Moreover, the panel FMOLS and DOLS estimations are applied. The causality test results of the Dumitrescu-Hurlin (2012) showed a bidirectional relationship between the financial institutions and EG for all countries. Oro and Alagidede (2018) investigated the FD and EG relationship in 30 oil-producing and 30 non-oil producing countries from 2006 to 2015 by using GMM estimation and panel threshold regressions. They used different variables to measure FD; *i)* private credits and *ii)*new broad-based FD index and its sub-components. Their findings showed a nonlinear relationship between FD and growth in both oil and non-oil producing countries. Haini (2019) examined the effect of financial and institutional development on EG in ASEAN countries between the period 1995-2017 by performing dynamic panel estimation. He concluded that FD has an important role in boosting EG but the impact of financial institutions and markets differ. On the other hand, Opoku, Ibrahim, and Sare (2019) studied the association between the economic growth and new broad-based FD variable in 47 African countries over the period 1980 to 2016. They deployed the framework of a frequency-domain spectral causality technique. Their results from most countries supported the neutrality hypothesis, suggesting that FD and EG are independent.

Most of the findings of the recent studies above stem from research applied in ASEAN countries, ARF countries, developed countries, SSA countries, etc. Consequently, very little is known about the FD-EG relationship in the more broader group of emerging countries. From that point of view, this chapter aims to find out the role of FD in the growth for 27 emerging countries, and this chapter applies the Johansen-

Fisher panel cointegration (JFPC) test to analyze the long-run relationship between EG and FD over the period 1980 to 2018. The panel VECM is also performed to find out the direction of a causal association between EG and FD. In addition, a new FD measure introduced by Svirydzenka (2016) is used. This overall FD index comprises the depth, efficiency, and access dimensions of the financial sector. Two components of this overall index, which are the index for financial institutions and the index for financial markets, are also used to answer the following question: Through which channels does EG have a long-term relationship with FD? Conceptually, this multi-dimensional variable defines FD more extensively than other alternative measures.

In detail, this chapter applies two different panel cointegration regressions with the overall FD index and its sub-indices separately. Before using the JFPC test to estimate the long-run relation, unit root tests are run to investigate whether the variables are stationary or not. Lastly, panel VECM is used to examine both the long-run and short-run dynamics.

This chapter aims to contribute to the literature in three ways. First, the study differs in its methodology which is the JFPC method. The second distinguishing property of the study is the use of a new broad-based measure for FD which covers different multidimensional perspectives of the financial system. Third, the long-run relationship with this new broad-based measure and its components and growth is investigated in a broad set of emerging countries.

The remainder of the chapter is categorized as follows. Section 3.2 gives information about the theoretical framework. Section 3.3 presents the data and a detailed explanation of the variables. Section 3.4 introduces the methodology, specifically the JFPC test, unit root tests and panel VECM, while Section 3.5 explains our model specifications and Section 3.6 discusses the results from these panel cointegration analyses. Section 3.7 draws some conclusions from these findings.

3.2. Theoretical Background

The relationship between FD and growth has been a significant area of debate among policymakers and researchers, and this relationship has been extensively discussed in both theoretical and empirical studies. The theoretical discussion of this relationship dates back to Schumpeter (1911) and later Shaw (1973) and McKinnon (1973). Schumpeter (1911) was the earliest economist who emphasizes the significance of

finance in the growth process. He also specified that financial services have a significant effect on stimulating growth through their functions. According to McKinnon (1973) and Shaw (1973) financial markets are suppressed by regulations especially in developing countries and these repressions adversely impact the level of savings and investment decisions. Hence, EG is hindered in developing countries. They also suggested that these countries should liberalize their financial markets by applying some reforms in order to get rid of the vicious cycle of low levels of interest rate and the growth rate because low-interest rates depreciate savings and boost ineffective investments. Furthermore, according to them, financial liberalization provides competitive markets that increase productivity growth and technological development. Besides, with the liberalization legal and required reserve ratios will be maintained at the minimum level which will reduce costs of funding and enable the banking sector to perform its financial intermediary functions effectively. Consequently, they concluded that a higher level of FD, which can be an outcome of financial liberalization, induces economic growth.

On the other hand, economists such as Robinson (1952), Lucas (1988) and Stiglitz (1994) argued the role of FD in boosting EG. Some of them did not believe in the significance of the financial system in the growth process. Peculiarly, Robinson (1952), signified that FD follows EG as a result of increased demand for financial services. Lucas (1988), stated that "*the importance of financial matters is very badly overstressed*". Stiglitz (1994) remarked that government intervention by suppressing financial systems can decrease market distortions and develop the overall performance of an economy.

These theoretical debates show that there are different ideas about the impact of finance in the growth process and the direction of this relationship has significant implications for policymakers for both developed and developing countries. In this sense, four growth-finance hypotheses in the literature clarify the direction of causality of the growth-finance nexus; i) Demand-Following hypothesis (DFH), ii) Supply-Leading hypothesis (SLH), iii) Feedback hypothesis (FBH) and iv) neutrality hypothesis (NH). DFH and SLH claims that unidirectional causality runs from either growth or finance to each other. The FBH supports the bidirectional association between growth and finance. The neutrality hypothesis advocates the idea that there is no causality between growth and finance.

Most of the researches in the literature support the SLH. Economic growth is caused by the development in finance. Guidotti (1995), Abu-Bader and Abu-Qarn (2008), Jalil, Feridun and Ma (2010), Ahmed and Wahid (2011), Chen et al. (2012), Wu et al. (2010) Enisan and Olufisayo (2009) supported "SLH" view stating that FD leads growth where unidirectional causality runs from FD to growth. On the other hand, Demetriades and Hussein (1996), Shan et al. (2001), Atindehou et al.(2005), Kar et al. (2011), Odhiambo (2004, 2008), Panopoulou (2009), Mukhopadhyay, Pradhan and Feridun (2011) show evidence for the view of "DLH" which claims a unidirectional causality running from growth to FD. According to this hypothesis, growth leads to higher FD. As the economy grows, the demand side of the financial services increases, leading to the expansion of these services. The financial system either somehow adapts to the growth of per capita output or restricts it to the extent that it does not work. For instance, finance seems to follow where enterprise leads. The same impulses that sustain enterprise in an economy make the wealth holders bold and when a powerful impulse to fund is shackled by a lack of finance, tools are invented and both institutions and habits are developed to release it (Patrick, 1966). So, this perspective highlights the demand side for financial services. If the economy develops, it produces new and additional demands for these services, and this causes a supply response in the growth of the financial system. According to this approach, the deficiency of institutions in developing countries is a sign of absence of demand for their services. Moreover, Patrick (1966) mentioned two possible causal relations between FD and growth; demand-following and supply-leading. The first one is demand-following refers to the circumstances in which the formation of modern financial institutions, financial assets & liabilities, and related financial services occurs in response to the demand for these services by savers and investors in the real economy (Patrick, 1966:174). DFH states that finance is passive and enables growth. The second one is supply-leading which is the formation of financial institutions and the supply of their related financial services, financial assets & liabilities are created in advance of demand for them. "Supply-leading" had two functions: to transfer resources from traditional (non-growth) sectors to modern ones, and to foster an entrepreneurial response in these modern sectors (Patrick, 1966:175).

Despite the SLH and DFH views, several researchers such as Huang-Yang and Hu (2000), Dritsakis and Adamopoulos (2004), Al-Yousif (2002), Fowowe (2011),

Guochen and Wei (2012) and Pradhan, Arvin and Norman (2015) supported the "FBH" view. They found that the causality runs in both directions. Finally, Lucas (1988), Stern (1989), Opoku et al. (2019) and Pradhan, Dasgupta and Samadhan (2013) supported the "NH" view which indicates that there is no causality between EG and FD.

3.3. Data And Variables

The annual data comprising the period of 1980-2018 for 27 emerging economies are used. These are; Argentina, Bahrain, Brazil, Chile, China, Czech, Egypt, Hungary, India, Indonesia, Israel, Korea, Kuwait, Malaysia, Mexico, Morocco, Oman, Pakistan, Philippines, Poland, Qatar, Russia, South Africa, Thailand, Turkey, UAE, and Vietnam. The sampling period starts in 1980 and ends in 2018 because of the availability of the data and the requirement of a balanced panel. The variables are economic growth, financial development index, and its sub-indices which are financial markets and institutions indices.

GDP per capita *(GDPPC)* is computed as the gross value of goods and services produced in a country divided by the population of the country. *GDPPC* is generally used in the literature to measure the welfare of countries based on their economic development. Thus, the natural logarithms of *GDPPC (lnGDPPC)* is used expressed in the current US $ for the measurement of EG, which is used as the dependent variable. This variable is taken from the WDI database.

Moreover, countries with developed industries and small affluent nations tend to have the highest *GDPPC*. Figure 3.1 shows the rank of *GDPPC* in the top 20 countries.

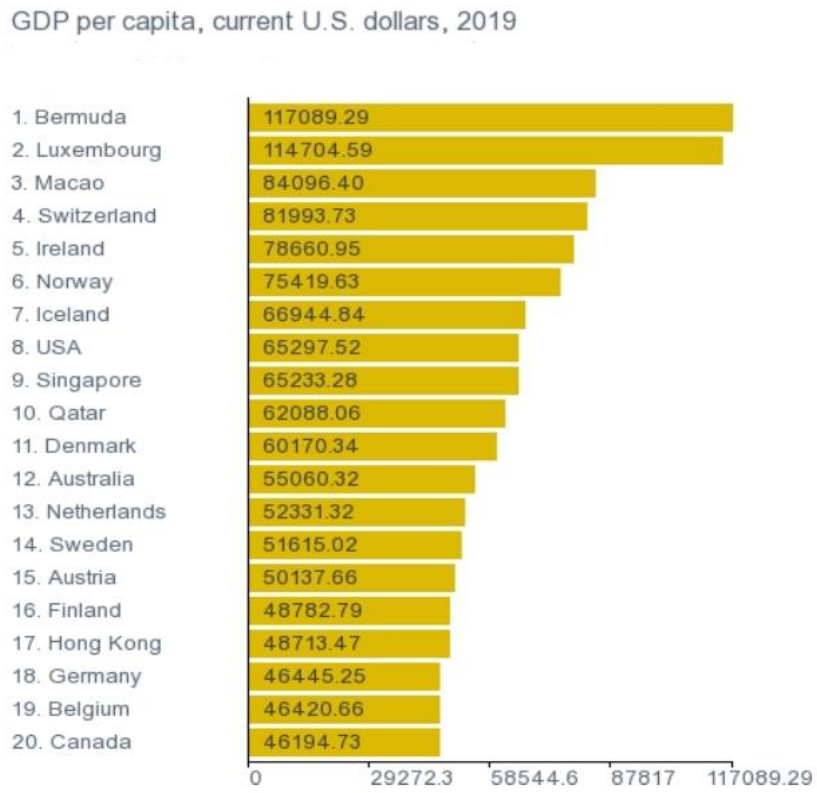


Figure 3.1. GDPPC in Top 20 Countries

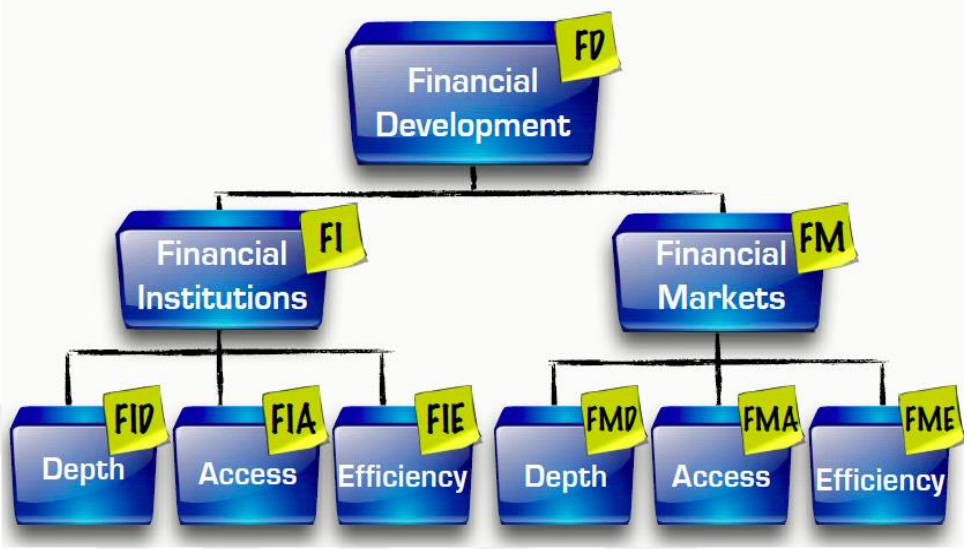
Source: TheGlobalEconomy.com; 2021.

In many studies, FD is proxied with different indicators. It is hard to explain FD because it contains the information reflected by too many different parameters together. In the first part of the analysis, FD is measured by three different measures but in this chapter, the overall FD index composed by Svirydzenka (2016), hereinafter *FDX*, is used as an independent variable. Moreover, two sub-indices of *FDX*, the index for financial institutions *(FI)* and the index for financial markets *(FM)*, are also used to find out through which channels EG has a long-term relationship with FD.

Svirydzenka (2016) formed a total of 9 indices that aim at measuring the heterogeneous degrees of financial development across countries. She used a three-step approach to form one summary index as illustrated in Figure 3.2. In the first step, she normalized the six lower indices which are *FMD, FMA, FME, FID, FIA* and *FIE* to gauge how deep, accessible, and efficient financial markets and institutions are. In the second step, she aggregated these three sub-indices separately for financial institutions (*FID, FIA, and FIE)* and financial markets *(FMD, FMA, and FME)*. Next, she formed two main indices from these sub-categories: *FI* and *FM*. *FI* includes insurance companies, banks, mutual funds, and pensions. *FM* covers bond and stock

markets. Finally, she created the overall financial development index of a country from these two higher-level indices. This multi-dimensional variable clarifies the nature of FD more extensively than the other measures.

Figure 3.2 summarizes how *FDX* is formed.



Note: The letters I and M indicate institutions and markets, and the letters D, A, and E indicate depth, access, and efficiency

Figure 3.2 The Pyramid of FD Index

Source: IMF staff, based on Čihák et al. (2012), derived from Svirydzenka (2016)

Table 3.1 presents the summary information for all variables comprising the dependent and independent variables applied in the analysis for 27 emerging countries over the period 1980 to 2018.

Table 3.1. Summary Information

Variables	Mean	Median	Std. Dev.	Max.	Min.	Obs.
lnGDPPC	8.3383	8.4025	1.3612	11.3513	4.5492	1006
FDX	0.3914	0.3757	0.1372	0.8527	0	1006
FM	0.3707	0.3636	0.1714	0.8731	0	1006
FI	0.3972	0.3742	0.1514	0.8204	0	1006

3.4. Methodology

In this chapter, the JFPC method is used for the empirical analyses of the EG and FD long-run relationship. The prerequisite of applying the panel cointegration method is to determine the stationary levels of the variables. Thus, various panel unit root (PUR) testing methods are used to specify the integration order of all our variables; *lnGDPPC, FDX, FI and FM.*

3.4.1. PUR

Individual unit root (UR) tests are almost identical to panel-based UR tests, and studies in recent years such as Maddala and Wu (1999), Breitung (2000), Levin, Lin and Chu (2002, hereinafter LLC), and Im, Pesaran and Shin (2003; hereinafter IPS) developed PUR tests that presumed all cross-sectional units are independent (Baltagi, 2005; Tugcu, 2018; Bhattarai, 2019).

LLC approach is specified by a three-step method with ADF type regressions and the main hypothesis is as follows:

$$\Delta y_{i,t} = \rho y_{i,t-1} + \sum_{L=1}^{p_i} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it} \quad (3.1)$$

m=1,2,3

i=1,..,N

t=1,…T

where d_{mt} is a vector of deterministic variables, α_{mi} is the corresponding vector of coefficients for the model m=1,2,3.

Particularly d_{1t} ={empty set}, d_{2t}={1} and $d_{3t} = \{1, t\}$.

p_i shows the lag order and it is allowed to vary across individuals. p_{max} is selected for a stated T and then t-stat of $\widehat{\theta_{iL}}$ is applied to designate if a smaller p_i is preferred. LLC's null hypothesis is that each individual time series have a unit root against the alternative that each time series is stationary; $H_0 = \rho = 0, H_1 = \rho < 0$.

The disadvantage of the LLC test is being restrictive in that it requires ρ to be homogenous across i and LLC tests presume that there is a common unit root process across cross-sections. On the other hand, IPS (2003) tests assume individual unit root processes and they are based on a heterogeneous cross-section unit. The null hypothesis of IPS is that each series in the panel holds a unit root; $H_0 = \rho_i = 0$ for all i. However, the alternative hypothesis allows for some of the individual series to have unit-roots.

$$H_1: \begin{cases} \rho_i < 0 \; for \; i = 1,2, \ldots., N_1 \\ \rho_i = 0 \; for \; i = N_1 + 1, \ldots N \end{cases} \quad (3.2)$$

where N shows the number of cross-sections. The IPS test statistics which is applied to test unit root in panel data is described in Eq. (3.3):

$$t_{IPS} = \frac{\sqrt{N}\left(\bar{t} - \frac{1}{N}\sum_{i=1}^{N} E\,[t_{iT}|\rho_i=0]\right)}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} var[t_{iT}|\rho_i=0]}} \rightarrow N(0,1) \quad (3.3)$$

Another method for applying PUR tests is Fisher-type tests which are proposed by Maddala and Wu (1999). These tests are combining the p-values from UR tests for each cross-section i to test the unit root in panel data. The Fisher-type test has the following form:

$$P = -2\sum_{i=1}^{N} ln\, p_i \;\Rightarrow\; X_{2N}^2 \tag{3.4}$$

Maddala and Wu (1999) asserted that the Fisher and IPS tests relax the restrictive hypothesis of the LLC test that ρ_i is the same under the alternative. Both Fisher-type and IPS tests associate information that is based on the UR tests but there is a difference between the two. The Fisher test can be used in unbalanced panel tests while IPS necessitates a balanced panel. Moreover, different lags can be used in the individual Augmented Dickey-Fuller (ADF) equations and also be employed to any other UR tests with the Fisher test (Baltagi, 2005). All PUR tests explained above presume that there is a unit root under the null hypothesis.

3.4.2. Panel Cointegration Tests

After testing whether there is a UR in the variables, it is then necessary to examine the existence of cointegration among them (Brooks, 2014). If two or more time series are non-stationary at their levels but their linear combination is stationary then these series are said to be cointegrated. If there are cointegrated variables, there is a presence of a long-run relationship between them. (Enders, 2014). In the panel cointegration, the concept is approximately the same as in the time series.

In the literature, there are two types of panel cointegration methods; residual-based and maximum likelihood-based. The main idea of residual-based tests such as Kao (1999), Pedroni (1999), Westerlund (2005), etc. is to test for the presence of a unit root in the residuals of a cointegration equation, and it was introduced by Engle and Granger (1987). The second type called maximum-likelihood-based tests is based on the multivariate cointegration technique, which was offered by Johansen (1988).

3.4.2.1. Kao and Pedroni Cointegration Tests

The popular residual-based tests of Pedroni and Kao (1999) are built on the concept of Engle and Granger (1987) cointegration tests. Kao (1999) offered DF and ADF type tests in panel data and DF type can be described as follows:

$$y_{it} = \alpha_i + \beta x_{it} + e_{it} \tag{3.5}$$

$$y_{it} = y_{it-1} + u_{it} \tag{3.6}$$

$$x_{it} = x_{it-1} + \varepsilon_{it} \quad (3.7)$$

where *t*=1,…*T; i*=1,2,…*N.* e_{it} *(residual series)* might be non-stationary and u_{it} is the constant term. y_{it} and x_{it} follows the no-cointegration hypothesis, and they both are random walks. α_i shows the fixed effects that diversify across cross-sections and β denotes the common slope parameter across *i*. Then the DF test can be computed from the estimated residuals as follows:

$$\widehat{e_{it}} = \rho \hat{e}_{it-1} + v_{it} \quad (3.8)$$

where $\widehat{e_{it}} = \widehat{y_{it}} - \widehat{x_{it}}\widehat{\beta}$ and $\widehat{y_{it}} = y_{it} - \overline{y_i}$.

ADF type of Kao test is shown as below:

$$\widehat{e_{it}} = \rho \hat{e}_{it-1} + \sum_{j=1}^{p} \gamma_j \Delta \widehat{e_{it-j}} + v_{itp} \quad (3.9)$$

p shows the lag length in the ADF equation.

For both DF and ADF statistics, the null hypothesis can be stated as $H_0: \rho = 1$ and the alternative hypothesis can be written as $H_1: \rho < 1$.

Moreover, Pedroni (1999, 2004) presented numerous tests for cointegration in panels and these tests differ from that of Kao, which allows heterogeneity intercept and trends across cross-sections as can be seen in Eq. (3.5). Also as in Eq. (3.8), ρ is heterogeneous across cross-sections.

The basic panel model that Pedroni presented is shown below:

$$y_{it} = \alpha_i + \delta_i t + \beta_{1i} x_{1it} + \beta_{2i} x_{2it} + \cdots + \beta_{Ki} x_{Kit} + e_{it} \quad (3.10)$$

t=1,…,*T, i*=1,…,*N, k*=1,…,*K*

where *T* is the number of observations over time, *N* is the number of the units in the panel and *K* is the number of regressors. In each panel y_{it} and x_{Kit} assumed to be *I*(1) and under the no cointegration hypothesis, e_{it} will be *I*(1). α_i and δ_i denote individual and trend effects. Pedroni tests include three group-panel statistics and four-panel statistics to test the hypothesis of no cointegration against the alternative cointegration hypothesis. In panel statistics: the null hypothesis $H_0: \rho_i = 1$ for all *i* and the alternative hypothesis $H_1: \rho_i = \rho < 1$. In group statistics: $H_0: \rho_i = 1$ and $H_1: \rho_i = \rho < 1$. But there is a difference between these two statistics groups. ρ is assumed to be the same across cross-sections in panel statistics whereas ρ is allowed to change over the cross-sections in group-panel statistics (Asteriou and Hall, 2007; Barbieri, 2008).

3.4.2.2. Johansen-Fisher Cointegration Test

The residual-based tests rest on the hypothesis that there is only one cointegrating vector between the variables, so if there is more than one cointegrating relation, this situation cannot be handled. On the other hand, the maximum-likelihood-based test allows specifying the number of cointegrating vectors among the variables (Örsal, 2008). Maddala and Wu (1999) developed an alternative method to test panel cointegration by using Fisher-type test. This method combines tests from individual cross-sections to acquire test statistics for the entire panel to test the null hypothesis shown in Eq.(3.4). The X^2 in Eq.(3.4) is based on the MacKinnon et al. (1999) p-values (p_i) for Johansen's trace and maximum eigenvalue tests. These two tests differ from each other in the formulation of the hypothesis. Trace tests are for more than r cointegrating vectors between the system of N>r time-series while maximum eigenvalue tests are for exactly r+1 cointegrating vectors.

Johansen's (1991,1995) method is based on VAR cointegration tests that use maximum likelihood estimates and all variables are treated symmetrically. Johansen's method starts with estimating VAR with order *p*:

$$y_t = \mu + A_1 y_{t-1} + \cdots + A_p y_{t-p} + \varepsilon_t \quad (3.11)$$

where A_p is an (*n*x*n*) matrices of coefficients, y_t is an (*n*x1) vector of variables that are cointegrated in *I*(1) and ε_t is an (*n*x1) vector of error terms.

The VAR model can be re-written as in Eq.(3.12).

$$\Delta y_t = \mu + \prod y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \, \Delta y_{t-i} + \varepsilon_t \quad (3.12)$$

where

$$\prod = \sum_{i=1}^{p} A_i - \mathrm{I} \; and \; \Gamma_i = -\sum_{j=i+1}^{p} A_j \quad (3.13)$$

where, $\prod$=coefficient matrix

If the reduced rank $\prod$ is *r*<*n*, then there is *nxr* matrices of α and β each with rank *r;* $\prod = \alpha\beta'$, $\beta' y_t$ is stationary.

r shows the number of cointegrating relations, α is the adjustment parameters in the vector error correction model (VECM) and β is a cointegrating vector.

For a given *r*, the maximum likelihood estimator of β denotes the combination of y_{t-i}

that yields the r largest canonical correlations of Δy_t with y_{t-i} after correcting for lagged differences and deterministic variables (Hjalmarsson and Österholm, 2007)

Suppose that ($\prod$)=1 then ln(1-λ_1) will be negative and ln(1-λ_1)=0$\forall_i$>1.

If the eigenvalue i is non-zero, then ln(1-λ_1)< 0, $\forall_i$>1. The largest eigenvalue must be significantly non-zero while others will not be significantly different from zero (Brooks, 2014). The Johansen framework uses two ratio tests; Trace and Maximum eigenvalue tests, which are shown in Eq.(3.14) and Eq.(3.15)

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda_i}) \quad (3.14)$$

$$\lambda_{max}(r,r+1) = -T \ln(1-\hat{\lambda}_{r+1}) \quad (3.15)$$

where r is the # of cointegrating vectors under the null hypothesis, $\hat{\lambda}_i$ is the estimated value for i^{th} ordered eigenvalue from $\prod$. For each eigenvalue linked to it, a different cointegrating vector will be an eigenvector (Brooks, 2014).

Maddala and Wu (1999) adjusted the Johansen method to the panel data with the help of Fisher-type tests. The Johansen-Fisher test based on VECM takes the following form:

$$\Delta y_{it} = \prod_i y_{it-1} + \sum_{j=1}^{n} \Gamma_{ij} \Delta y_{it-j} + \varphi_i Z_{it} + \varepsilon_{it} \quad (3.16)$$

t=1,…,T, i=1,…,N

where ε_{it} shows an error term and $\varepsilon_{it} \sim NK(0, \Omega_i)$. n shows the lag length of vector error correction technique, y_{it} is an (nx1) vector of variables and cointegrated in I(1) with a rank of r_i for $0 \leq r_i \geq K$. $\prod_i$ shows the long-run cointegrating matrix. The short-run matrices are shown as Γ_{ij} (i=1,..,N; j=1,..n). Z_{it} denotes the vector of deterministic term and φ_i is the vector of coefficients. The Johansen-Fisher regression can be also calculated as in Eq.(3.4), just by combining p-values of the cross-section trace or maximum eigenvalue tests.

3.4.3. VECM

Generally, after investigating the long-run relation, VECM is used to define the direction of causality among variables. If one has non-stationary but I(1) series, then VECM is the suitable method to examine both long-run and short-run dynamics of the series. Adjustment parameter is added to the cointegration regression to form the VECM. In this way, short-run adjustments correct deviations from the long-run

equilibrium (Engle and Granger, 1987).

The general form of VECM is shown as in Eq. (3.17):

$$\Delta y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \, \Delta y_{t-i} + \sum_{i=0}^{n} \delta_i \, \Delta x_{t-i} + \varphi \, Z_{t-1} + \mu_t \quad (3.17)$$

Z is the Error Correction Term *(ECT)* and shows the OLS residuals from the long-run cointegrating Eq. (3.18):

$$y_t = \beta_0 + \beta_1 x_t + \varepsilon_t \quad (3.18)$$

and Eq. (3.18) can be restated as in Eq. (3.19):

$$Z_{t-1} = ECT_{t-1} = y_{t-1} - \beta_0 - \beta_1 x_{t-1} \quad (3.19)$$

ECT pertains to the fact that the last period deviation from long-run equilibrium affects the short-run dynamics of the dependent variable. So, the coefficient of *ECT*, which is φ, shows the speed of adjustment because it measures the speed at which Y turns back to equilibrium after a change in X.

3.5. Model Specification

This chapter aims to investigate the long-run relationship between *EG* and *FDX*. Thus, first UR tests are applied to determine the order of integration and the JFPC method is followed. Pedroni and Kao's cointegration methods are restrictive when examining the cointegration characteristics of an n-dimension vector of *I*(1) variables where more than one cointegrating vector between variables may emerge. So these two methods have disadvantages as compared to the JFPC method in the sense that they restrict the hypothesis of one cointegrating vector between variables. Since this chapter explores through which channels EG has a long-term relationship with *FDX; FM or FI*, the JFPC method is preferred because of its flexibility in specifying the number of cointegrating vectors. In other words, the JFPC method allows accommodating more than one cointegrating vector. Lastly, VECM is applied to estimate the long-run and short run-dynamics between the variables. The panel data consists of 27 emerging countries between the years 1980 to 2018, which ensures a comprehensive data resource.

Two different panel cointegration regressions are deployed with overall index and sub-indices separately; Model 1 includes *lnGDPPC* and *FDX* and Model 2 comprises of *lnGPPCD, FM,* and *FI.*

The basic empirical regression framework for Model 1 is shown in Eq.(3.20) and Model 2 is shown in Eq.(3.21) below:

$$lnGDPPC_{it} = \beta_0 + \beta_1 FX_{it} + \varepsilon_{it} \quad (3.20)$$

$$lnGDPPC_{it} = \beta_0 + \beta_1 FM_{it} + \beta_2 FI_{it} + \varepsilon_{it} \quad (3.21)$$

where i=1,2,3…,N refers to each country in the panel and t=1,2,3,…;T represents the time period. β_1 and β_2 show the coefficients which capture long-run effects and ε_{it} denotes the error term. *lnGDPPC* is the dependent variable and refers to the natural logarithm of *GDPPC*. *FDX* is the overall financial development index, *FM* is Financial Markets Index and *FI* is Financial Institutional Index.

The following panel VECM based equations is also estimated to consider the direction of causality among the variables:

The Eq.(3.20) of Model 1 transforms in Panel VECMs as follows:

$$\Delta lnGDPPC_{it} = \alpha_i + \sum_{j=1}^{n} \beta_1 \Delta lnGDPPC_{it-j} + \sum_{j=1}^{n} \beta_2 \Delta FDX_{it-j} + \beta_3 ECT_{it-j} + \varepsilon_{it} \quad (3.22)$$

$$\Delta FDX_{it} = \alpha_i + \sum_{j=1}^{n} \beta_1 \Delta lnFDX_{it-j} + \sum_{j=1}^{n} \beta_2 \Delta lnGDPPC_{it-j} + \beta_3 ECT_{it-j} + \varepsilon_{it} \quad (3.23)$$

The Eq.(3.21) for Model 2 can be turned into panel VECMs as follows:

$$\Delta lnGDPPC_{it} = \alpha_i + \sum_{j=1}^{n} \beta_1 \Delta lnGDPPC_{it-j} + \sum_{j=1}^{n} \beta_2 \Delta FM_{it-j} + \sum_{j=1}^{n} \beta_3 \Delta FI_{it-j} + \beta_4 ECT_{it-j} + \varepsilon_{it} \quad (3.24)$$

$$\Delta FM_{it} = \alpha_i + \sum_{j=1}^{n} \beta_1 \Delta FM_{it-j} + \sum_{j=1}^{n} \beta_2 \Delta LNGDPPC_{it-j} + \sum_{i=1}^{n} \beta_3 \Delta FI_{it-j} + \beta_4 ECT_{it-j} + \varepsilon_{it} \quad (3.25)$$

$$\Delta FI_{it} = \alpha_i + \sum_{j=1}^{n} \beta_1 \Delta FI_{it-j} + \sum_{j=1}^{n} \beta_2 \Delta LNGDPPCS_{it-j} + \sum_{j=1}^{n} \beta_3 \Delta FM_{it-j} + \beta_4 ECT_{it-j} + \varepsilon_{it} \quad (3.26)$$

n denotes lag length, Δ shows the first difference of variables. α_i is the constant term, β_1, β_2, β_3, and β_4 are the parameters, ECT_{it-j} is the error correction term and ε_{it} is the error term. The ECTs represent the long-run dynamics while differenced variables show the short-run dynamics. The short-run causality is determined by F-statistics and the short-run causality hypothesis is that short-run coefficients are jointly 0. The long-

run causality is measured by the t-statistics of the lagged ECTs. The model is eligible only when the variables are I(1).

3.6. Empirical Results

The testing process is comprised of four steps. The first step is to check the presence of unit-roots for all variables to find integration order. Before applying the cointegration test, the VAR is estimated by using stationary series and the optimal lag lengths for Model 1 and Model 2 are determined. The first model includes *lnGDPPC* and *FDX* and the second one consists of *lnGDPPC, FM and FI*. After deciding optimal lag lengths based on Akaike information criteria (AIC) for two Models, an appropriate model that includes deterministic components is chosen for the regressions. In the third step, the JFPC test is conducted to identify a long-run association between the variables. Lastly, after detecting the long-run relationship among the variables, the panel VECM is performed to find short-run and long-run dynamics.

3.6.1. PUR Tests Results

This chapter employs LLC, IPS, Fisher-type; ADF Chi-square and PP Chi-square PUR tests to determine the stationary levels of *lnGDPPC, FDX, FI, and FM* across countries. All four-panel unit root test outcomes in levels and first differences are shown in Table 3.2.

Table 3.2. PUR Tests Results

Method	**LLC**	**IPS**	**ADF**	**PP**	**LLC**	**IPS**	**ADF**	**PP**
	Panel A: Level				**Panel B: 1st Difference**			
FDX	-2.81[a] (0.002)	-0.76 (0.221)	63.85 (0.168)	56.14 (0.394)	-29.63[a] (0.00)	-27.63[a] (0.00)	635.55[a] (0.00)	691.11[a] (0.00)
FI	-0.46 (0.321)	1.57 (0.942)	47.04 (0.736)	49.98 (0.629)	-30.08[a] (0.00)	-28.29[a] (0.00)	645.78[a] (0.00)	718.83[a] (0.00)
FM	-2.24[c] (0.012)	-0.72 (0.230)	58.37 (0.317)	59.21 (0.291)	-30.08[a] (0.00)	-27.75[a] (0.00)	633.91[a] (0.00)	699.88[a] (0.00)
lnGDPPC	1.15 (0.875)	5.59 (1.00)	14.83 (1.00)	14.67 (1.00))	-20.70[a] (0.00)	-20.13[a] (0.00)	444.85[a] (0.00)	448.02[a] (0.00)

a and *c* indicates the rejection of the non-stationary hypothesis at the significance levels of 1%, 10% respectively. Lag lengths are selected automatically by Schwarz information criteria (SC).

According to LLC test results, *FDX* and *FM* with individual intercepts are stationary in levels at 1% and 5% significance levels whereas *lnGDPPC* and *FI* are nonstationary at their levels. According to the other three UR test results (IPS, ADF and PP), all variables (*LnGDPPC, FDX, FM, and FI)* with individual intercepts are non-stationary

at their levels. However, they become stationary at 1 % significance level in their first differences. So, it is concluded that all variables with individual intercepts are integrated of *I*(1) for 1980 to 2018. Since the precondition of cointegration is satisfied, in the next step two different panel cointegration analyses are conducted to determine the long-run association between the variables.

3.6.2. Panel Cointegration Test Results

3.6.2.1. JFPC Test Results For Model 1

Before employing the JFPC method, an optimal lag length for the VAR-based panel model should be selected. The results from several tests are presented in Table 3.3 for the variables *lnGDPPC* and *FDX*.

Table 3.3. Lag Selection for Model 1

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-718.1898	NA	0.0216	1.8419	1.8553	1.8465
1	2055.344	5525.788	1.81e-05	-5.2412	-5.2055*	-5.2275
2	2063.997	17.1949	1.79e-05	-5.2531	-5.1935	-5.2302*
3	2070.999	13.8778	1.78e-05	-5.2608	-5.1774	-5.2287
4	2078.980	15.7792*	1.76e-05*	-5.2710*	-5.1637	-5.2297
5	2082.458	6.8572	1.76e-05	-5.2697	-5.1385	-5.2192
6	2083.968	2.9698	1.78e-05	-5.2633	-5.1083	-5.2037
7	2087.274	6.4862	1.78e-05	-5.2615	-5.0827	-5.1927
8	2087.926	1.2744	1.79e-05	-5.2530	-5.0503	-5.1750

* refers lag order selection, LR: sequential modified LR test statistic FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Table 3.3 reveals that three of the six criteria point out that the most suitable lag is 4. Besides, AIC points out the 4th lag length as optimal, this lag is used in analyses. After choosing the optimal lag length, the JFPC test is deployed.

There are 5 models for deterministic trend specifications for the JFPC analysis and before applying the test the appropriate model is choosen which indicates intercept (no trend) in the cointegration equation (CE) and VAR namely, Model 3.

Hypothesis for investigating whether there is a cointegrating vector(s) between variables can be stated as:

H_0= no cointegrating vector (r=0) and

H_1= there is at least 1 cointegrating vector ($r \leq 1$).

The rejection criteria for both hypotheses are at the 5 % level. The results of the JFPC test where the dependent variable is *lnGDPPC* and the independent variable is *FDX*

are given in Table 3.4 below.

Table 3.4. JFPC Test Results for Model 1

Null-Hypothesis	Fisher Stat. From Trace test	Prob.	Fisher Stat. From max-eigen test	Prob.
r=0	140.6[a]	0	134.1[a]	0
r≤1	71.15	0.0588	71.15	0.0588

r: # of co-integrating vectors. Intercept (no trend) in CE and VAR is used in the test. *a* indicates the rejection of no cointegration hypothesis at 1% significance level. Probabilities for panels are calculated using asymptotic chi-square distribution.

The results in Table 3.4 demonstrate that both the trace and maximum eigenvalue tests reject the null hypothesis of zero cointegrating vectors (r=0) in favor of one cointegrating vector under investigation at %1 significance level. Furthermore, the probability of at least 1 cointegrating vector is 0.0588 which is more than 5% and it means that there is a single cointegration equation between *lnGDPPC* and *FDX*. These findings ensure evidence for a long-run association between the two variables.

3.6.2.2. JFPC Test Results For Model 2

The test results for the optimal lag length for the VAR-based panel model are shown in Table 3.5 for the variables *lnGDPPC*, *FM* and *FI.*

Table 3.5. Lag Selection for the Model 2

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-386.6985	NA	0.0005	0.9966	1.0145	1.0035
1	3451.437	7637.006	3.04e-08	-8.7965	-8.7249*	-8.7690
2	3474.619	45.9492	2.93e-08	-8.8327	-8.7075	-8.7846
3	3490.089	30.5434	2.88e-08*	-8.8493*	-8.6704	-8.7805
4	3497.647	14.8645	2.89e-08	-8.8456	-8.6131	-8.7562
5	3501.217	6.9940	2.93e-08	-8.8317	-8.5456	-8.7217
6	35.04.270	5.9580	2.98e-08	-8.8165	-8.4767	-8.6858
7	3513.737	18.4008*	2.97e-08	-8.8177	-8.4242	-8.6664
8	3519.960	12.0486	2.99e-08	-8.8106	-8.3635	-8.6386

Table 3.5 reveals that the most suitable lag is 3 for the analysis. After choosing the optimal lag length based on AIC, the JFPC test is estimated for Model 3 which states intercept (no trend) in CE and VAR assumption. Moreover, the hypothesis for examining whether there is a cointegrating vector(s) between variables can be

formulated as

H_0= no cointegrating vector (r=0) and

H_1= there is at least 1 cointegrating vector (r≤1).

H_2= there is at least 2 cointegrating vectors (r≤2).

Table 3.6 displays the results where the dependent variable is *lnGDPPC* and the independent variables are the sub-indices of *FDX* namely, *FM* and *FI.*

Table 3.6. JFPC Test Results for Model 2

Null Hypothesis	Fisher Stat. From Trace test	Prob.	Fisher Stat. From max-eigen test	Prob.
r=0	236.5[a]	0	187.6[a]	0
r≤1	107.3[a]	0	102[a]	0
r≤2	68.71	0.0858	68.71	0.0858

a indicates the rejection of no cointegration hypothesis at 1% significance level.

The results documented in Table 3.6 show that no cointegration hypothesis is rejected at 1% significance level. The one cointegration hypothesis (r≤1) is rejected at 1% significance level. However, the probability of at least two cointegrating vectors (H_2 = r ≤ 2) is 0.0858 which is more than 5% therefore the hypothesis that at least two cointegrating vectors is not rejected. In other words, there are two cointegrated vectors between the variables. As it is mentioned before, the advantage of the JFPC test is to find out whether there is more than one cointegration relationship between variables. This feature of the methodology allows to conclude that there are two cointegrating vectors and all the variables are cointegrated. To sum up; EG is cointegrated in the long run with *FM* and *FI.*

3.6.3. Panel VECM Test Results

In the panel VECM, all variables are treated as endogenous without the causality assumption. This method aims to gauge the variables' short-run adjustments to the long-run equilibrium. After confirming a long-run association between the variables, panel VECM is conducted to provide the possible causality link among *lnGDPPC* and *FDX*. As panel VECM is sensitive to lag length, AIC is used to determine the optimal lag length.

The long-run cointegration model is shown in Eq.(3.27) when the dependent variable

is *lnGDPPC:*

$$ECT_{it-1} = 1lnGDPPC_{t-1} - 7.045531FDX_{t-1} - 5.547076 \quad (3.27)$$

and estimated VECM with *lnGDPPC* as the target variable is presented below:

$$\begin{aligned}\Delta lnGDPPC_t = {} & -0.016428ECT_{it-1} + 0.144867\Delta lnGDPPC_{t-1} - \\ & 0.066924\Delta lnGDPPC_{t-2} + 0.093072\Delta lnGDPPC_{t-3} - \\ & 0.052586\Delta lnGDPPC_{t-4} - 0.137384\Delta FDX_{t-1} + \\ & 0.027174\Delta FDX_{t-2} + 0.294806\Delta FDX_{t-3} + 0.109705\Delta FDX_{t-4} + \\ & 0.043608 \quad (3.28)\end{aligned}$$

The long-run cointegration model is shown in Eq.(3.29) when the dependent variable is *FDX:*

$$ECT_{it-1} = 1FDX_{t-1} - 0.141934lnGDPPC_{t-1} + 0.787312 \quad (3.29)$$

and estimated VECM with *FDX* as the target variable is as follows:

$$\begin{aligned}\Delta FDX_t = {} & -0.010870ECT_{it-1} - 0.046854\Delta FDX_{t-1} - 0.066991\Delta FDX_{t-2} - \\ & 0.061995\Delta FDX_{t-3} - 0.014280\Delta FDX_{t-4} + 0.006667\Delta lnGDPPC_{t-1} + \\ & 0.025288\Delta lnGDPPC_{t-2} - 0.028447\Delta lnGDPPC_{t-3} - \\ & 0.003392\Delta lnGDPPC_{t-4} + 0.006939 \quad (3.30)\end{aligned}$$

Table 3.7 below shows both long-run and short-run results for *lnGDPPC* and *FDX*.

Table 3.7. Panel VECM Results for Model 1

	Independent Variables		
Dependent Variables	ΔlnGDPPC	ΔFD	ECT_{t-1}
ΔlnGDPPC	_	2.19 (0.067)	[-4.34][a] (0.00)
ΔFD	5.82[a] (0.000)	_	[-1.64] (0.100)

a and b shows the rejection of null hypothesis at the 1%, 5% significance level. (ECT_{t-1}) signifies the Error CorrectionTerm. The numbers in the main body of the table display F-statistics from the Wald test. Brackets denote the t-statistics and parenthesis shows the probability.

The speed of adjustment parameter must be significant and the sign must be negative between the range 0 and -1. A negative sign shows departure in one direction, and the correction has to be pulled back to the other direction. Thus, as it is seen in Eq. (3.28), the coefficient of the speed of adjustment is -0.016428 (t-stat 4.34 in Table 3.7) and significant at 1% level, which indicated that the whole system is getting back long-run equilibrium at a speed of -0.016428 annually. So, it is concluded that there is a long-

run causality running from *FDX* to *lnGDPPC* when *lnGDPPC* is used as the target variable. On the other hand, in Eq.(3.30) the coefficient of the speed of adjustment is -0.010870 but insignificant (t-stat -1.64, in Table 3.7). It means that *lnGDPPC* does not tend to explain the changes in *FDX* in the long run. Therefore, unidirectional causality from *FDX* to *lnGDPPC* is found.

Moreover, the Wald test is a joint test for short-run coefficients and the null hypothesis is that short-run coefficients are jointly 0. Whether a short-run *FDX* granger causes the *lnGDPPC* and vice versa. The results presented in Table 3.7 show that the *p-value* of *F*-statistics is 0.067 when the *lnGDPPC* is the dependent variable. So, the null hypothesis can not be rejected at 5% significance level which points out that the absence of short-run causality running from *FDX* to *lnGDPPC*. On the other hand, there is short-run causality running from *lnGDPPC* to *FDX* as F-stat is 5.82 in Table 3.7.

For Model 2; the long-run cointegration equations with two cointegrated vectors are shown in Eq.(3.31) and (3.32) when the dependent variable is *lnGDPPC:*

$$ECT_{1,it-1} = 1lnGDPPC_{it-1} - 7.104327FI_{it-1} - 5.502211 \quad (3.31)$$

$$ECT_{2,it-1} = 1FM_{it-1} - 0.447960FI_{it-1} - 0.200539 \quad (3.32)$$

and estimated VECM is shown in Eq.(3.33)

$$\begin{aligned}\Delta lnGDPPC_{it} = {} & -0.015695ECT_{1,it-1} + 0.063812ECT_{2,it-1} + \\ & 0.188868\Delta lnGDPPC_{it-1} - 0.090476\Delta lnGDPPC_{it-2} + \\ & 0.040131\Delta lnGDPPC_{it-3} - 0.217905\Delta FM_{it-1} + \\ & 0.028986\Delta FM_{it-2} + 0.130771\Delta FM_{it-3} + 0.599066\Delta FI_{it-1} - \\ & 0.161895\Delta FI_{it-2} + 0.189968\Delta FI_{it-3} + 0.037826 \quad (3.33)\end{aligned}$$

The long-run cointegration equations when the *FM* is the dependent variable are shown in Eqs. (3.34) and (3.35)

$$ECT_{1,it-1} = 1FM_{it-1} - 0.447960FI_{it-1} - 0.200539 \quad (3.34)$$

$$ECT_{2,it-1}1lnGDPPC_{it-1} - 7.104327FI_{it-1} - 5.502211 \quad (3.35)$$

and estimated VECM with *FM* Eq.(3.36) is as follows:

$$\begin{aligned}\Delta FM_{it} = {} & -0.08053ECT_{1,it-1} + 0.001417ECT_{2,it-1} - 0.044642\Delta FM_{it-1} - \\ & 0.012583\Delta FM_{it-2} - 0.022115\Delta FM_{it-3} + 0.009158\Delta lnGDPPC_{it-1} + \\ & 0.026099\Delta lnGDPPC_{it-2} - 0.030860\Delta lnGDPPC_{it-3} - \\ & 0.022922\Delta FI_{it-1} - 0.149605\Delta FI_{it-2} - 0.038400\Delta FI_{it-3} + 0.007448\end{aligned}$$

(3.36)

Lastly, the long-run cointegration equations when the *FI* is the dependent variable are shown in Eqs. (3.37) and (3.38) and the estimated VECM for *FI* is shown in Eq.(3.39) as follows:

$$ECT_{1,it-1} = 1FI_{it-1} - 2.232343FM_{it-1} - 0.447672 \quad (3.37)$$

$$ECT_{2,it-1} = 1lnGDPPC_{it-1} - 15.85929FM_{it-1} - 2.321803 \quad (3.38)$$

$$\begin{aligned}\Delta FI_{it} = {} & -0.011523ECT_{1,it-1} + 0.0011827ECT_{2,it-1} - 0.087445\Delta FI_{it-1} - \\ & 0.053824\Delta FI_{it-2} - 0.043546\Delta FI_{it-3} + 0.009664\Delta lnGDPPC_{it-1} + \\ & 0.025307\Delta lnGDPPC_{it-2} - 0.026040\Delta lnGDPPC_{it-3} + \\ & 0.022375\Delta FM_{it-1} + 0.008836\Delta FM_{it-2} - 0.010373\Delta FM_{it-3} + 0.00689\end{aligned} \quad (3.39)$$

Table 3.8. Panel VECM Results for Model 2

	Independent Variables			
Dependent Variable	ΔlnGDPPC	ΔFM	ΔFI	$ECT_{1,t-1}$
ΔlnGDPPC	_	4.00[a]	4.94[a]	[-3.90][a]
		(0.007)	(0.002)	(0.000)
ΔFM	2.80[b]	_	1.58	[-6.01][a]
	(0.039)		(0.192)	(0.000)
ΔFI	11.70[a]	1.07	_	[-1.97][b]
	(0.000)	(0.360)		(0.04)

a and b shows the rejection of the no long-run causality hypothesis at the 1%, 5% level of significance. ($ECT_{1,t-1}$) is the ErrorCorrectionTerm of 1st cointegration Eq. The numbers in the main body of the table demonstrate F-statistics from the Wald test. Brackets denote the t-statistics and parenthesis shows the probability.

Table 3.8 shows both long and short-run results from VECM and the long-run causality test indicates that causality runs from *FM* and *FI to lnGDPPC*, since the coefficient of the error term of the first cointegrating vector is -0.015695 in Eq. (3.33) and statistically significant at 1% level. This means that the error term of the first cointegrating vector contributes to explain the changes in *lnGDPPC.* When *FM* is the target variable, the first cointegrated equation is negative with the coefficient of -0.08053 as can be seen in Eq.(3.36) and statistically significant at 1 % level. This suggests that deviation from long-run equilibrium are corrected for within the current year at a convergence speed of 8% and there is long-run causality from *lnGDPPC* and *FI* to *FM*. When *FI* is used as a dependent variable, the coefficient of the speed of adjustment in Eq. (3.39) is -0.011531 and statistically significant at 5 % level with a t-

stat of -1.97, Table 3.8. The results indicate that there is long-run causality running from *lnGDPPC* and *FM* to *FI*. In other words, changes in *FI* can be explained by *lnGDPPC* and *FM*. Therefore, there is bidirectional causality between *lnGDPC, FM* and *lnGDPC* and *FI*. Furthermore, Table 3.8 reports only the first vector because the second cointegrating vector indicates that the processes are not converging in the long run, so this part primarily concentrates on the target model which depends on the 1st cointegrating vector.

In order to confirm the result of the short-run causality between *the lnGDPPC, FM* and the *FI* based on VECM estimates, the Wald test is performed. The null hypothesis is that there is no short-run causality. The results in Table 3.8 confirm that the *p-values* of *F*-statistics are 0.007 and 0.002 for *FM* and *FI* respectively when the *lnGDPPC* is the dependent variable. So, the null hypothesis can be rejected which pointes out that there is short-run causality running from *FM* to *lnGDPPC* and *FI* to *lnGDPPC*. Furthermore, the short-run causality results when the dependent variable is *FM* suggest that there is short-run causality running from *lnGDPPC* to *FM* at a 5 % level of significance (p-values of F-stat is 0.039); however there is no evidence of short-run causality running from *FI* to *FM*. Finally, when *FI* is used as a target variable, the F-stat of 11.70 in Table 3.8, which is significant at a 1 % significance level, indicates that there is short-run causality from *lnGDPPC* to *FI*. But there is no short-run causality from *FM* to *FI*.

The overall findings reveal the existence of long-run unidirectional causality from, from financial development to economic growth, and bidirectional causality between financial markets and financial institutions and economic growth. On the other hand, short-run results differ from variable to variable.

3.6.4. Robustness Tests

Pedroni and Kao's (1999) panel cointegration tests are applied to check the robustness of the results. Both tests are used to investigate the long-run relationship among the variables, and the empirical results are reported in Table 3.9.

Table 3.9. Pedroni and KAO Panel Co-integration Tests Results

Variables	lnGDPPC & FDX	lnGDPPC, FM & FI
Panel A: Pedroni Test		
Case 1:Common AR Coefs.		
Panel v-Stat.	-3.5257	-3.6336
	(0.99)	(0.99)
Panel ρ-Stat.	-1.9331	-0.4555
	(0.02)	(0.32)
Panel PP-Stat.	-4.0623[a]	-4.1276[a]
	(0.00)	(0.00)
Panel ADF-Stat.	-4.2743[a]	-4.1664[a]
	(0.00)	(0.00)
Case 2: Individual AR Coefs.		
Group ρ-Stat.	0.7126	-0.0635
	(0.76)	(0.47)
Group PP-Stat.	-4.6787[a]	-5.4381[a]
	(0.00)	(0.00)
Group ADF-Stat.	-4.2088[a]	-4.5539[a]
	(0.00)	(0.00)
Panel B: KAO Test		
ADF	-19.9825[b]	-3.9818[a]
	(0.02)	(0.00)

a and b show the significance level at 1%, and 5% respectively. Kao cointegration test includes an individual intercept (no trend) and the Pedroni test includes no intercept & trend.

In Panel A, the results of the Pedroni cointegration tests display that out of seven statistics, four statistics reject the no cointegration hypothesis at the 1% significance level for two different panel models; i) *lnGDPPC* and *FDX* and ii) *lnGPPC*, *FM* and *FI.* Moreover, in Panel B, the result of the Kao test display that no cointegration hypothesis is rejected at 5% significance level when *lnGDPPC* is dependent and *FDX* is an independent variable. Also when the sub-indices *FM* and *FI* are used as independent variables, the no- cointegration hypothesis is rejected at the 1% level of significance. Therefore, these findings show that a long-run association exists among the variables. These results are consistent with the JFPC test results that were conducted before.

3.7. Conclusion

This chapter investigates the long-run association between EG and FD by applying the JFPC method for 27 emerging countries. This relation is tested by using a new, overall index of FD which is developed by Svirydzenka (2016) and also employs two components of this overall index; *FI* and *FM* to discover through which channels EG has a long-term relationship with FD. The JFPC method is preferred because the major

advantage is that it allows multiple cointegrating vectors among the variables. This method and the new FD index and its sub-components have not been used to explain EG in emerging countries before. The aim is to reveal some evidence on which sub-components of FD affect the improvement of EG.

The empirical analysis is comprised of three approaches. First, PUR tests are employed to determine the stationary levels of all variables because the most important condition of the JFPC test is that all variables should be stationary at order one $I(1)$. Then, the JFPC method is performed to check the long-run relation. Lastly, the VECM is applied to find out the direction of a causal association between EG and FD. Moreover, two different cointegration tests; Pedroni (1999) and Kao (1999) are employed to check the robustness of the results.

The empirical results suggest that there is a long-run association between EG, the overall FD index, and its sub-indices. Similarly, results from VECMs display that there is a unidirectional causality between EG and the overall FD index which supports the "Supply-Leading Hypothesis". However, there is bidirectional causality between EG, financial markets, and financial institutions indices.

The findings support the idea that the changes in EG can be explained by both financial markets and financial institutions. In other words, both sub-indices have a significant effect on EG in the long run and vice versa. Financial markets and institutions are also caused by the growth process, too. These findings support the prediction of "Feedback Hypothesis", which suggests bidirectional causality between EG and financial markets and EG and financial institutions. On the other hand, the short-run tests exhibit mixed results.

To summarize, analyzing the relationship between EG and FD is especially important for emerging economies because contrary to developed ones, emerging countries need to improve their financial institutions and financial markets to promote their economies. The results of this study have inferences for policymakers in emerging markets. Two sub-indices of financial development can be considered as drivers of the GDP per capita. If they desire to stimulate GDP per capita, they should foster growth in the banking sector, bond and stock markets.

CHAPTER 4
CONCLUSION

Financial development can help promote growth by enhancing economic conditions, financial institutions, and markets, especially in emerging countries. FD helps to produce better information on investments and capital allocation, trading, diversification, and risk management. It also specifies the mobilization of savings and eases the exchange of goods and services. So, the determinants and effects of the development of financial systems in emerging economies is an interesting research topic. This study addresses several research questions. Does opening capital accounts, trade, and stock markets trigger financial development? If emerging countries develop their financial systems, does that improve their economic growth? If there is a link between financial development and economic growth, what is the direction of the causality? Through which channels does financial development can affect economic growth? The answers to these questions will have implications for policymakers in emerging markets.

Chapter One gives detailed information about the components of financial development and its importance for emerging countries. Moreover, determinants of financial development provided in the current literature are discussed.

Chapters Two and Three both consider financial development but in relation to different questions. Chapter Two analyzed the relationship between financial openness and financial development to determine which financial openness measure has a greater impact on financial development; trade openness, capital account openness or stock market openness. The findings show that opening both trade and capital accounts are the key factors for stimulating financial development. Moreover, the results also support that opening trade and capital accounts are more critical than opening the stock market to boost financial development. Finally, the findings demonstrate that trade openness and capital account openness have substantial relationships with financial development, and that will encourage policymakers to take steps for removing barriers against foreign investment.

Chapter Three evaluates the long-run association between economic growth and financial development from the perspective of a new broad-based financial development index introduced by Svirydzenka (2016). More specifically, this multi-dimensional new FD index explains the nature of financial development more extensively by combining depth, access, and efficiency aspects of the financial system. Moreover, two components of this index, which are financial institutions and financial markets indices, are used to discover through which channels EG has a long-term relationship with FD. The results indicate a long-run association between economic growth, the overall FD index, and its sub-indices. Likewise, results from VECMs show that there is a unidirectional causality between EG and FD index whereas bidirectional causality occurs between EG, financial markets, and financial institutions indices.

This study's methodology and results contribute to the literature in several ways. Firstly, the second chapter of this dissertation is unique because it uses capital flow-based measure *FOEL,* and valuation-based measure *SEGM*, which are not employed to explain financial development before. These variables and their variants have been used in the literature before to test their impact on EG, market returns, etc. But, their relation with FD has been studied for the first time in this chapter. The second contribution of this study provided in Chapter 3 is that it analyzes the relationship between EG and FD by using a new overall FD index and JFPC method in emerging countries. Unlike the previous literature, this method has not been performed to explain the EG and new overall FD index and its sub-indices relation, especially in emerging countries. the JFPC method is used because the main advantage is that it imposes no restrictions on the number of cointegrating vectors. Therefore, it is possible to find out through which ways FD affects EG. Thirdly, the study provides direct evidence that the changes in EG can be clarified by both financial markets and financial institutions. Besides, financial markets and institutions are also affected by the growth process, too. Thus, if emerging countries want to boost EG, they should promote growth in the banking sector, bond, and stock markets. These results have important implications for policymakers in emerging countries to determine the ways for improving their financial development for stronger economic growth.

This dissertation includes 27 emerging countries and the panel regressions results are based on average marks. There can be individual country effect differences for Turkey and other countries. These country-specific differences can be checked by the alternative methodology of Kónya (2006) which identifies the individual effects for each country. In this respect, future studies applying Kónya's method can provide more compelling arguments. He used a new panel-data method which is based on SUR systems and Wald tests with country-specific bootstrap critical values. There are two advantages of this method. First, it does not assume that the panel is homogeneous, so it can be possible to test for Granger causality on each individual panel member separately. Nevertheless, since contemporaneous correlation is allowed across countries, it makes the potential to exploit the additional information obtained by the panel data setting. Secondly, this method does not need preliminary tests of unit roots and cointegration, though it still requires the specification of the lag structure. This is a significant feature since the unit-root and cointegration tests, in general, suffer from low power, and different tests frequently cause contradictory conclusions (Konya, 2006).

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