Does Financial Structure Matter for Economic Growth? The Case for 10 OECD Countries

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ABSTRACT

In this study we aim to investigate the relationship between financial structure and economic growth in 10 OECD countries between the years 1993 and 2014 inclusively. The overall results for panel estimations were obtained using GMM estimator. For further analyses of evolutionary effects of financial structure, the sample then was split in to 4 different sub samples with time span of 5 to 6 years. Our findings indicate that a negative correlation exists between further promotion of financial market and economic growth. Furthermore, there is no optimal financial structure, and financial structure evolves through different economic conditions. Moreover financial development is positively correlated with economic growth and human capital and capital stock both affect the economic growth in a positive manner. This study provides useful thoughts for policymakers that can help them improve their policies; we recommend them to pay more attention policies that enhance the financial development and human capital in order to improve the economic conditions.

Keywords: Financial Structure, Financial development, OECD Countries, Panel Data Analysis

ÖZ

Bu çalışma, 10 OECD ülkesi için finansal yapı ve ekonomik büyüme arasındaki ilişkiyi 1993 ile 2014 yılları arasında ortaya çıkarmayı hedeflemektedir. Panel veri seti, GMM yöntemi kullanılarak analiz edilmiştir. Çalışmada kullanılan veri seti 4 ana gruba ayrılmış ve 5 ile 6 yıllık sureyi kapsayacak şekilde analiz edilmiştir. Bulgular finansal piyasa yapısı ile ekonomik büyüme arasında ters yönlü bir ilişki olduğunu ortaya çıkarmaktadır. Bulgular, bu bağlamda, uygun bir finansal yapının mevcut olmadığını ve ekonomik koşullara göre değişebileceğini ortaya koymaktadır. Diğer taraftan, finansal büyüme ile ekonomik büyüme arasında pozitif bir ilişki olduğu tespit edilmiştir. Sermaye stoku ile işgücü sermayesi de ekonomik büyümeyi pozitif yönde etkilemektedir. Bu çalışmadaki sonuçlar, politika yürütücüleri için önemli mesajlar içermektedir. Ekonomik koşulları daha da iyileştirmek için finansal kalkınmayı ve insan sermayesini de daha da ileriye götürmek gerekmektedir.

Anahtar Kelimeler: Finansal Yapı; Finansal Kalkınma; OECD Ülkeleri; Panel Veri Analizi.

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Chapter 1

INTRODUCTION

The financial structure is one of the main important factors that affect economic growth, and different countries tend to have a different financial structure as if some are market based, and some are bank based. In bank oriented financial systems (Japan & Germany), banks play a significant role in collecting savings, reallocating funds, and they are in charge of reviewing the decisions made by the companies. On the other hand, in market oriented systems (such as the United States & United Kingdom), financial markets act as the intermediary to finance firms using possible investors. Although banks are highly active in the market, which eases the risk assessment process as well. Furthermore, financial structure is highly dependent to some factors such as income level and judicial system, generally rich countries with stronger law system and substantial shareholder's right protection are more likely to be market oriented and countries with lower quality are more likely to be more bank oriented (Demirgüç-Kunt & Levine, 1999).

Financial structure is one of the most important topics related to economic growth. And the question of which type of financial structure, market oriented or bank oriented, is more beneficial in case of economic growth has been investigated by many researchers. Moreover, there is high relevancy among financial structure and development in financial sector, while financial development is one of the most studied topics in the literature. However, there has been a little attention paid to how

does financial structure evolves through different economic and financial development stages (Demirgüç-Kunt & Levine, 1999; Liu & Zhang, 2018). The question that do different countries while having an improvement in their overall conditions tend to change from one type of financial structure to another or no. Besides that, the literature has not been very successful in defining this issue, and the primary researches tend to investigate the direct impact of financial structure on economic growth and determine the type of financial structure of different countries and compare these types together. For instance, some studies suggest that bank-based financial structures are superior to the market-based (Bencivenga & Smith, 1991; Bhide, 1993; Diamond, 1984; Gerschenkron, 1962; Singh, 1997; Stiglitz, 1985; Stulz, 2000). While other studies suggest that market-based has more advantage to bank-based systems (Boot & Thakor, 1997; Boyd & Smith, 1998; Greenwood & Jovanovic, 1990; Greenwood & Smith, 1997; Holmström & Tirole, 1993; Jensen & Murphy, 1990; Levine, 1997; Wenger & Kaserer, 1998). The general debate on financial structure falls under four different views: market-based, bank-based, financial services and financial law and, regulatory system.

Besides that, another question that arises is why different countries face different structures of financial systems. How these systems are defined from the first point, is there any factor that affects these countries and determines them as market or bank based. From one point of view, the findings of Demirgüç-Kunt & Levine, in 1999 showed that countries that follow a common law are more likely to be market oriented, while other countries with different legal roots. Countries legal roots come from various aspects, such as colonization and conquest through time and adaptation of these countries to these legal systems ended up with five different legal systems.

These legal systems are as follow English Common Law, French Civil Law, German Civil Law, and Scandinavian Civil Law.

Furthermore, the countries that follow common-law tend to have the most robust protections for the investors while countries that follow French civil law are having the least strong in comparison in the case of investor protection. A further reason for different financial system structure is financial systems development since generally, the countries that their financial system is not well developed tend to be more bank based since a well-functioning market needs a well-developed financial system. In the same way, countries that protect the rights of its investors are more likely to have a well-developed financial system which leads to a better functioning financial market, resulting the country to have a market based financial structure.

Another factor affecting the financial structure is contract enforcement, substandard contract enforcement is strongly tied with the development of the financial system that if countries cannot offer well-functioning and robust contract enforcement while having a well-defined law system, they will suffer from an underdeveloped financial system. A further reason for this issue is corruption since corruption can decrease the efficiency of the market and lead to an underdeveloped financial system. Furthermore, among factors affecting the financial system structure, another essential category can be mentioned as government regulations for the financial system, since regulations are a necessity for a well-functioning financial system. On the other hand, if the regulation is at an extreme level, it will cause the costs to increase since the more human resource is needed to make sure all the regulations are applied correctly and also decreases the freedom in the market for developing new securities. In the same way, if the regulations are not strong enough, it will cause corruption and

mismanagement in the financial market. Some important regulation set by the government can be mentioned as accounting regulations, banking regulations. Countries that have strong accounting policies and standard tend to have more developed financial systems and generally are categorized as market based. Countries that restrict their banking industry from entering different sectors and limit their activities are weaker in case of financial system development. Moreover, in the macroeconomic factors that are controlled by the government we can mention inflation, countries that are facing a high inflation level are more likely to have an underdeveloped financial system due to the reason that high inflation leads to inefficiency in banks and the market (Boyd, Levine, & Smith, 2001; Huybens & Smith, 1999).

Following that, we get to a question that is it possible to have both systems at the same time, theoretically, only if we lived in an Arrow Debreu McKenzie world, it would be possible, in different words, under certain assumptions aggregate demand would be equal to aggregate supply for every security and commodity in the market. In that sense, we would live in a perfect market where there would be no need for any intermediary. But we don’t live in an ideal world, and those certain assumptions do not hold, therefor we need intermediaries to reduce the problems that occur because of inefficiencies in the market (Allen & Gale, 1995). Consequently, the reasons behind different financial system structure can be vast, but in general, we can say that different financial systems exist because economies allocate their resources differently. Besides that, they have unique methods of sharing their risk and the amount of information shared is different from country to country due to many various reasons.

In this study, we investigate the relationship between financial structure and economic growth among 21 OECD countries. OECD is a group of countries consist of 36 members founded in the 1960s in order to enhance the economic situation of the people around the world. To achieve their goals, they share their experience to solve the problems by helping directly and indirectly. One of their main essential functions is policy recommendation. As an illustration of their work, we can refer to OECD helping European Union shaping its trade policy. Although 21 European countries are part of OECD but it also works with non-OECD members. An example of what can be OECD working with India, China and, Brazil, while they are not members of this group. Generally, OECD helps policy makers by research, recommendation and guidelines and, other necessary assessments. OECD has been chosen as the sample of this study due to the high importance of this group.

Economic growth or more in general, economic development is the most investigated topic in the literature. Many researchers around the world have tested a lot of possible factors that affect economic growth positively or negatively. Despite the enormous existing literature, economic growth is still an important topic that has many unknown factors, which resulted in more attempts in investigating it every year and because of distinctive characteristics of economic growth, it is likely to remain the same in the future. Here beside the financial structure and financial development, we include some of the critical factors since ignoring them might lead to a biased result, our other variables are financial development, per capita physical capital, government expenditure, human capital, trade openness, and capital stock.

Following that, financial development is a vital topic in the literature, although its effects on economic growth have been proved by the existing literature. The early

research on financial development and economic growth goes back to the 1900s where Schumpeter (1911) highlighted the positive impacts of financial development on economic growth. Development of the financial sector by definition refers to the improvements in the transaction costs occurring in the financial system, this reduction in cost can be reached by enhancing the information gathering, contract enforcement, markets, and the agencies that act as intermediaries. The level of improvement in each one would result in reducing the costs and eventually development in the financial sector. Financial development benefits economic development via mobilizing and accumulating savings, generating investment information, assisting and promoting foreign capital inflows, and optimization of resource allocation. Moreover, countries with more financial sector development are more likely to have higher growth in comparison with other countries with a less developed financial sector. Furthermore, financial development decreases the poverty and inequalities by easing the access of financing for the poor, reducing their sensitivity to the risk by facilitating the risk management process, and improving investment to have a more prosperous income level generation (World Bank, 2016).

In this study, we analyze the relation between financial structure and economic growth in 10 OECD countries between the years 1993 to 2014 based on the availability of data to investigate the linkage between the two. Since ignoring other important factors that are affecting economic growth might lead to a biased result. Thus we include six different factors to avoid biased results. The variables are financial development, per capita physical stock, government expenditure, human capital, capital stock, and trade openness. Per capita physical stock is another factor that affects economic development; its positive effects have been found by Liu and Zhang (2018). Government expenditure is another factor that is being used

commonly in the literature (Asimakopoulos & Karavias, 2016; d'Agostino, Dunne, & Pieroni, 2016; Nyasha & Odhiambo, 2015).

Following that, human capital is another interesting variable that has been used in the literature for ages and its effects on economic growth has been proved by many researchers in the literature (Fang & Chang, 2016; Pelinescu, 2015; Su & Liu, 2016; Teixeira & Queirós, 2016). Another factor that has a key impact on economic growth is trade openness (Hye & Lau, 2015; Idris, Yusop, & Habibullah, 2016; Keho, 2017; Ulaşan, 2015). We will go into the details of these variables in the data and variables section. The following structure of this paper has been organized as follow: the second section discusses the literature review of financial structure, section 3 covers data, variables, methodology and model specification, section 4 covers estimation results, and section 5 consists of conclusion and policy recommendations.

Chapter 2

LITERATURE REVIEW

2.1 Financial Structure

Financial structure by far has been one of the important topics in the literature, where many researchers attempted to investigate the relationship between the financial structure of an economy and its economic growth. Financial structure by definition has several functions as Merton (1995) argues, financial structure must provide a system for payments, allocating resources and funds, a method to distribute the resources upon time and space, manage and control the risk, decrease the asymmetry of information between different parties involved in a transaction, and evaluate the information in order to help diversification of investments. Following that, there has been a long debate between researchers about which type of financial structure is more successful in applying these functions and is more beneficial to economic growth. These debates are generally discussing the importance of four subgroups of financial structure such as Bank-based, Market-based, Financial Services, and Financial Law and Regulatory Systems. Here we explain these subgroups in more details.

2.1.1 Bank Based

The bank based perspective refers to the positive impact of banks on economic growth. This impact is made by banks offering special services, such as gathering information about enterprises and their managers which would lead to increase in efficiency of management of firms and capital allocation (Diamond, 1984;

Ramakrishnan & Thakor, 1984). Furthermore, they enhance the efficiency of investment by managing the liquidity risk, which results in economic growth (Allen & Gale, 1999; Bencivenga & Smith, 1991). Besides all these, one important function of banks is savings mobilization, where banks collect the savings and invest them in possible opportunities by that they also reduce the cost and benefit from the Economic of Scale (Sirri, 1995; Stulz, 2000). Moreover, some researchers argue that bank based is more beneficial for the firms, since market puts all the possible information into account and it decreases the motivation for the investors to obtain new information (Stiglitz, 1985). However, in the bank based system, banks diminish this problem since they build a long term relation with enterprises and they tend to protect their information from the market (Arnoud, Greenbaum, & Thakor, 1993). Furthermore, it is easier for banks to monitor the behavior of firms compared to the market, this advantage reduces the chance of risky behaviors carried out by the companies which are not in favor of investors (Boot & Thakor, 1997). While in the market oriented systems, individual investors instead of monitoring the behavior of the company can simply liquidate their shares and get rid of the possible problems instead of trying to resolve them. Alongside that powerful banks overcome the problem of the inflexible and weak judiciary system, where enforce the firms to act as they should do by putting restrictions on them, where this would not be applicable in market oriented systems (Gerschenkron, 1962; Rajan & Zingales, 1998). This issue can harm the overall health of the economy if investors avoid investing in these countries due to the uncertainty of their investment because of lack strong contract enforcement system. And also there are many other studies that support the bank based financial structure (Christopoulos & Tsionas, 2004; Majid & Mahrizal, 2007; Menyah, Nazlioglu, & Wolde-Rufael, 2014; Moshirian & Wu, 2012).

2.1.2 Market Based

The second important financial structure is market oriented financial structure. The market based financial structure emphasizes the importance of the linkage between economic growth and the market. Which implies that the market is more important for achieving better economic growth, while in bank oriented systems, banks are the main intermediaries that help to promote economic growth. The General idea behind Market oriented financial systems is that markets act as the main beneficiary of the economic growth besides the existence of other intermediaries. To enumerate some, active markets encourage investors to search for new information about companies, since new information can lead to profit (Holmström & Tirole, 1993). As Greenwood and Smith (1997) argue, markets promote economic growth by reducing the transaction costs for mobilizing savings, and by that it enhances investment. Furthermore, markets help to reduce the risk by allowing individual investors to buy or sell at a low cost and in a concise matter of time (Bencivenga, Smith, & Starr, 1996; Levine, 1991). Moreover, the market provides easier access for the companies who wish to raise funds using equity issuance, which leads to a better capital allocation (Arestis, Demetriades, & Luintel, 2001). Likewise, developed financial markets allow risk reduction by benefiting from diversification, where risk reduces due to the benefits of diversification. In fact this benefit would not be possible in other financial systems where financial market is not as developed as market oriented systems (Levine, 1991; Saint-Paul, 1992), so by that they also improve the efficiency of corporate management (Jensen & Murphy, 1990). Following on that, Rajan (1992) argues that banks reduce the innovation and competition among companies since banks tend to protect the existing and established firms that are closely tied to the banks against the competition in the market. Here are some studies who found

positive relationship between stock market development and economic growth (Adjasi & Biekpe, 2006; Allen & Gale, 2000; Atje & Jovanovic, 1993; Ayadi, Arbak, Naceur, & De Groen, 2015; Bekaert, Harvey, & Lundblad, 2005; Bernard & Austin, 2011; Enisan & Olufisayo, 2009; Gambacorta, Yang, & Tsatsaronis, 2014; Greenwood & Jovanovic, 1990; Levine, 1996; Levine & Zervos, 1998; Masoud & Hardaker, 2012; Nurudeen, 2009; Rioja & Valev, 2004).

2.1.3 Financial Services

This view emphasizes the effects of the overall financial service quality on economic growth it takes into account an overall view of the financial structure as a whole. Meanwhile, it does not matter whether the economy is being considered as a bank based or market based system, but only the general quality of the offered services in both markets and banks is important for the economic growth (Levine, 1997; Merton & Bodie, 1995). In this view, the competition among banks and the markets benefits the market imperfections and helps the efficiency of the overall market. The results for such a competition would be a better service quality, which leads to the formation of well-operating markets and banks instead of a special type of financial structure.

2.1.4 Financial Law and Regulatory System View

This view shows the important relationship between financial system and law, and financial system consists of a series of agreements, where these agreements are enforced by the legal system and are backed by the law enforcement. Their findings show the positive relationship between financial system and law. They argue that stronger the law and enforcement system in applying the rights of investors, stronger and more efficient will be the financial system. In general, one can say that law and regulatory system is a guarantee for the offered financial services, so as much the legal system is stronger, the financial services tend to be more efficient. Furthermore,

this view is a suitable measure to differentiate financial systems, while this is not the case for market or bank oriented ratios. In this manner law and regulatory systems foster economic growth by helping the overall of markets and other intermediaries to perform better and reach economic development (Rafael La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Rafael La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997; Rafael La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000a; Rafael La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000b).

2.1.5 Controversies in the Literature

In case of financial structure, literature has been giving mixed evidence for the mentioned financial structure system. For instance, using a pooled data set Ergungor (2008), found supportive evidence for bank oriented view. He found that there is a non-linear relation between financial structure and economic growth where different countries which have weaker and less flexible law system have a higher growth rate in bank oriented systems. Similarly, the results in Baum, Schäfer, & Talavera (2011), and Kim, Lin, & Chen (2016), show that bank based financial systems are more helpful for economic growth. In the same way, findings of Beck, Levine, & Demirgüç-Kunt (2002), Demirgüç-Kunt & Maksimovic (1998), Demirgüç-Kunt & Maksimovic (2002), and Levine (1999), support the financial law and regulatory systems view. On the other hand, some other studies such as Blackburn, Bose, & Capasso (2005), Levine (2002), and Ndikumana (2005), provide evidence that supports financial service view and emphasize that both bank and market in necessary to complement and help economic growth. More recently there are other studies that indicate the importance of market based system over bank based system, for example, Demirguc-Kunt, Feyen, & Levine (2011) by using quantile regression method on a large data set found that the effects of market based is overwhelming the

bank based view. Their findings show that services offered by the markets are much more important in comparison to the offered services by banks for the economy. Following on that, also findings of Castro, Kalatzis, & Martins-Filho (2015), and Nyasha & Odhiambo (2017), clearly backs the market oriented view. On the other hand, also there are some other studies that their findings indicate that market based view not only is irrelevant to economic growth but also sometimes it diminishes the economic growth (Gilchrist, Yankov, & Zakrajšek, 2009; Næs, Skjeltorp, & Ødegaard, 2011; Singh, 1997). Equally important, there are other studies that examine not only the type of financial structure, but they investigate whether the financial structure can evolve through different economic stages and conditions. For instance, Lin, Sun, & Jiang (2009), and Liu & Zhang (2018) show that different economies face different types of the financial structure at different levels of economic development. Moreover, Liu and Zhang described their findings as inverse U shaped, showing that financial structure changes as the economy face different phases of development. Recently more studies are indicating that it is plausible for the financial structure to change during different economic stages (Demirguc-Kunt et al., 2011; Kpodar & Singh, 2011; Song & Thakor, 2010). Following on that, the overall literature indicates the overall impact of financial structure on economic growth, not the evolving effects of financial structure.

2.2 Financial Development

The relationship between Financial development economic growth is one of the most investigated issues in the literature (Bangake & Eggoh, 2011; Beck & Levine, 2004; Beck, Levine, & Loayza, 2000; Berthelemy & Varoudakis, 1996; Blackburn & Hung, 1998; Chow & Fung, 2013; Herwartz & Walle, 2014; Al-Yousif, 2002; Levine, 1999; Levine, Loayza, & Beck, 2000; Rousseau & Yilmazkuday, 2009;

Uddin, Shahbaz, Arouri, & Teulon, 2014; Wachtel, 2003; Yucel, 2009). Besides that the high relevancy of the financial structure and development makes it even more important for our study. The early works of this relationship were done by Schumpeter (1911), which first, he argued that financial development has a positive relationship on economic growth. For many years there has been an extensive debate going on between econometricians about whether financial development matters for economic growth or no. For instance, the general debate falls under four different categories trying to investigate all the possible relationships between financial development and economic growth (Chuah, Thai, & Chuah, 2004). First, the general hypothesis of "supply leading" where it mentions that financial development leads to economic growth; this is one of the main and conventional theories of the relationship between two. Second hypothesis is called "demand following" where it argues that financial development is caused by the economic growth and without any economic growth, financial development would not occur, since economic growth would lead to increase in demand for the financial services (Demetriades & Hussein, 1996; Patrick, 1966; Robinson, 1952). Next hypothesis is called "bi directional" which is the combination of previous hypothesizes, meaning that economic growth and financial development help each other to boost at the same time (Berthelemy & Varoudakis, 1996; Blackburn & Hung, 1998; Demetriades & Hussein, 1996; Greenwood & Jovanovic, 1990; Greenwood & Smith, 1997; Harrison, Sussman, & Zeira, 1999; Saint-Paul, 1992). Moreover, the fourth hypothesis indicates that economic growth and financial development are independent of each other or have minimal effect that can be ignored (Stern, 1989). In addition to that the general financial development research focuses on two different sectors, bank based financial development (Christopoulos & Tsionas, 2004; Majid & Mahrizal, 2007; Menyah et

al., 2014; Moshirian & Wu, 2012; Tang, 2005), and market based financial development (Choong, Yusop, Law, & Sen, 2003; Levine, 1991; Singh, 1997). While some researchers suggest that both of these types are important and can lead to economic growth (Bilson, Brailsford, & Hooper, 2001; Castañeda, 2006; Garcia & Liu, 1999; Gjerde & Saettem, 1999; Kwon & Shin, 1999; Shaw, 1973; Trew, 2006).

2.2.1 Bank Based Financial Development

The first part of the financial development studies, examines the relationship between the development of bank oriented financial systems and economic growth. For instance, the supply lead hypothesis shows an important role, where bank based financial development drives economic growth and there is a one-way direction causality from financial development to economic growth (Ang, 2008; Bencivenga & Smith, 1991; Boulila & Trabelsi*, 2004; Christopoulos & Tsionas, 2004; Hsueh, Hu, & Tu, 2013; Jalil, Feridun, & Ma, 2010; Khalifa Al-Yousif, 2002; Menyah et al., 2014; Naceur & Ghazouani, 2007; Pradhan, Arvin, Norman, & Nishigaki, 2014; Thornton, 1994; Wu, Hou, & Cheng, 2010). On the other hand, another group of researchers argue that the relationship between bank based financial development and economic growth can be defined by the demand following hypothesis, where it states that economic growth is the reason behind development in financial sector (Ang & McKibbin, 2007; Demetriades & Luintel, 1996; Kar, Nazlıoğlu, & Ağır, 2011; Liang & Jian-Zhou, 2006; Odhiambo, 2009; Panopoulou, 2009).

2.2.2 Market Based Financial Development

Another group of studies in the literature focuses on market base development in the financial sector, and they argue the effects of financial market development and economic growth hypothesizes. In this manner, some studies suggest that demand following hypothesis stand a stronger position, means, economic growth leads to

financial market development (Ang & McKibbin, 2007; Dritsaki & Dritsaki-Bargiota, 2005; Kar et al., 2011; Odhiambo, 2009; Panopoulou, 2009). On the other hand, some other researchers argue that the relationship among two are defined by supply leading hypothesis where economic development is achieved by development in financial market development (Colombage, 2009; Enisan & Olufisayo, 2009; Kolapo & Adaramola, 2012; Tsouma, 2009; Van Nieuwerburgh, Buelens, & Cuyvers, 2006). Furthermore, the final view demonstrates that financial development and economic growth both cause development in each other and bi-directional relationship exist among them (Caporale, Howells, & Soliman, 2004; Darrat, Elkhal, & McCallum, 2006; Hou & Cheng, 2010; Wongbangpo & Sharma, 2002).

2.3 Government Expenditure

Government expenditure is one of the important factors affecting the economy, where the government can improve the quality of life of its citizens through enhancing economic conditions. There have been many studies on the relationship between economic growth and government spending. The extensive literature on government expenditure and economic growth provided mixed results about the relationship among two. Some studies suggest that there is a positive relation between government expenditure and economic growth (Alexiou, 2009; Ghosh & Gregoriou, 2008; Huang, 2006; Loizides & Vamvoukas, 2005; Wu, Tang, & Lin, 2010). On the other hand, some other studies imply that there is a negative relationship between economic growth and government expenditure (Abu-Daber & Aamer, 2003; Barro, 1999; Hasnul, 2015; Rao & Hassan, 2011). Similarly, some researchers found no causality among two (Durevall & Henrekson, 2011; Halicioĝlu, 2003).

2.4 Human Capital

Early studies on the relationship between economic growth and human capital, was done in the early 1960s, where some researchers such as Arrow (1971), and Uzawa (1965) mentioned the importance of human capital for economic growth. However, many studies started using human capital after Barro (1991), argued that human capital is one of the important determinants for economic growth. Some researchers argued that human capital has an important role in innovation and enhancing investment opportunities (Aghion et al., 1998). However, Bils & Klenow (2000), broadly disagree with this idea and argue that the relationship among two are too weak to be considered as the main determinants of economic growth and the reason behind the positive relationship, is other variables that affect both of them and leads to the belief that there is a strong relationship among them. Similarly, some other studies suggest a negative relationship between economic growth and human capital (Hamilton & Monteagudo, 1998). But the overall of the studies are in favor of the positive relationship between human capital and economic growth (Anyanwu, 2014b; Benhabib & Spiegel, 1994; Siddiqui & Rehman, 2017; Teixeira & Fortuna, 2010).

2.5 Trade Openness

There has been a long debate about the impacts of trade openness on economic growth in the literature. This relationship that defined by different researchers, while arguing that trade openness enhancing the economy by easing the way for new knowledge and technologies to flow into the country, and enhancing the efficiency of industries which results in economic growth (Almeida & Fernandes, 2008; Baldwin, Skudelny, & Taglioni, 2005; Barro & Sala-i-Martin, 1997; Grossman & Helpman, 1991). Also higher level of trade openness allows to increase the size of the markets,

and by that, it encourages foreign investors to invest in the country (Alesina, Spolaore, & Wacziarg, 2000; Bond, Jones, & Wang, 2005; Grossman & Helpman, 1991). But the general overview of the literature about trade openness shows a positive relationship between trade openness and economic growth (Anyanwu, 2014a; Awokuse, 2007; Chang, Kaltani, & Loayza, 2009; Fetahi-Vehapi, Sadiku, & Petkovski, 2015; Jouini, 2015; Rahman & Mamun, 2016; Rahman & Salahuddin, 2009). However, some countries might not be able to adapt to the new technologies due to many different reasons such as financial restrictions. Thus, they might not benefit from trade openness in the same way as others (Zahonogo, 2016). In the same way, some researchers found a negative relationship or no relation among trade openness and economic growth (Harrison & Hanson, 1999; Musila & Yiheyis, 2015; Ulaşan, 2015; Vlastou, 2010).

Chapter 3

DATA AND METHODOLOGY

3.1 Data

Despite the extensive existing literature on economic growth, not much attention has been paid to the financial structure and economic growth. The reason behind this can be the missing place of an official index or exact measure for financial structure. However, there have been different studies that investigated this issue such as Liu & Zhang (2018), where they used various measures to calculate the financial structure. Here a panel of 10 OECD countries has been gathered using annual data from 1993 to 2014. The sample size was limited to 10 countries due to lack of availability of data since many of the countries had missing data due to different reasons. We used the raw data to calculate the required variables as suggested by Liu and Zhang (2018) the method of calculation has been shown in table 1, which specifies the formula and source of the data.

The raw data for this study was collected from different sources, the data used to calculate the financial structure and financial development were obtained from World Development Indicators (to be denoted from now on to WDI), and Penn world database, the data for GDP and General government final consumption expenditure has been collected from WDI, Other variables such as physical stock, human capital, openness have been collected from Penn world database. Table 2 shows the descriptive statistics of our variables, where mean, maximum, minimum, standard

deviation, and the number of observations have been reported. Figures 1 to 8 shows the graphical form of the data for each variable and cross section, where we can see that the majority of our variables have an upward trend. Moreover figures 1, 2, and 3 represent the data for GDP, financial structure, and financial development shows a sharp decline in the years 1999 and 2008, which is the result of two crises of 1999 Dot-com crisis and the 2008 Financial crisis, these two events had an extensive effect on Financial Structure, Financial Development, and GDP. However, other variables were not affected as much as these variables. Furthermore, table 3 represents the correlation matrix, in the table, we can see that there is only high correlation between LPS and LTO where the correlation is above 0.8, besides that there is no high correlation among our independent variables.

3.1.1 Dependent Variable

Gross domestic product is our dependent variable for this study since we are investigating the effects of financial reforms on Economic development, GDP has been one of the main concerns of the literature since the beginning, and many studies have investigated the determinants of GDP which led to many different models. Hereby running our model, we try to examine the relationship of the financial sector and economic growth since now more than ever the economies around the globe are dependent to the financial sector and its contributions affect the wellbeing of the people from different nations. Our sample consists of 10 countries (Australia, Chile, Israel, Japan, Korea, Netherlands, Poland, Mexico, Turkey, and United States) from OECD which are the leading economies around the globe, and our study emphasizes the importance of the financial sector for these significant countries.

3.1.2 Main Independent Variables

Our main independent variables are Financial Structure and Financial development. These two variables are two of the main representors of the financial sectors since the financial sector is linked directly to the economic expansion since the financial sector is the leading party that mobilizes the savings and help economic growth by redistributing the allocated money. Here Financial Structure specifies the form of the financial sector, whether it follows a bank based system or market based system, since this variable has been calculated by dividing the total stock market capitalization to total bank lending, a small value for this variable indicates the sector follows a bank based system whereas a bigger number suggests that the sector is more market based. As we can see from figure 2, financial structure is very volatile, and this might be the result of the shifts in the tendency of the financial sector to evolve through time and react to every different economic condition differently by changing from being one type of market oriented to bank oriented or vice versa. Moreover, financial development is calculated as a summation of stock market capitalization and bank lending over GDP, and this ratio represents the overall development of financial sectors.

Table 1: Sample Summary

Country name	**Abbreviations**	**Number of observation**	**Sample**
Australia	AUS	22	1993-2014
Chile	CHL	22	1993-2014
Israel	ISR	22	1993-2014
Japan	JPN	22	1993-2014
Korea	KOR	22	1993-2014
Mexico	MEX	22	1993-2014
Netherland	NLD	22	1993-2014
Poland	POL	22	1993-2014
Turkey	TUR	22	1993-2014
United States	US	22	1993-2014

Table 2: Data Description

Variable	Abbreviation	Definition	Source
Gross domestic product	GDP	Gross Domestic Product per capita (Constant 2010)	OECD statistics
Financial development	FD	Stock market capitalization and bank lending as a share of GDP	World development indicators
Financial structure	FS	Total stock market capitalization to Total bank lending	World development indicators
Per capita physical stock	PS	Total physical capital stock to GDP	Penn world database
Government expenditure	GE	General government final consumption expenditure	OECD statistics
Human capital	HC	Human capital Index	Penn world database
Trade openness	TO	Total Exports and imports as a share of GDP	Penn world database
Capital stock	PL	Price level of capital stock	Penn world database

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std.dev	Min	Max
LGDP	220	9.947008	0.727693	8.670363	10.9068
LFD	220	0.297335	0.640879	-1.322394	1.474376
LFS	220	-0.01149	0.589521	-1.998035	1.176635
LTO	220	-0.66732	0.47152	-1.832581	0.277632
LGE	220	2.699311	0.285979	2.094295	3.290171
LHC	220	1.112523	0.17226	0.606126	1.314484
LPL	220	-0.40122	0.383008	-1.323132	0.516708
LPS	220	-3.36634	0.573929	-4.536027	-2.203114

Table 4: Correlation Matrix

	LGDP	LFD	LFS	LTO	LGE	LHC	LPL	LPS
LGDP	1.0000							
LFD	0.3910	1.0000						
LFS	-0.2481	-0.0066	1.0000					
LTO	-0.4250	0.1189	-0.0826	1.0000				
LGE	0.7668	0.2303	-0.3821	-0.0919	1.0000			
LHC	0.7699	0.7297	-0.1026	-0.1046	0.5582	1.0000		
LPL	0.8347	0.2598	-0.1867	-0.4148	0.5398	0.5869	1.0000	
LPS	-0.7322	-0.0177	0.1239	0.8680	-0.5741	-0.3653	-0.6114	1.0000

3.2 Methodology

In this study, we investigate the relationship between financial structure and economic growth using a panel data from 1993 to 2014, for ten OECD countries. For this purpose we used System GMM (Generalized Method of Moments), GMM estimators which were first established by Holtz-Eakin, Newey, & Rosen (1988), and was completed by Arellano & Bond (1991), later on, Arellano & Bover (1995) and Blundell and Bond (1998) introduced System GMM approaches. According to Hoeffler (2002), this approach can omit the variable bias, which is the result of heterogeneity and endogeneity problem. Despite the fact that this method was invented about 30 years ago, still, it has its popularity since many of the published articles are using this method as their main methodology (see Jha, 2019; Liu and Zhang, 2018). Furthermore, Beck et al. (2000), argues that GMM estimator for panel data can handle the endogeneity of all explanatory measures by exploiting the variation of time series and putting into account for fixed effects as well. Moreover, system GMM counterparts for the difference specification with the main model specified in the level form and include the lagged differences as an extra variable for the specifications in level form. Overall we can state that the effectiveness and efficiency of system GMM in comparison to difference GMM is much stronger (Blundell & Bond, 1998). Following will be the overall look of the process behind GMM estimation, autoregressive panel first order:

$$y_{it} = \alpha y_{i,t-1} + \theta x'_{it} + u_{it}$$

$$u_{it=}\eta_i + \vartheta_{it}$$

While x'_{it} stands for the explanatory variables Vector, u_{it} stands for the disturbance term, and t and i stand for the time and country accordingly, η_i denotes the fixed

effects, and ϑ_{it} stands for the idiosyncratic shocks. Where it is assumed that they have a structure of error elements with

$E(\eta_i) = 0, \quad E(\vartheta_{it}\eta_i) = 0 \quad i = 1, \dots, n; t = 2, \dots, T$

$E(\vartheta_{it}\vartheta_{is}) = 0, i = 1, \dots, n \; and \; t \neq s$

And this condition offers

$E(\vartheta_{i1}\vartheta_{it}) = 0$ for t ≥ 2

$E(\eta_i \Delta y_2) = 0$

Based on the mentioned assumptions, we can reach the following linear moment conditions

$E\left(y_{i,t-s}\Delta u_{it}\right) = 0$ for t ≥ 3 and s ≥ 2

$E\left(u_{it}\Delta y_{i,t-1}\right) = 0$ for t ≥ 3

3.2.1 Model Specification

For the empirical analysis the following models were applied, where we start with the basic model which includes our main variables (Gross domestic products, Financial structure, and Financial development) and we continue by adding one variable to the model, until we reach model VI which takes into account all of our variables and it is being considered as our final main model.

Model I

In this model variables financial structure and financial development were added since they are our main independent variables and economic growth is our dependent variable. The differenced level of economic growth was added to the independent side as well.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Model II

This model includes economic growth as our dependent variable and the first difference of economic growth, financial structure, financial development, and trade openness as our independent variable.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \beta_3 log[TO_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Model III

This model includes financial structure, financial development, trade openness, government final consumption expenditure, and first difference of economic growth as independent variables and economic growth as our dependent variable.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \beta_3 log[TO_{it}] + \beta_4 log[GE_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Model IV

In this model beside financial structure, financial development, trade openness, government expenditure, and first difference of economic growth we add per capita physical stock as our independent variable while economic growth is our dependent variable.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \beta_3 log[TO_{it}] + \beta_4 log[GE_{it}] + \beta_5 log[LPL_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Model V

Our fifth model consists of economic growth as our dependent variable and first difference of economic growth, financial structure, financial development, trade

openness, government final consumption expenditure, per capita physical stock, and human capital as our independent variables.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \beta_3 log[TO_{it}] + \beta_4 log[GE_{it}] + \beta_5 log[PL_{it}] + \beta_6 log[HC_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Model VI

Our final model consist of all our independent variables which are financial structure, financial development, trade openness, government final consumption expenditure, per capita physical stock, human capital, and capital stock, similarly the first difference of economic growth was added as an independent variable while economic growth is our dependent variable.

$$log[gdp_{it}] = \beta_0 log\left[gdp_{i,t-1}\right] + \beta_1 log[FS_{it}] + \beta_2 log[FD_{it}] + \beta_3 log[TO_{it}] + \beta_4 log[GE_{it}] + \beta_5 log[PL_{it}] + \beta_6 log[HC_{it}] + \beta_7 log[PS_{it}] + \eta_i + \varphi_t + \vartheta_{it}$$

Chapter 4

EMPIRICAL FINDINGS

This chapter will include the results for the GMM estimation in order to investigate the relationship between financial structure and economic development. At first, we discuss the general model of the entire sample from 1993 to 2014 to see the general effect of financial structure on Gross domestic product. Following that we investigate the same issue using a short panel of 6 years for the same countries to see whether the effects of financial structure changes over time or its attributes remain unchanged through different time horizons. This relationship will provide enough information to see whether there is any evolutionary effect between financial structure and economic growth or not. Since this relationship indicates whether the financial structure of a country changes through different economic conditions or it remains unchanged. Here we interpret the results for the GMM estimation for our models from Model 1 to model 6, all the estimated results for the general model can be seen in table 5, and the subgroup models can be seen in table 6.

4.1 General Model

This general model includes all 23 years of data for 10 OECD countries, in the first model we start the basic model by adding financial structure and financial development and afterwards in each model we add one variable and we finish the final model with all 7 variables in the same model as our independent variables and GDP as our dependent variable.

4.1.1 Model I

In this model we include financial structure, financial development as our independent variables, financial structure with a coefficient of -0.040585 is statistically significant at 1% level of confidence interval, and financial development with a coefficient of 0.04992 is statistically significant at 1% level of confidence interval, constant coefficient of 10.42908 is statistically significant at 1% level of confidence interval. P value for Hansen over identification test is 0.00003, which is statistically significant at 1% level of confidence interval, which means we can reject the null hypothesis of valid instruments.

4.1.2 Model II

In this model besides variables in model one, we add trade openness, after adding the third independent variable see that the Hansen J test is still significant with p value of 0.000113 at 1% level of confidence interval resulting in rejection of our null hypothesis, financial structure with a coefficient of -0.040247 and financial development with a coefficient of 0.050537 are both statistically significant at 1% level of confidence interval, trade openness is insignificant so we cannot have any interpretation on this variable, our constant is statistically significant at 1% level of confidence interval with a coefficient of 10.44042.

4.1.3 Model III

Here government expenditure was added to the previous model, government expenditure with a coefficient of -0.27553, and financial structure with a coefficient of -0.04685 and financial development with a coefficient of 0.078528 and constant with a coefficient of 11.30725 are statistically significant at 1% level of confidence interval. Moreover, trade openness is insignificant, and p value for Hansen over

identification test is 0.008699 which leads to rejection of null hypothesis of valid instruments.

4.1.4 Model IV

Here the variable capital stock was added to the model III, we can see that the Hansen over identification test is improving however still we can reject the null for this test, since the p value for this test is 0.073951 which is statistically significant at 5% level of confidence interval, the coefficients for financial structure, financial development, government expenditure, capital stock, and constant are -0.042417, 0.079391, -0.250431, 0.07752 , and 7.713393 accordingly which are all statistically significant at 1% level of confidence interval.

4.1.5 Model V

In this model we add human capital as another control variable, after adding this variable we can see that the Hansen J test p value increases to 0.18527 which is bigger than 10% of confidence interval, meaning that we fail to reject the null hypothesis of Hansen over identification test. Furthermore the coefficients for financial structure, financial development, government expenditure, capital stock, human capital, and constant are: -0.041112, 0.07795, -0.244127, 0.088389, 2.675635, and 7.713393 accordingly, and all these variables are significant at 1% level of alpha.

4.1.6 Model VI

Our final model consists 7 independent variables with gross domestic product as the dependent variable, financial structure with a coefficient of -0.04058, financial development with a coefficient of 0.077867, government expenditure with a coefficient of -0.42845, capital stock with a coefficient of 0.087054 and human capital with a coefficient of 2.670755, and the constant with a coefficient of

7.725672 are all significant at 1% of alpha, however per capita physical stock and trade openness are insignificant, the P value for Hansen over identification test is 0.245066 which we fail to reject at any level of 1%, 5%, and 10% of alpha, indicating that our instruments are valid and our model is over-identifying.

4.2 Subgroup Model

Here we investigate the evolutionary effect of financial structure on gross domestic product, to see whether financial structures have the same attributes towards gross domestic products through different time span or not, for this purpose we split our data in to 4 different time horizons sample I consists of years 1993 to 1998, sample II from 1998 to 2004, sample III from 2004 to 2009, and sample IV from 2009 to 2014, our main focus in these subgroups is financial structure mainly.

4.2.1 Sample I

Sample I covers the years from 1993 to 1998,all variables are included in this model in order to omit the missing variable bias, however our focus here is financial structure and its effects, P value for Hansen over identification test is 0.317662 which is statistically insignificant meaning all our instruments are valid, however in this model only 4 coefficients are significant, which are financial structure, financial development , human capital and constant, with a coefficient of -0.051865, 0.133889, 3.026629, and 6.978764 accordingly which are statistically significant at 1% level of alpha except human capital which is significant at 10% level of alpha.

4.2.2 Sample II

Sample II covers the years from 1998 to 2004, using this data set we find financial structure with a coefficient of -0.042695 significant at 1% level of alpha, financial development with a coefficient of 0.061457 significant at 1% level of alpha, human capital with a coefficient of 3.925667 significant at 1% level of alpha, per capita

physical stock significant at 5% level of alpha with a coefficient of 0.077096, and a significant constant at 1% level of alpha with a coefficient of 6.564652. The P value for Hansen J test is 0.133079 which is not statistically significant meaning that we cannot reject the null hypothesis of valid instruments.

4.2.3 Sample III

Sample II covers the years from 2004 to 2009, after running the model on this data set we found that the majority of the variables were insignificant including financial structure and financial development and only two coefficients of human capital and per capita physical stock were significant with coefficient of 3.504343 significant at 1% level of alpha and 0.135543 significant at 10% level of alpha accordingly, and constant with a coefficient of 6.912321 significant at 1% level of alpha. The p value for Hansen J test is 0.199839 which is insignificant at any levels of alpha, implying that the null hypothesis for Hansen J test cannot be rejected.

4.2.4 Sample IV

Sample II covers the years from 2009 to 2014, the P value for the Hansen J test is 0.350913 which shows that we fail to reject the null hypothesis at any level of alpha, and our model is well fitted. Financial structure and financial development are insignificant and only human capital with a coefficient of 2.741535 and constant with a coefficient of 8.367927 are significant at 1% level of alpha.

4.3 Overall Results

From our models 1 to 6 we can see that financial structure has a negative significant effect on gross domestic product through all the models and this effect seems to be stable through the model and stays close to 0.04 which shows the negative relationship between two variables in short run, as we can observe in model VI 1% increase in financial structure leads to 0.04% decrease in GDP. This negative

relationship can be due to the harms of multiple crises that have happened in the years 1999 and 2008 since these events had an extensive negative impact on GDP of all countries included in our sample. Financial development has a positive effect on gross domestic product through all our models, we can see that in model I the coefficient for this variable is 0.04, however this coefficient increases to 0.05% in model II and stabilizes in model III by changing to 0.07 and it keeps its attitudes similar to this coefficient through the rest of the models meaning that 1% increase in financial development leads to 0.07% increase in GDP which is in line with literature that financial development has a positive effect on economic growth (Batuo, Mlambo, & Asongu, 2018; Ibrahim & Alagidede, 2018). Trade openness remains insignificant through the entire model so we cannot interpret this variable since we fail to say whether it is different than zero.

Government expenditure was first added to our model in model III and has a coefficient of -0.275, and it affects stay close to -0.2 through models IV and V, in model VI this coefficient increases to -0.0428, meaning that 1% increase in government expenditure has a negative effect of 0.42% of GDP.

Per capita Physical stock was added to our model first in model IV, it has a significant coefficient of 0.07752, and it increases to 0.088 in model V and to 0.087 in model VI, meaning that 1% increase in physical capital stock will lead to 0.087% increase in gross domestic product. Human capital is another essential variable which was added in model V with a coefficient of 2.675 and with a slight change in model VI changed to 2.670, meaning that 1% increase in human capital will lead to 2.6% increase in GDP. Finally, Capital stock was added to our model in model VI.

However this variable was insignificant so we cannot make any assumption based on this variable.

As we can see from the P value of Hansen over identification test, every variable had a positive impact on our model, resulting in a more robust final model. In subgroup models, our primary focus is on financial structure, from the table 6 we can see that financial structure between two periods of 1993 to 1998, and 1998 to 2004 it has a significant negative effect on economic growth. However, the variable in the third and fourth model is insignificant which shows that the impact of financial structure is not consistent through the time, despite the fact that there can be many reasons behind these insignificant variables such as financial crises of 2008 which had a huge impact on the financial structure of countries. Here this inconsistency in the coefficient of financial structure despite having an over identified model, proves that structure of financial system of each country is not fixed and can change according to the conditions that each economy is facing, meaning that a bank based or market based financial system does not tend to keep the same structure and if needed it changes the structure and adapt to the new conditions of the economy by a different structure.

Table 5: GMM Estimation Results

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Constant	10.42908*	10.44042*	11.30725*	11.31551*	7.713393*	7.725672*
LFS	-0.040585*	-0.040247*	-0.04685*	-0.042417*	-0.041112*	-0.04058*
LFD	0.04992*	0.050537*	0.078528*	0.079391*	0.07795*	0.077867*
LTO		0.023026	-0.014339	0.009137	0.024806	0.202519
LGE			-0.27553*	-0.250431*	-0.244127*	-0.42845*
LPL				0.07752*	0.088389*	0.087054*
LHC					2.675635*	2.670755*
LPS						-0.18149
AR(1)	0.956729*	0.957287*	0.965015*	0.968362*	0.917917*	0.918969*
Hansen J test (p-level)	0.00003*	0.000113*	0.008699*	0.073951**	0.185270	0.245066
Inverted AR Roots	0.96	0.96	0.97	0.97	0.92	.92
Number of instruments	2	3	4	5	6	7

Note: *, **, and *** indicate statistical significance at 1%, 5%, and 10% respectfully.

Table 6: GMM Estimation Results for Subgroups

Variable	1993-1998	1998-2004	2004-2009	2009-2014
Constant	6.978764*	6.564652*	6.989705*	8.367927*
LFS	-0.051865*	-0.042695*	0.032765	-0.026855
LFD	0.133889*	0.061457*	0.016494	0.042813
LTO	0.076043	-0.176140	1.005008	-0.066545
LGE	-0.429574	-0.195348	-0.859226	-0.355580
LHC	3.026629***	3.925667*	3.504343*	2.741535*
LPL	0.085344	0.077096**	0.135543***	-0.021869
LPS	-0.241342	0.165373	-0.612654	0.154676
AR(1)	0.956729*	0.791799*	0.472568 *	0.678424*
Hansen J test (p-level)	0.317662	0.133079	0.199839	0.350913
Inverted AR Roots	0.77	0.79	0.47	0 .68

Note: *, **, and *** indicate statistical significance at 1%, 5%, and 10% respectfully.

Chapter 5

CONCLUSION

This study aims to investigate the relationship between financial structure and financial development and economic growth and to see whether financial structure remains unchanged during different economic conditions or it evolves and adapts to new economic conditions. For this purpose, a sample of 10 OECD countries where chosen between years 1993 to 2014. From the results of the aggregated models, we can point at some major findings of this study.

The financial structure is negatively correlated with economic growth, this negative relation points at the financial market meaning that further emphasizing on the importance of financial market has a negative relationship with economic growth, meaning that activities in the financial market has reached a level that, promoting financial markets does not support the economic growth. This result is in contrast with the findings of Liu and Zhang (2018), where they found a positive relationship between financial market and economic growth for Chinese provinces. However, the majority of our sample has been chosen from developed and developing countries where financial markets are fully established and are functioning efficiently, but Chinese financial markets are lacking efficiency and are highly controlled by the authorities and cannot operate freely.

A positive correlation was found among financial development and economic growth, this finding is in line with the literature, where financial development leads to economic growth. Financial development here refers to both intermediary institutions and financial market and development in these aspects can lead to improvements in economic conditions. Furthermore trade openness remained insignificant through our models, this insignificant variable does not mean that trade openness is irrelevant to economic growth, but according to Ulaşan (2015) trade openness alone cannot be a source of economic growth, meaning that, without correct complementary control variables for trade openness and economic growth we cannot define any robust relationship among two, due to the omitted variable bias. Government expenditure has a negative correlation with economic growth. A negative relationship between economic growth and government expenditure might be the result of government interventions in the private sector that affects economic growth in a negative manner and lack of efficiently in using its resources (Barro, 1990; Furceri & Sousa, 2011; Hasnul, 2015; Wu et al., 2010). Moreover, capital stock is positively correlated with economic growth; this relationship is in line with the literature where capital stock positively affects economic growth. Human capital is another highly important variable where it is positively correlated with economic growth, and this relationship is in line with the literature where the majority of studies suggest a positive relationship among two variables, especially in developed and developing countries where human capital is one of the most important factors affecting the economy.

Our findings here can be useful for OECD policymakers, since financial structure and development is one of the crucial issues in today's world. Based on our findings, we suggest that it is better for OECD countries to promote financial development by

providing better growing conditions. Furthermore due to the changes in financial structure, we emphasize on no optimal financial structure and recommend policymakers to focus on overall of financial system and to not categorize countries based on one specific financial structure so at any economic condition financial structure can adapt its system and promote the economic growth rather than focusing on one structure and arranging policies according to one specific of market based or bank based structure.

Furthermore, in this study we have used a limited number of countries with sufficient date span, however our variables for financial structure were limited to a few variables only, for further studies we suggest to collect a higher number of cross-section and other groups of countries including more developing countries and other variables representing different aspects of financial structure which can be added to the model, more control variables can also be used in order to obtain more robust results for variables such as trade openness.

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APPENDICES

Appendix A: Figures

Figure 1: GDP Graphs

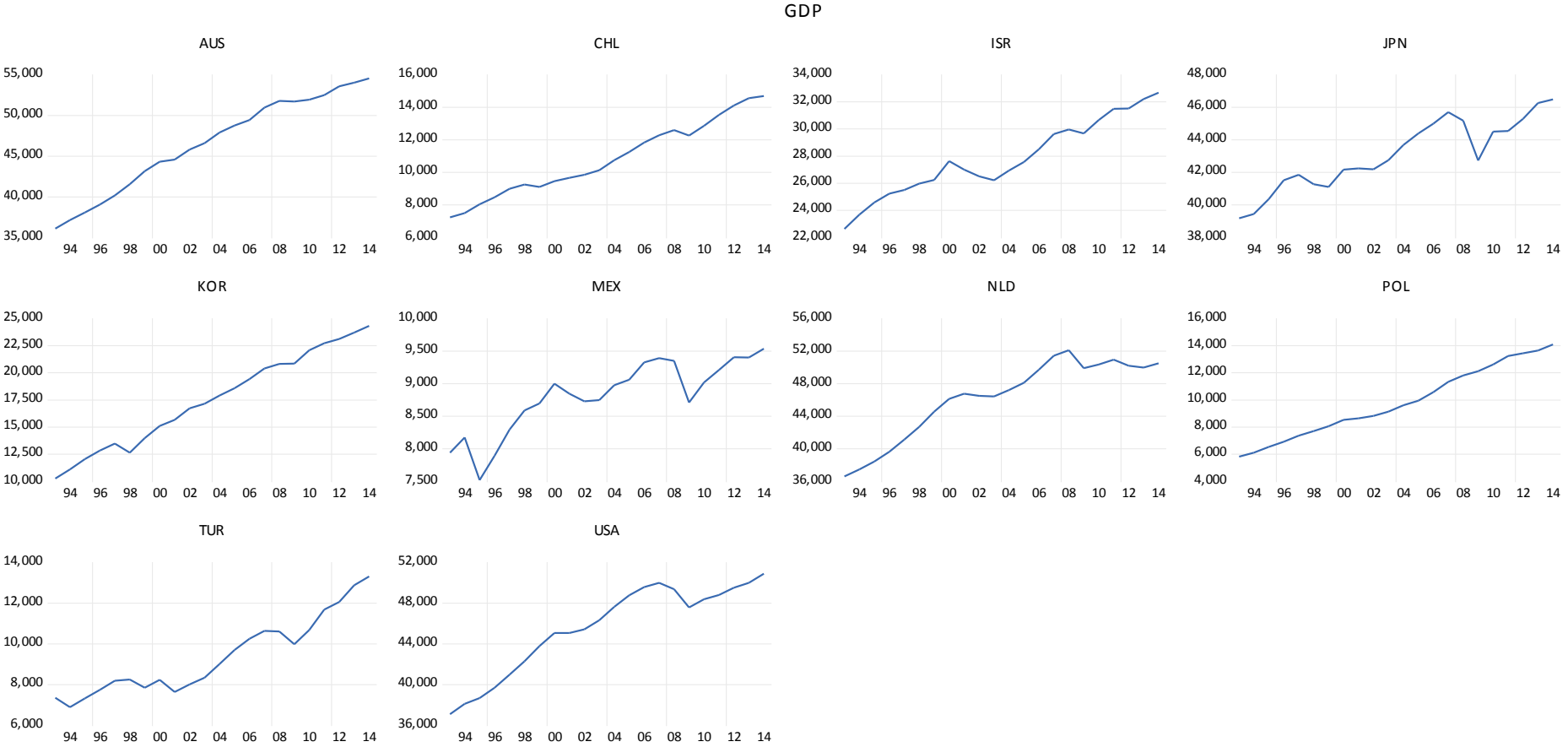


Figure 2: Financial Structure Graphs

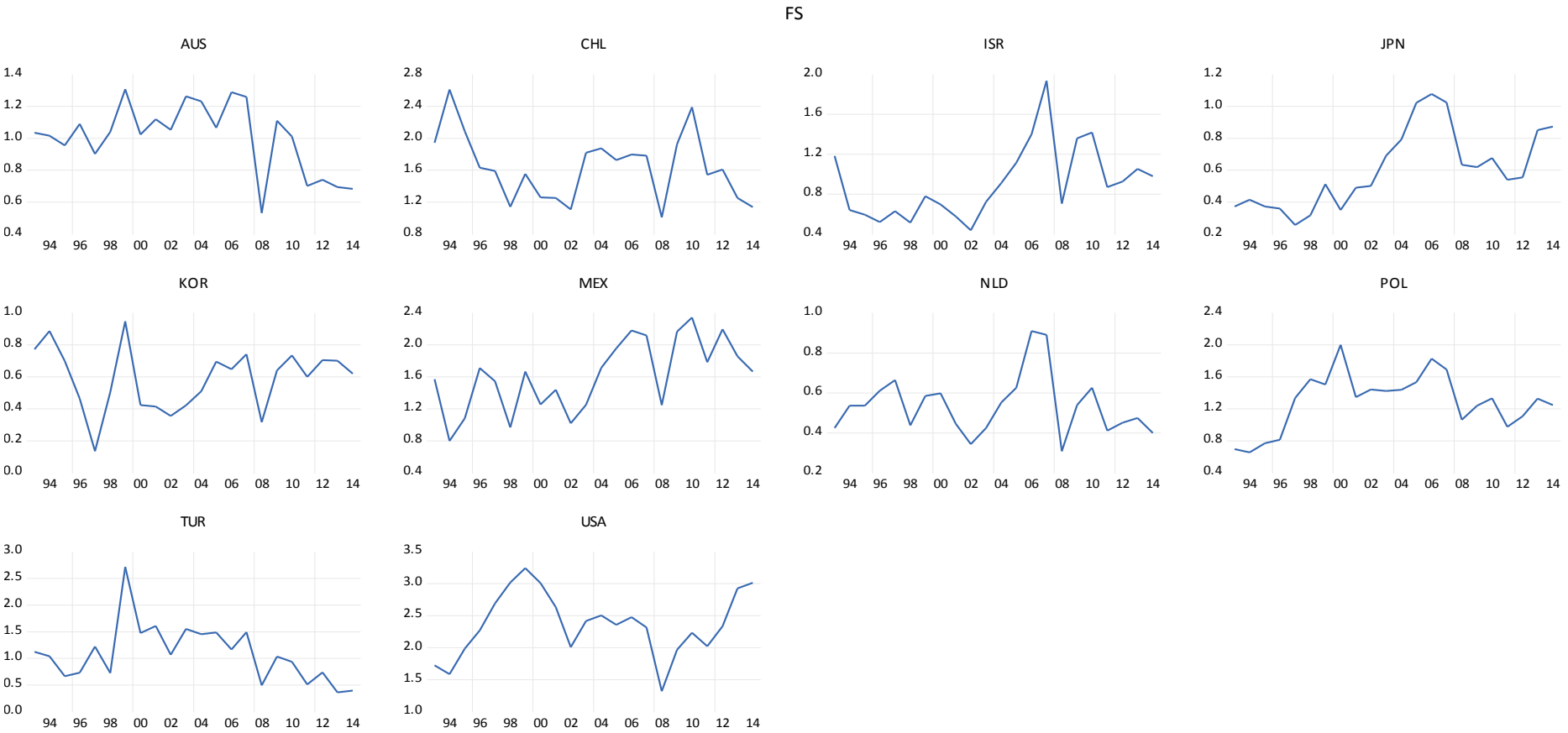


Figure 3: Financial Development Graphs

Figure 4: Government Final Consumption Expenditure Graphs

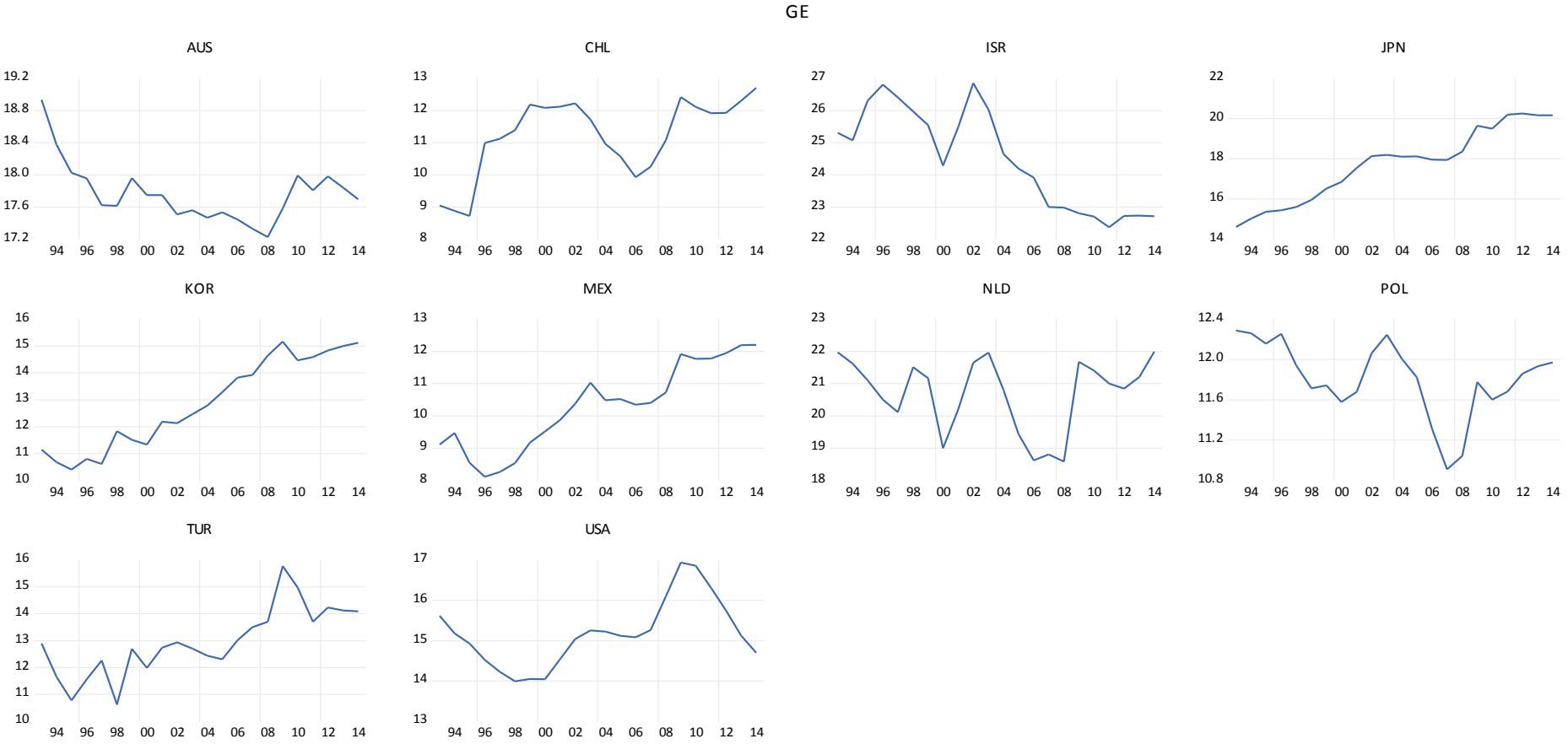


Figure 5: Human Capital Graphs

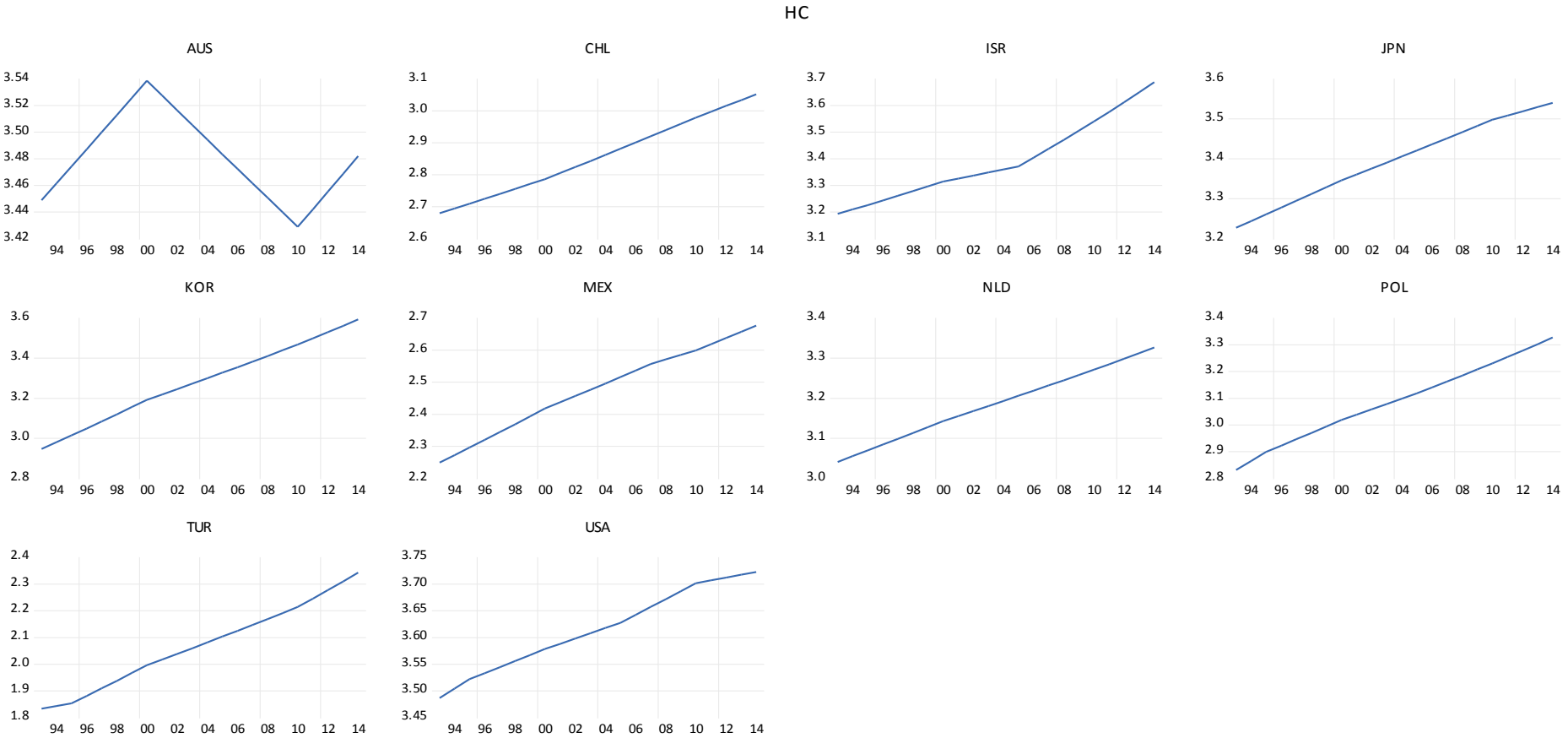


Figure 6: Capital Stock Graphs

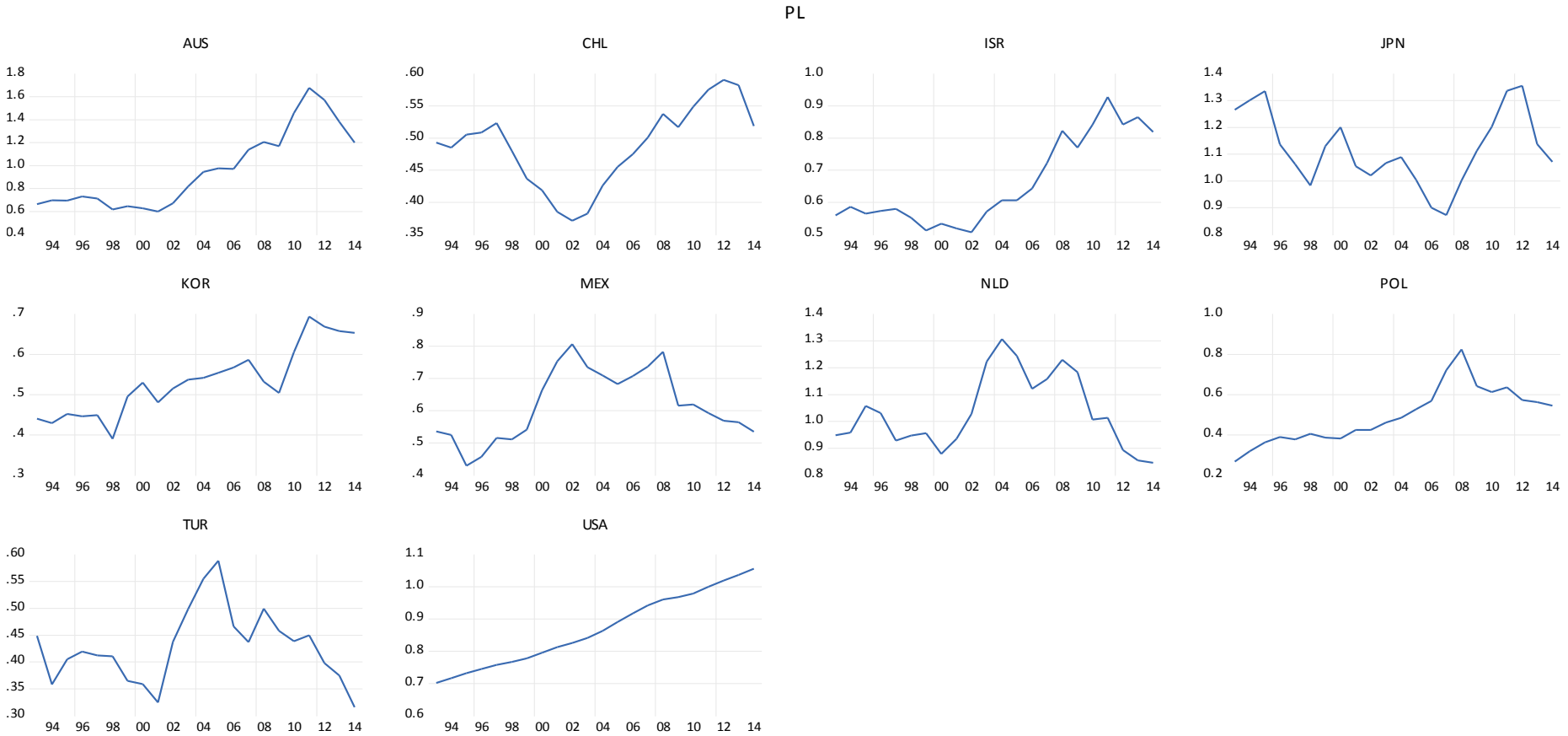


Figure 7: Per Capita Physical Stock Graphs

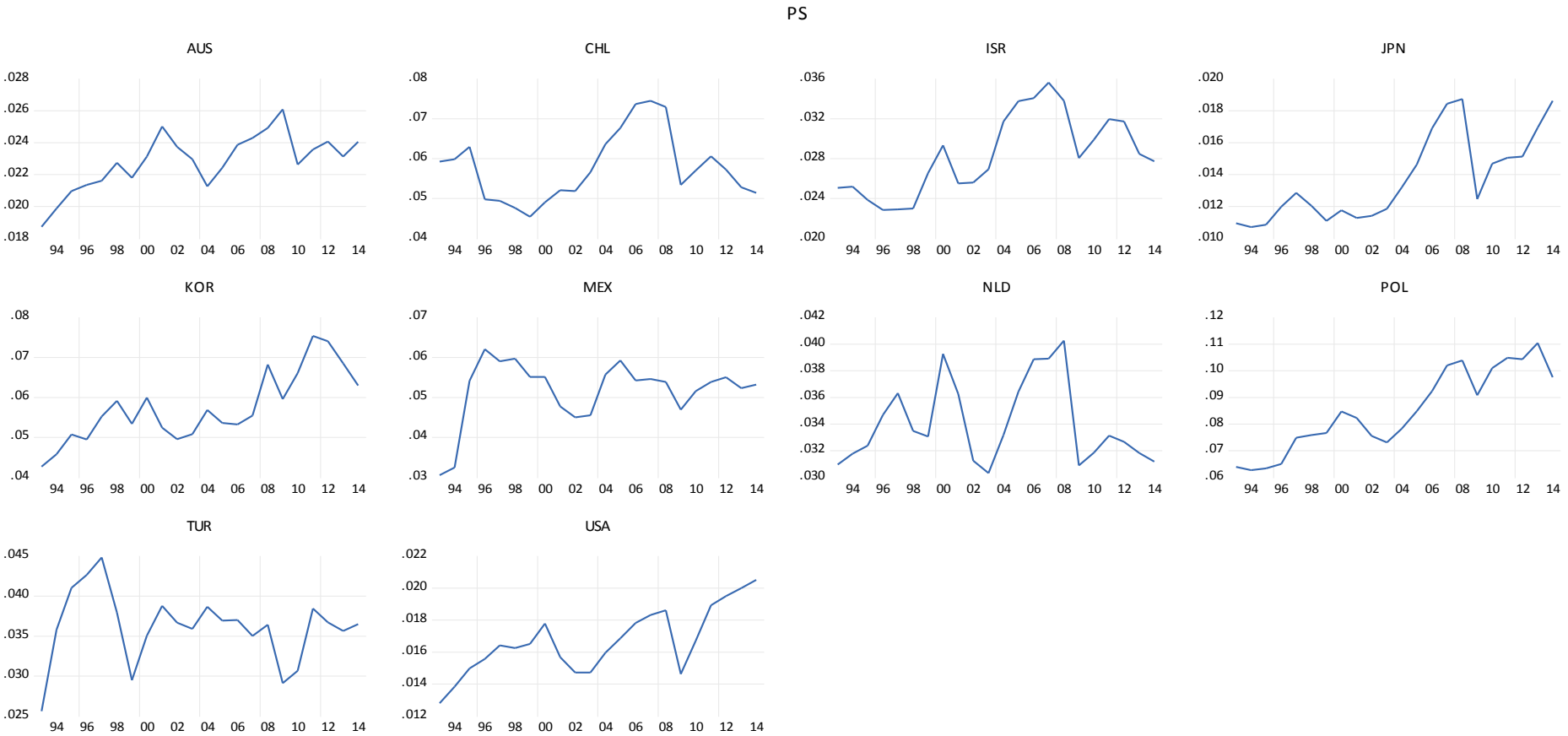
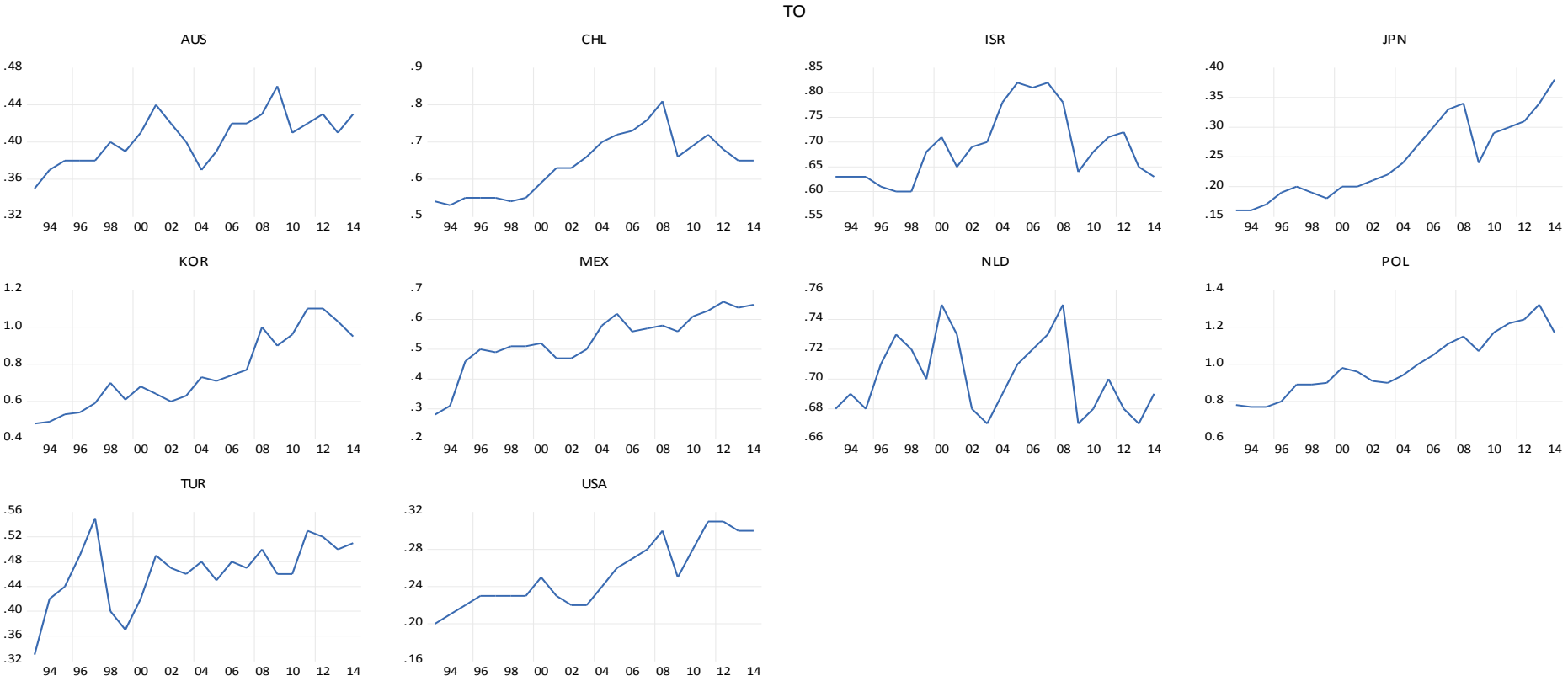


Figure 8: Trade openness Graphs



Appendix B: GMM Estimation Results

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:18
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 7 iterations
Instrument specification: C LFS LFD
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.42908	0.139562	74.72692	0.0000
LFS	-0.040585	0.008438	-4.809502	0.0000
LFD	0.049920	0.017295	2.886436	0.0043
AR(1)	0.956729	0.011301	84.66142	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.998885	Mean dependent var	9.959705
Adjusted R-squared	0.998817	S.D. dependent var	0.723189
S.E. of regression	0.024877	Sum squared resid	0.121917
Durbin-Watson stat	1.829949	J-statistic	20.82178
Instrument rank	15	Prob(J-statistic)	0.000030

Inverted AR Roots .96

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:17
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 7 iterations
Instrument specification: C LFS LFD LTO
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.44042	0.143370	72.82170	0.0000
LFS	-0.040247	0.008444	-4.766536	0.0000
LFD	0.050537	0.017298	2.921464	0.0039
LTO	0.023026	0.022434	1.026401	0.3060
AR(1)	0.957287	0.011533	83.00053	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.998891	Mean dependent var	9.959705
Adjusted R-squared	0.998817	S.D. dependent var	0.723189
S.E. of regression	0.024873	Sum squared resid	0.121263
Durbin-Watson stat	1.836289	J-statistic	20.84650
Instrument rank	17	Prob(J-statistic)	0.000113

Inverted AR Roots .96

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:17
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 7 iterations
Instrument specification: C LFS LFD LTO LGE
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.30725	0.224800	50.29925	0.0000
LFS	-0.046850	0.007592	-6.171363	0.0000
LFD	0.078528	0.015951	4.922976	0.0000
LTO	-0.014339	0.020682	-0.693314	0.4889
LGE	-0.275530	0.039057	-7.054534	0.0000
AR(1)	0.965015	0.009660	99.89286	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999116	Mean dependent var	9.959705
Adjusted R-squared	0.999052	S.D. dependent var	0.723189
S.E. of regression	0.022267	Sum squared resid	0.096682
Durbin-Watson stat	1.745499	J-statistic	13.59700
Instrument rank	19	Prob(J-statistic)	0.008699

Inverted AR Roots .97

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:15
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 8 iterations
Instrument specification: C LFS LFD LTO LGE LPL
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.31551	0.254876	44.39607	0.0000
LFS	-0.042417	0.007343	-5.776566	0.0000
LFD	0.079391	0.015269	5.199476	0.0000
LTO	0.009137	0.020552	0.444569	0.6571
LGE	-0.250431	0.037815	-6.622485	0.0000
LPL	0.077520	0.018200	4.259377	0.0000
AR(1)	0.968362	0.010092	95.95013	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999191	Mean dependent var	9.959705
Adjusted R-squared	0.999129	S.D. dependent var	0.723189
S.E. of regression	0.021345	Sum squared resid	0.088389
Durbin-Watson stat	1.641012	J-statistic	10.04569
Instrument rank	21	Prob(J-statistic)	0.073951

Inverted AR Roots .97

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:15
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 9 iterations
Instrument specification: C LFS LFD LTO LGE LHC LPL
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.713393	0.457164	16.87226	0.0000
LFS	-0.041112	0.007070	-5.814963	0.0000
LFD	0.077950	0.014802	5.266340	0.0000
LTO	0.024806	0.020050	1.237174	0.2175
LGE	-0.244127	0.036634	-6.663847	0.0000
LHC	2.675635	0.381472	7.013968	0.0000
LPL	0.088389	0.017462	5.061725	0.0000
AR(1)	0.917917	0.020188	45.46808	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999275	Mean dependent var	9.959705
Adjusted R-squared	0.999215	S.D. dependent var	0.723189
S.E. of regression	0.020268	Sum squared resid	0.079282
Durbin-Watson stat	1.663722	J-statistic	8.797849
Instrument rank	23	Prob(J-statistic)	0.185270

Inverted AR Roots .92

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/25/19 Time: 16:10
Sample (adjusted): 1994 2014
Periods included: 21
Cross-sections included: 10
Total panel (balanced) observations: 210
2SLS instrument weighting matrix
Convergence achieved after 9 iterations
Instrument specification: C LFS LFD LTO LGE LHC LPS LPL
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.725672	0.462291	16.71170	0.0000
LFS	-0.040578	0.007072	-5.737628	0.0000
LFD	0.077867	0.014777	5.269647	0.0000
LTO	0.202519	0.145032	1.396375	0.1642
LGE	-0.428449	0.153389	-2.793211	0.0057
LHC	2.670755	0.385131	6.934659	0.0000
LPL	0.087054	0.017470	4.983179	0.0000
LPS	-0.181494	0.146650	-1.237600	0.2174
AR(1)	0.918969	0.020061	45.80943	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999280	Mean dependent var	9.959705
Adjusted R-squared	0.999217	S.D. dependent var	0.723189
S.E. of regression	0.020240	Sum squared resid	0.078655
Durbin-Watson stat	1.661087	J-statistic	9.106982
Instrument rank	25	Prob(J-statistic)	0.245066

Inverted AR Roots .92

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/27/19 Time: 08:39
Sample (adjusted): 1994 1998
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50
2SLS instrument weighting matrix
Convergence achieved after 24 iterations
Instrument specification: C LFS LFD LPS LPL LHC
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.978764	1.707604	4.086876	0.0003
LFS	-0.051865	0.018059	-2.871959	0.0072
LFD	0.133889	0.048235	2.775770	0.0091
LTO	0.076043	0.435227	0.174721	0.8624
LGE	-0.429574	0.441202	-0.973644	0.3375
LHC	3.026629	1.567936	1.930327	0.0625
LPL	0.085344	0.080139	1.064944	0.2949
LPS	-0.241342	0.418668	-0.576451	0.5683
AR(1)	0.773825	0.150459	5.143091	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999265	Mean dependent var	9.775467
Adjusted R-squared	0.998874	S.D. dependent var	0.761044
S.E. of regression	0.025538	Sum squared resid	0.020870
Durbin-Watson stat	2.064380	J-statistic	5.884081
Instrument rank	23	Prob(J-statistic)	0.317662

Inverted AR Roots .77

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/27/19 Time: 08:40
Sample: 1998 2004
Periods included: 7
Cross-sections included: 10
Total panel (balanced) observations: 70
2SLS instrument weighting matrix
Convergence achieved after 9 iterations
Instrument specification: C LFS LFD LPS LPL LHC
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.564652	1.250873	5.248055	0.0000
LFS	-0.042695	0.011340	-3.765072	0.0004
LFD	0.061457	0.022546	2.725888	0.0087
LTO	-0.176140	0.411828	-0.427704	0.6706
LGE	-0.195348	0.419607	-0.465551	0.6435
LHC	3.925667	1.093000	3.591644	0.0007
LPL	0.077096	0.031721	2.430449	0.0186
LPS	0.165373	0.412270	0.401128	0.6900
AR(1)	0.791799	0.073212	10.81510	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999546	Mean dependent var	9.898129
Adjusted R-squared	0.999397	S.D. dependent var	0.741953
S.E. of regression	0.018218	Sum squared resid	0.017259
Durbin-Watson stat	1.672461	J-statistic	8.450805
Instrument rank	23	Prob(J-statistic)	0.133079

Inverted AR Roots .79

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 07/08/19 Time: 08:48
Sample: 2004 2009
Periods included: 6
Cross-sections included: 10
Total panel (balanced) observations: 60
2SLS instrument weighting matrix
Convergence achieved after 20 iterations
Instrument specification: C LFS LFD LHC LPL
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.989705	0.887153	7.878807	0.0000
LFS	0.032765	0.034839	0.940478	0.3524
LFD	0.016494	0.063466	0.259880	0.7962
LTO	1.005008	1.327302	0.757181	0.4532
LGE	-0.859226	1.227858	-0.699777	0.4879
LHC	3.504343	1.010324	3.468533	0.0012
LPL	0.135543	0.070396	1.925437	0.0610
LPS	-0.612654	1.285646	-0.476534	0.6362
AR(1)	0.472568	0.148019	3.192611	0.0027

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.998950	Mean dependent var	10.02814
Adjusted R-squared	0.998525	S.D. dependent var	0.701921
S.E. of regression	0.026958	Sum squared resid	0.030523
Durbin-Watson stat	1.801585	J-statistic	5.990759
Instrument rank	22	Prob(J-statistic)	0.199839

Inverted AR Roots .47

Dependent Variable: LGDP
Method: Panel Generalized Method of Moments
Date: 06/27/19 Time: 08:43
Sample: 2009 2014
Periods included: 6
Cross-sections included: 10
Total panel (balanced) observations: 60
2SLS instrument weighting matrix
Convergence achieved after 11 iterations
Instrument specification: C LFS LFD
Constant added to instrument list
Lagged dependent variable & regressors added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.367927	0.943210	8.871758	0.0000
LFS	-0.026855	0.028436	-0.944387	0.3504
LFD	0.042813	0.061106	0.700636	0.4874
LTO	-0.066545	0.330297	-0.201470	0.8413
LGE	-0.355580	0.304459	-1.167908	0.2494
LHC	2.741535	0.755424	3.629135	0.0008
LPL	-0.021869	0.063347	-0.345220	0.7317
LPS	0.154676	0.315572	0.490144	0.6266
AR(1)	0.678424	0.094145	7.206183	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999698	Mean dependent var	10.11081
Adjusted R-squared	0.999576	S.D. dependent var	0.660373
S.E. of regression	0.013594	Sum squared resid	0.007762
Durbin-Watson stat	2.029882	J-statistic	2.094432
Instrument rank	20	Prob(J-statistic)	0.350913

Inverted AR Roots .68

Appendix C: Literature Table

Authors	Sample	Variables	Method used	Main findings
Kul B. Luintel Mosahid Khan Philip Arestis Konstantinos Theodoridis (2008)	A panel of 14 countries from 1976 to 2005	GDP, Gross Fixed Investment , GDP deflator , Population, Stock Market Capitalization Ratio, Stock Market Total Value Traded Ratio, Stock Market Turnover Ratio, Private Credit Ratio	OLS and panel co integration	Irrelevancy of financial structure to GDP Cross country heterogeneity among financial development, structure, and GDP
Chih-ChuanYeh Ho-Chuan (River)Huang Pei-ChienLin (2013)	A panel of 40 developed and developing countries from1960 to 2009	real per capita GDP growth rate, FS-Activity, FS-Size, FS-Efficiency	ARDL	Economic growth and financial structure are cointegrated and positive long run relationship was found
Kul Luintel Mosahid Khan Roberto Leon-Gonzalez Guangjie Li (2016)	Panel of 69 countries from 1989 to 2011	Financial development, financial structure, GDP, Gross Fixed Capital Formation, GDP deflator, purchase power parity, exchange rate and population	DOLS and panel cointegration	Market based financial structure promotes economic growth better than bank based systems
Thorsten Beck HansDegryse ChristianeKneer (2014)	a Panel of 77 countries from 1980 to 2007	GDP growth, volatility of GDP growth, size of the financial sector, Intermediation, Non-intermediation, Education, Initial GDP, inflation, openness, exports, imports, government consumption, employment, share hour, compensation share	OLS	Intermediation activities boost economic growth and decreases the volatility real sector is not affected by the size of the intermediary activities

O. Emre Ergungor (2008)	a panel of 46 countries from 1980 to 1995	GDP growth, capital stock, productivity growth, financial development, financial structure, Formalism, Inflexibility, Inflation, Manufacturing capital, trade, corruption , legal efficiency, law and order tradition, property rights, schooling years, shareholders rights index	2SLS	Financial development promotes economic growth, bank based systems are best fitted in countries with inflexible law system
Ali A.Bolbol AytenFatheldin Mohammed M.Omran (2005)	Egypt from 1974 to 2002	GDP, growth rate, total factor productivity, real per capita income growth, budget deficit, external debt, real effective exchange rate, external debt, international reserves, real interest rate, domestic credit, private investment, national savings,	OLS	Positive relationship between market based system and total factor productivity and negative relationship between bank based system and total factor productivity
Jakob B.Madsen Md.Rabiul Islam Hristos Doucouliagos (2018)	A panel of 21 OECD countries from1870to 2011	Net Gini coefficient, Top 10% income shares, Communist influence, Private savings ratio, Non-residential investment ratio, Gross enrollment rate, Patent applications by domestic residents, Financial development, Contract-intensive money, Age dependency ratio, Real interest rate, Tobin's *q*, Life expectancy at age 10,	2SLS	High level of financial development reduces the inequality effects on economic growth

		Patent stock , R&D intensity		
Yaofu Ouyang Peng Li (2018)	A panel of 30 Chinese provinces from 1996 to 2015	GDP, energy consumption, financial development	GMM panel VAR	Negative effect of financial development on economic growth
Michael Batuo Kupukile Mlambo Simplice Asongu (2018)	A panel of 41 African countries from 1985 to 2010	Financial instability, financial development, GDP growth, terms of trade, inflation rate, government size, output gap, capital account openness, domestic credit to private sector, money and quasi money, real interest rate, interest rate spread,	GMM	Financial development and liberalization have a positive effect on financial instability, and negative relationship between financial instability and economic growth
Jose L. Ruiz (2018)	A panel of 116 countries from 1991 to 2014	GDP, Bank credit to private sector, Domestic credit to private sector, Government expenditure, Gross capital formation, Inflation, Initial income, Insurance companies , Mutual funds, openness, pension funds, population	OLS	Positive effect of institutional investors on economic growth
Muazu Ibrahim Paul Alagidede (2018)	A panel of 29 sub-Saharan countries from 1980 to 2014	GDP, government expenditure, inflation, trade openness, labor, capital formation, secondary school enrolment, primary pupil teacher ratio, private credit, domestic credit,	2SLS	Positive effect of financial development on economic growth
Rudra P. Pradhan	A panel of 49	GDP, composite innovation index,	Panel granger	Financial innovation and

Mak B. Arvin Sahar Bahmani (2018)	European countries from1961 to 2014	financial innovation, financial development index	causality, FMOLS, DOLS	development are positively correlated with economic growth
Shah Saud Songsheng Chen Danish Abdul Haseeb (2019)	A panel of 59 countries from 1980 to 2016	GDP, environmental quality, financial development, foreign direct investment, trade openness, electricity consumption	DSUR, Westerlund cointegration test	Bi-directional causality was found among economic growth and all independent variables
Lei Pan Vinod Mishra (2018)	China from January 1999 to November 2015	Industrial production index, market capitalization of A shares and B shares in Chinese stock markets,	ARDL	Negative impact of stock market on economic growth
Chung-Hua Shen Xingyu Fan Dengshi Huang Hongquan Zhu Meng-Wen Wu (2018)	A panel of 48 countries from 1998 to 2014	GDP, bank deposits to private sector, liquidity liabilities, stock market capitalization ratio, stock traded, stock market turnover ratio, government expenditure, total investment	LSDVC LTS	Positive effect of bank and market development on economic growth
Jagadish Prasad Bist (2018)	A panel of 16 countries from 1995 to 2014	GDP, Credit to the private sector, financial development, capital formation, trade openness, consumer price index, labor force	DOLS FMOLS	Positive long run relationship between financial development and economic growth and also long run cointegration was found among two
Franklin Allen Laura Bartiloro Xian Gu	A panel of 108 countries from 1972 to 2015	Financial development (Privet credit, stock market capitalization, stock market value traded), financial structure (size, activity,	OLS GMM	Positive relationship between financial structure and economic structure

Oskar Kowalewski (2018)		efficiency, structure, aggregate), economic structure(agriculture and industry value added, industry to service value added), legal origin, creditor rights, debt contract enforcement, government effectiveness, culture (religion, banking crises, systemic banking crises)		
Shigeki Ono (2017)	Russia From 1999 to 2014	Money supply, outstanding bank loans, GDP, exchange rate, oil production		Found support for demand following hypothesis and economic growth granger causes bank lending
Naeem Muhammad Abu Reza Mohammad Islam Hazem A. Marashdeh (2015)	A panel of GCC countries from 1975 to 2012	GDP, foreign direct investment, trade, government expenditure, capital formation, inflation rate, oil production	Fixed and random effect GMM	Positive relationship among foreign direct investment, financial development variables, oil production and GDP
Tibebe A. Assefa André Varella Mollick (2017)	A panel of 15 African countries from 1995 to 2010	Real GDP growth, Trade Openness, Openness, Stock return volatility, Stock return volatility, Stock market capitalization, Primary Enrolment Rate, Gross Capital Formation, Discount rate, Inflation	SGMM FEM	Positive effect of foreign direct investment on GDP
Krishna Murari (2017)	A panel of 5 south Asian middle income countries from 1980	GDP, domestic credit by banking sector, money supply, capital formation, inflation, net foreign direct investment inflow,	Panel cointegration	Strong positive relationship between financial development and economic growth

	to 2013	domestic credit to private sector		
Kojo Menyah Saban Nazlioglu Yemane Wolde-Rufael (2014)	21 African countries From 1965 to 2008	GDP, trade openness, financial development variables(bank liquid reserves to bank asset ratio, domestic credit provided by banks, domestic credit to private sector, interest spread, liquid liabilities, money and quasi money, quasi liquid liabilities, bank concentration)	Panel Granger causality	No impact of financial development on economic growth
Nahla Samargandi Jan Fidrmuc Sugata Ghosh (2014)	Saudi Arabia from 1968 to 2010	GDP, government expenditure, investment share, oil price, inflation, trade openness, financial development measures (M2, M3, credit to private sector)	ARDL	Positive relationship between financial development and growth in non-oil sector, negative/zero relationship between financial development and GDP
Rym Ayadi Emrah Arbak Sami Ben Naceur Willem Pieter De Groen (2014)	A panel of Countries in SEMC and the EU-MED from 1985 to 2009	GDP, inflation , financial, the composite index, capital flow, net foreign direct investment, portfolio investment, openness index, financial development measures (bank credit to private sector, share of bank deposits, banks meta efficiency, stock market capitalization, stock market total value traded, stock market turnover ratio,	GMM	Negative relationship among financial development measures and GDP
Guglielmo Maria Caporale	A panel of 10 newly	domestic credit to the private sector,	GMM	Limited contribution of stock and

Christophe Rault Anamaria Diana Sova Robert Sova (2014)	joined EU members from 1994 to 2007	General government expenditure, Secondary school enrollment ratio, Inflation, average consumer prices, Investment, Interest margin rates between lending and deposit, Liquid Liabilities, GDP, Reform index of financial institutional development, Stock market capitalization, Trade openness		credit market to economic growth due to lack of financial depth
Everlyne Ngare Esman Morekwa Nyamongo Roseline N. Misati (2014)	A panel of 36 countries from 1980 to 2010	GDP, real growth rate, government expenditure, trade openness, inflation, gross investment, human capital, quality of institutions	Granger causality	Stock market existence foster economic growth, the more developed is the stock market the lower the growth rate of that country, overall positive relationship between financial development and economic growth
Xianming Fang Yu Jiang (2014)	Chinese provinces from 1998 to 2011	Financial development measures (insurance, banking, and securities), industry outputs, balance of bank loans, market capitalization, premium income level of provinces, number of employees	Spatial regression	Banking and insurance sectors have significant effects on economic growth while effects of securities market is not certain
Rudra P. Pradhan,	A panel of 31 OECD	Broad money supply, claims on assets,	Panel cointegration	Banking sector development

B. Mak Arvin, Neville R. Norman Yasuyuki Nishigaki (2014)	countries from 1960 to 2011	domestic credit provided by banks, domestic credit to private sector, liquid liabilities, inflation rate, GDP	and granger causality	granger causes economic growth and long run equilibrium among variables were found
Dilek Durusu-Ciftci M. Serdar Ispir Hakan Yetkiner (2017)	A panel of 40 countries from1989 to 2011	Credit market development, GDP, stock market development, population, rate of technology growth, and rate of depreciation	AMG CCE	Both credit development and market development have positive long run relationship with GDP
Rudra P. Pradhan B. Mak Arvin John H. Hall Mahendhiran Nair (2016)	A panel of 18 EU countries from 1961 to 2013	GDP, innovation measures (patents by residents, patents by non-residents, patents by residents and non-residents, research and development expenditure, research engaged in research and development expenditure), financial development index	VECM Granger causality	Development of financial sector enhances the innovation and economic growth
Laura Cojocaru Evangelos M. Falaris Saul D. Hoffman Jeffrey B. Miller (2012)	A panel of 15 CEE countries from 1990 to 2008	GDP, interest Rate Spread, overhead cost, bank concentration, private credit, domestic credit, initial GDP, secondary school enrollment	GMM	Negative effect of bank credit and interest rate spread on economic growth
Jin Zhang Lanfang Wang Susheng Wang (2012)	A panel of 286 Chinese cities from 2001 to 2006	GDP, financial development measures (total credit, total deposits, total savings, loans financed with local banks, rate of total deposits of corporations in banks), initial GDP per capita, human capital,	GMM OLS	Positive relationship between Financial development measures and economic growth

		fixed asset investments, economic reform proxy, consumer price index, foreign direct investment, government expenditure, information transmission, local infrastructure		
Abdul Jalil Mete Feridun (2011)	Pakistan From 1975to 2008	GDP, capital formation and trade, broad money, deposits, credit to private sector, liquid liabilities, real interest rate, investment flow, capital series	PCM ARDL	positive impact of financial development on economic growth
Manoel Bittencourt (2012)	4 Latin American countries from 1980 to 2007	GDP, liquid liabilities, private bank credit, claims on bank deposits, stock market capitalization, government expenditure, investment, openness, schooling rate, urbanization rate, political transitions, government debt, external debt, inflation tax	POLS	Finance promotes investors to invest in productive activities therefore it leads to economic growth
Philip Arestis Ambika D. Luintel Kul B. Luintel (2010)	6 countries from 1962 to 2000	GDP, fixed investment, total loans provided by deposits, population, market capitalization, financial structure	VAR, VECM	Financial structure has a positive effect on economic growth
Salih Turan Katircioglu Neslihan Kahyalar Hasret Benar	India from 1965 to 2004	RGDP, financial development measures (broad money, domestic credit), trade openness measures (total exports , total	Granger causality	Long run relationship between financial development, international trade and real income growth

(2007)		imports)		
Samy Ben Naceur Samir Ghazouani (2007)	An unbalanced panel of 11 MENA countries	GDP, Market capitalization ,Value traded, Turnover, Stock market index, Credit to private sector, Liquid liabilities, Bank development index, Initial income per capita, Trade openness, Foreign direct investment, Black market premium, Inflation rate, Government consumption, Oil prices, Political turmoil, Financial crises, Legal system	GMM	No relationship between financial market development and bank development with economic growth
Chuck C Y Kwok Solomon Tadesse (2006)	A panel of 41 countries from 1980 to 1995	GDP, banking assets, banking assets as a share of GDP, equity market capitalization, equity market capitalization as a share of GDP, architecture-size, architecture-activity, architecture-efficiency, common law dummy, shareholder protection, legal inflexibility, inflation, trade openness, revolution, assassinations, corruption, accounting standards, institutions index	OLS	The more uncertain is the country's avoidance the more likely they follow a bank based financial system
James B. Ang Warwick J. McKibbin (2007)	Malaysia from 1960 to 2001	liquid liabilities, GDP, commercial bank assets to total commercial and central bank assets, domestic credit to private sector,	VECM, granger causality	Economic growth leads to development in financial sector

		index for financial repression		
Ross Levine (2002)	48 countries from 1980 to 1995	Assassination, bank credit ratio, black market premium, bureaucratic efficiency, Civil liberties, corruption, C rights, Government, inflation rate, initial income, legal origin, market capitalization ratio, overhead costs, private credit ratio, revolutions and coups, rule of law, schooling, S rights, total value traded, trade	OLS	No support for bank based or market based financial structure