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THE IMPACT OF FINANCIAL DEVELOPMENT ON ECONOMIC GROWTH:
EVIDENCE FROM OECD COUNTRIES

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FİNANSAL GELİŞİMİN EKONOMİK BÜYÜME ÜZERİNDEKİ ETKİSİ:
OECD ÜLKELERİNDEN KANITLARAR

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PREFACE

I would like to give my appreciation to my advisor Assoc. Prof. Serda Selin Ozturk for assistance, tolerance, and deliberation. She was accessible, and helpful all the time during my thesis process. Indeed, this thesis would not be able to come out without her and her help.

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Last but not least, I dedicate the thesis to my daughter which is my world. She is the source of my energy and the backbone of my soul. Even though she does not understand how significant work she did with only look at my eyes now, eventually the time will tell her everything that she did in the past.

CONTENTS

LIST OF ABBREVIATIONS

FE	Fixed Effect
GDP	Gross Domestic Product
OLS	Ordinary Least Squares Regression
RE	Random Effect

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ABSTRACT

Financial development is a crucial factor for all countries because it directly affects economic development, which means that it affects every single unit of a country. More than that, financial development is the pillar of a country's independence. This is why it encourages economic growth in terms of capital appreciation, technological progress, production, and investment. Thus, the question of how increasing financial developments in the post-globalization period and, which channels affect economic growth has been a topic that has been explored for a long time. While empirical studies often establish a direct link between indicators that provide financial development and growth, discussions continue on how these results should be interpreted. This study tries to shed light on this relationship with OECD countries. While doing this, the panel data analysis method was used, and the findings obtained as a result of the study show the existence of a significant relationship.

Keywords: OCED Countries, Financial Development, Economic Growth, Random And Fixed Effect, Hausman Test

ÖZET

Finansal gelisme direk olarak ulkelerin her birimini etkiledigi icin cok onemli bir faktordur.Ayrica, finansal gelisme bir ulkenin bagimsizliginin temelidir. Bu sebeble, finansal gelisme sermaye artisini, teknolojik ilerlemeyi, uretimi ve yatirimi destekler. Bu nedenle küreselleşme sonrası dönemde artan finansal gelişmelerin nasıl ve hangi kanallardan ekonomik büyümeyi etkilediği sorusu uzun süredir araştırılan bir konu olmakla birlikte araştırmacılar farklı sonuçlar etmesi bu ilişkiye dair araştırmaların artmasını teşvik etmiştir. Ampirik çalışmalar genellikle finansal gelişmeyi sağlayan göstergeler ile büyüme arasında doğrudan bir ilişki kurarken, bu sonuçların nasıl yorumlanması gerektiğine dair tartışmalar devam etmektedir. Bu çalışma, OECD ülkeleri temel alınarak bu ilişkiye ışık tutmaya çalışmaktadır. Bunu yaparken, panel data analizi metodu kullanılmış ve çalışma sonucunda elde edilen bulgular, anlamlı bir ilişki varlığını göstermektedir.

Keywords: OECD Ülkeleri, Finansal Gelişim, Ekonomik Gelişme, Rastgele Ve Tesadüf Efekt Model, Hausman Test

INTRODUCTION

The long-term growth phenomenon, which is one of the most important issues of the economic literature, has been tried to be explained by using analytic models. Models are classified according to the internal and external nature of the variables (usually the capital, labor, and productivity) used to explain growth. Financial innovations affect the growth dynamic through credit channels. At the same time, the fact that savings contribute to growth by converting into investments is directly related to financial intermediation activities. For this reason, in the growth literature, the financial development level variable has been increasingly used in economic growth models recently. Some authors have included the level of financial development as a variable that affects productivity or the movement of capital (Graff and Karman, 2006). Some authors, on the other hand, considered the level of financial development in their models as an explanatory variable that directly affects growth, and investigated the direct relationship between financial development level and growth. The empirical relationship between liberalization and development and growth in the financial markets after the 1980s first started with the cross-country analysis of King and Levine (1993). Later, this relation was repeated with many other studies and in many studies, a strong relationship was found between financial development and economic growth (Kim, et al. 2010).

The level of development of the financial system is determined by the role it plays in effectively directing the created savings to investments. Any improvement in the financial system facilitates a more efficient distribution of resources by enabling savings owners to diversify their portfolios. In this case, the development is measured by the full and efficacious operation of the financial system, and by directing scarce resources to accurate and efficient investment projects. What's more, an improved

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financial system strengthens the flow of information between the borrower and the lender and provides diversification of risk by offering more products to both savings owners and investment entrepreneurs. Thus, the credit system works more effectively.

In line with what the financial liberalization theory advocates, in order for financial development to occur, a system free from financial pressure and control must be established. In an economy where capital movements are fully liberated, banks and institutions can borrow from abroad without any restrictions. As stated in Kaminsky and Schmukler (2003), the fully liberalized local financial system is implemented by removing controls on borrowing and lending rates, removing credit benefits to certain sectors, and gaining the freedom to hold deposits in foreign currency. Full liberalization in stock markets is also accomplished when foreigners do not encounter difficulties in the number of stocks they hold, and the transfer of earnings and interest payments earned in the homeland. The theory of financial pressure on governments interfering with financial markets and preventing them from functioning effectively was first analyzed in the studies of McKinnon (1973) and Shaw (1973). Considering that the developed financial system is the cause of higher growth rates, the connection between financial liberalization and many other variables that provide financial development is tried to be found through empirical studies. Hermes (1994) stated that financial development and deepening caused by the financial liberalization provided economic growth; Rajan and Zingales (2003) found that openness of foreign trade, especially liberal capital movements, contributed to the development of financial institutions (Kim et al., 2010). Another group of economists, such as Buffy (1984), Taylor (1983), and Van Wijnbergen (1983), argue that the financial system has become more fragile and the credit markets are narrowing, as opposed to the wider literature on this issue (Vuranok, 2009).

CHAPTER 1

1. ECONOMIC GROWTH

Growth theory is generally used for developed countries and development theory is a concept used for developing or transition countries (Wan, 1971). However, it is a fact that economic growth is necessary for economic development, which is the expression of radical changes and structures in the economic structure. Many issues such as technological development, research and development activities, education, and health services, which are the main engines of development, need more income. Therefore, economic growth, which expresses the increase in income, is essential for development. Providing and maintaining economic development and growth is the primary goal for every country, whether developed or developing. Countries that have achieved their economic development and growth are constantly making arrangements and developing policies in their economies to ensure the continuity of this situation, and the developing ones to achieve their economic growth and development.

Economic growth is a developed concept as a result of differences that emerge between the countries' economic development levels. Due to the struggles of the countries, whose post-war economies deteriorated, to regain their former level, the development efforts of the countries that have gained their independence and the economies that adopt the socialist system, the development, and growth desire to reach and pass through the economically capitalist system has been paid much attention. The large differences between per capita income levels between developing countries and developed countries in the said period also increased sensitivity to growth. Research

on economic growth has raised the question of why some countries are richer than others or some economies are growing faster than others.

Economic growth is defined as the continuous increase of scarce resources such as manpower, capital equipment, natural resources, and technology and knowledge, in an economy and in a certain period (usually in a year), to provide real income growth per capita (Ülgener, 1980: 409). Growth is an increase in quantity, weight, and volume (Özgüven, 1988: 36). Economic growth is basically a concept related to increases in a country's production capacity or potential and the results of these increases. The increase in the output depends on the number of production factors or the quality of production. Economic growth; short-term business cycles due to the increase in capacity utilization rates depending on the increase in demand, either when the economy is in full employment conditions, in the long and medium-term based on the expansion of the existing production capacity as a result of the addition of new production factors or technological development to the economy-based production increases (Berber, 2006).

Unlike the cyclical theory, economic growth is concentrated in long-term trends, or unlike the inflation theory, it is not only concerned with indicative increases in prices. As in other areas of the economy, there are positive and normative branches in growth. Positive growth theory works on how the world will grow; normative growth theory works on how the world should grow. This concept was later called "optimal growth theory" (Wan, 1971).

Kuznets recognizes the economic growth of a country as a long-term increase in its capacity to supply different economic goods to its population. This growing capacity should be based on advanced technology, systems, and political regulations. According

to Kuznets, the characteristics representing the growth process in developed countries are as follows (Todaro, 2000):

1-High rate of increase in total factor productivity, especially labor productivity,

2-The rapid growth of population and per capita production,

3-High rate of structural change in the economy,

4-High rate of social and ideological change,

5-Ability to reach other parts of the world for the raw materials and markets needed by developed countries,

6-This economic growth has a small effect on the third world population, that is, it spreads to a very small population.

Historically, economic growth has increased significantly over the past two centuries. One of the most important reasons is the prosperity and continuous progress that came with the Industrial Revolution, that is, the increase in income. This situation is shown in Figure 1. Hence, GDP per capita, as well as the population, showed a serious increase after the 1800's. Although the population growth rate was higher than the per capita GDP growth rate at the beginning of this period, by the 2000s the per capita GDP growth rate exceeded the population growth rate.

Figure 1: World GDP per capita

Index (1.0 in initial year)
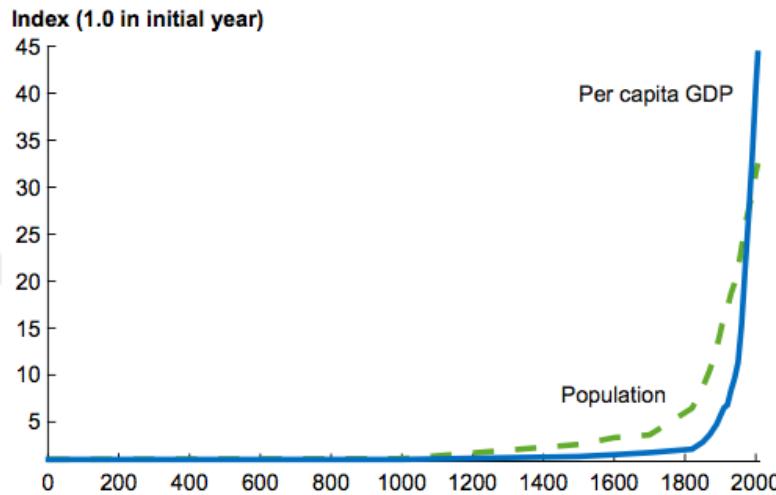
1.1 Historical Development of Economic Growth Theories

Economical thought can be broadly divided into three stages: Pre-modern (Greek, Roman, Arab), Early modern (mercantilist, physiocrats), and Modern (since Adam Smith in the late 18th century). Systematic economic theory has developed since the dawn of the modern age.

Economics has been under scrutiny in some ways since ancient times. Some ancient philosophers have made various economic observations. Among, Aristotle is probably the most important. Medieval Arabs also contributed to the understanding of the economy. In particular, Ibn Khaldun wrote articles on economic and political theory. For example, he explored how population density relates to the division of labor that leads to economic growth and thus, a larger population.

In the medieval and early renaissance period, economic policies in Europe considered their economic activity as a commodity, which was taxed to raise the income of the

nobility and the church. Economic shifts are regulated by feudal rights, such as the right to collect wages for poor people, as well as guild restrictions and religious restrictions on lending. Economic policy is designed to promote trade in a particular area. Owing to the importance of social class, laws on the dress and housing arrangements, including allowed styles, materials, and frequency of purchases, have been enacted. Niccolo Machiavelli is the first author to advise on economic policy, which states that principles and republics limit spending and prevent the wealthy or the public from wasting the other. In this way, a state will be seen as "generous" because it did not impose a heavy burden on its citizens.

In the Early Modern period, mercantilists were close to establishing the economic theory with a certain framework. This different school reflected the emergence of nation-states in Western Europe and emphasized the importance of maintaining a positive balance of payments.

Mercantilism, above all, represents the economic strategies widely declared by the European nation-states in the early capitalist period, and possibly some Asian states in the 20th and 21st centuries. Classical economics was both a reaction to capitalism and synthesis of thought, which was the basis of both capitalism and agricultural systems, as understood in Europe in the 18th century. For this reason, mercantilist economists were writers who supported political strategies that lived in Europe during this period. Thus, mercantilists regarded national wealth as liquid and internationally accepted values (than gold or silver) rather than consumable goods and services. Since this wealth was provided by the trade surplus balance, the state then assumed the role of creating conditions in the local economy in a way that would give it an export advantage (Rankin 2011).

Although Merkantalism tries to create a compact economic framework, they are not accepted as an "economy school" by many researchers. At this point, physiocracy is the first approach that is considered a school. The term physiocracy means the law or the rule of nature. It originated from a compilation written by François Quesnay and published in two volumes in 1767-1768. The school was extremely influential on economic policy issues in France during the period of Louis XV reigned from 1756 to the early 1770s. The most important contribution to the economy is Tableau économique. It involves the first attempt to define the processes of production, distribution, sharing of the riches of a country with two major sectors of the economy (production and manufacturing) and three social classes in a plan. These three classes are the proprietor class and the production class, that is farmers and handicrafts. (Steckel, 1995: 266)

1.2. Economic Growth Theories

At this point, classical growth theory, Harrod-Domar growth theory, neoclassical growth theory is discussed within the theoretical framework.

1.2.1 Classical Growth Theory

The concepts of growth and development in the classics are defined in the form of productivity increase, production increase, and capital accumulation, and are used in the same sense. Technological change and capital accumulation are considered to be the driving force of growth. XVIII. The realization of the Industrial Revolution in the 19th century created the necessary environment for economic growth. There are three main ways of growth: capital accumulation, division of labor, and mechanization. The factors that will slow growth are the factors that come from the outside rather than from the economy (Özgüven, 1988: 4-5).

According to the classics, in a system where trade is completely free, every country transfers its capital and labor to the most useful areas. This personal effort ensures the best distribution of labor by stimulating industry, rewarding creativity, and using the unique power provided by nature most effectively. It also increases overall efficiency by increasing overall production. It emphasizes the static benefits of foreign trade, such as the classic economic growth theory, effective resource allocation, and economies of scale. The dynamic benefits of foreign trade, such as information and technology transfer, were not taken into account in this theory (Türker, 2007: 41).

The main theorists of the classical growth approach are A. Smith, D. Ricardo, J. S. Mill, and T. Malthus. These were the first steps to model economic growth.

1.2.1 A. Smith's Growth Theory

Smith discussed two different sources of economic growth: one is the increase in specialization, which is directly efficacious, and the other is the economic growth provided by savings and capital accumulation. This fact shows the level of specialization. Specialization is always effective, and all countries benefit from increased comparative advantages and returns to scale. As a result, per capita income has increased (Skaggs, 1999: 481). There are three ways that division of labor and specialization can increase productivity (Smith, 1991):

1-Increasing the skills of each worker increases the amount it can do. On the other hand, the division of labor necessarily improves the skill of the worker, as it reduces everyone's work into a single process and turns this process into the only pursuit of his life.

2-When moving from one job to another, the benefit obtained by saving the time lost is much more than it might be thought at first. When moving from one job to another,

the tools change, the person takes the job slowly, the desire and effort decreases, the efficiency decreases.

3-Everyone has realized how easy it is to use suitable machines. These machines that make the job easier came out as a result of the division of labor.

Improving the skills of each worker can save time lost when moving from one job to another. The increase in the number of machinery and equipment not only reduces the labor force but also reduces its number. Otherwise, an increase in capital is used to support inefficient labor (Skaggs, 1999).

Classical economists explained economic growth within the framework of capitalist ideological assumptions based on class structure. It is talked about an economic growth model shaped by the roles of workers, capitalists, and landowners (those who earn rental income from the land) in the economic process. Classical economists tried to explain economic growth based on the assumption of a production function, in which labor, capital, and arable land were the main factors of production.

1.2.1 D. Ricardo's Theory of Growth

While Ricardo and Malthus support Smith's views, the most important differences are in whether or not economic growth will continue. According to Ricardo, the production of a country can increase in two ways (Ozguven, 1998):

1. A great deal of the income is transferred to the investment, both the amount of production and the value of the product increase. Thus, the welfare level of the country increases. However, this path was initially to cut consumption.

2. Another way is to increase the productivity of the employed labor and increase the production volume. But this time, the excess product needs to be evaluated. This extra product will lower the price.

The second of these two ways can be preferred because the second road maximizes production without restricting consumption. According to Ricardo, capital is the practical information, machinery, raw materials, and savings section used for the production of wealth. Capital increases as saving increases, and growth increases as capital increases (Barkai, 1986: 603-604). As the capital increases, the demand for production increases. According to Ricardo, technology can harm labor demand. Technological change is not the only way to success (Barkai, 1986: 611).

According to D. Ricardo, trade is beneficial, and it is a profitable business to import goods from abroad cheaper. Therefore, free trade is one of the basic elements of growth. Because when every country specializes in the production of the product or service, which is relatively advantageous, and makes free trade with other countries, the resources are used more effectively. All countries participating in the trade benefit from this specialization.

1.2.2 Modern Growth Theories

After the Second World War, the per capita income of developing countries fell. In order to meet the living standards of citizens of developed countries and establish fast-growing standards, the need for innovation has emerged. On the other hand, with the increasing interest in economic growth and the increasing competition among the economic systems, ideological groups formed as communist and non-communist after the war. In addition, the former independent colonies of Africa and Asia have realized that the world's income gap is steadily widening. Many countries have helped to develop underdeveloped economies for ethical reasons (Van Den Berg, 2001).

After classical thought, the Great Depression of 1929 and the above II. The increase in income differences between countries after World War II had an important effect. In this period, the Harrod-Domar model emerged from the theories put forward by Harrod and Domar belonging to the Keynesian school. This model is the model that R. Harrod and E. Domar developed independently in the 1940s and achieved similar results. This approach, which investigates the balanced economic growth conditions, is based on the assumption of fixed capital return on fixed labor and capital use (Sever, 2009). The Harrod-Domar model is based on two important assumptions:

1.Total production is a function of capital accumulation.
2. Capital accumulation depends on total income and saving rate

The Harrod-Domar growth model places capital accumulation in the center of economic growth as the engine of growth, rather than natural resources. Here, investments can affect the economy in two ways. It is the effect that investments will have on income level due to multiplier and production capacity. Growth in the model is explained by the relationship between aggregate demand, production, and employment. It is assumed that the growth rate in the economy will change according to the marginal saving tendency and capital product coefficient. There are three different growth concepts in the model. These; natural growth rate, required growth rate, and actual growth rate. The natural growth rate explains the production increases due to the further expansion of the workforce. The natural growth rate depends on the existence of technological change, the increase of workforce, and the savings and investment behaviors of households and firms (Solow, 1965: 65). The required growth rate is the growth rate in the outputs that are important for entrepreneurs who are planning investments according to the results of economic activities. Third, it gives the actual change in total output.

1.2.3 Neoclassical Growth Theories

Neoclassic, like the classics, express that growth and development is a natural phenomenon that occurs spontaneously and there is no significant difference between them. Classical and neoclassical economists defined development differences between countries as deviations from equilibrium and stated that it was temporary. When an out-of-balance situation occurs in the economy, it can be rebalanced by providing a change in the ratio of capital to products. But this issue is valid only for the long term. In other words, if the Neoclassical growth model does not have long enough, regulations in the capital-product coefficient will not be able to rebalance and lose its function (Sato, 1964). Due to international commodity and capital flows, development differences are considered temporary, deviating from balance, and will disappear. Many growth theories have been developed in neoclassical thinking, but the most accepted is the growth theory of R. Solow.

The neoclassical growth model is the approach that covers the long term and the productivity increase is added to the Harrod Domar model. R. Solow emphasized in his article that the Harrod-Domar model solves the problems with the help of short-term classical analyzes but cannot explain long-term problems. Solow's study is a study that accepts the long-term growth model, although it is based on the Harrod-Domar model outside of the flat rate. Linking the Harrod-Domar model's economic balance on the back of the knife to the assumption that the labor-capital ratio is fixed, Solow states that the problem will be solved by abandoning this assumption (Solow, 1956). Even if the economy leaves little of the natural growth rate, there are problems such as unemployment and continuous inflation as there is no balancing power in the system. The constant acceptance of the capital-labor ratio was the main criticism. Factor ratios in the neoclassical model are flexible and far from all rigidity (Sato, 1964).

Solow defined a production function with production factors that can be constantly replaced. The marginal products of the factors change as they can be continuously substituted. The constant substitution of factors is what makes the Solow model Neoclassical (Van Den Berg, 2006) In the growth model of Solow, there is an analysis of the relationships between savings, capital accumulation, and economic growth. In addition, the relationship between savings, investment and economic growth, and population growth and technological development, which are considered as external variables, is discussed. After comparing three separate production functions, Solow concludes that the Cobb-Douglas production function is more realistic.

In the simple Solow growth model, total revenue is a function of capital and labor:

$$Y \ = \ F \ (K, L) \tag{1}$$

For both production factors, it is assumed that the law of decreasing yields in the short term is valid and in the long term, there is constant return by scale. Unlike Harrod-Domar, since there are two production factors, it can be a substitute between them. Depending on the varying prices that arise according to the scarcity of the two factors, the producers go in the way of substitution. When labor is relatively expensive, capital is used as a substitute factor for the workforce. In the Solow model, the capital-labor rate (K / L) is not constant, it may change. When the increase in capital is greater than the rate of increase in the workforce, a higher level of efficiency is achieved since the amount of capital per workforce will increase (Berber, 2006).

The Solow model is successful in understanding important differences in the wealth of nations. Countries that convert most of their resources into physical capital investment and skill accumulation and effectively use the inputs are rich. Countries that fail in one or more of these areas will reduce their income. However, the Solow model cannot

fully explain why some countries invest more than others, and why they have higher levels of technology and efficiency (Jones, 2001).

Solow's growth model began to be criticized over time. For example, because the model is based on diminishing returns to scale, the economy faces a stable situation where economic growth ends sooner or later. However, in the past 200 years, a large part of the world economy has not experienced a steady decline; there has been an unprecedented process of economic growth. Hence, the existence of the reduced returns predicted in the Solow model has not been proven. Perhaps, the world economic process may have overcome the decline in returns based on the scale of technological innovation (knowledge development, innovation) (Sever, 2009).

According to the neoclassical growth model, if the preferences and technologies are the same in economies, the poor of these economies will grow faster than the rich ones. According to this convergence prediction, while rich countries are growing less rapidly; poor countries close the gap with a higher growth rate. This is called "unconditional convergence". The view that connects the closing of the income gap between poor and rich countries to the various policies that poor countries should follow is expressed as "conditional convergence" (Barro and Martin, 1992). Conditional convergence takes into account economic and political conditions: Economic growth of countries with different political and social structures also varies.

For example, it may be attributed to conditions such as the rapid growth of poor countries, ensuring and sustaining economic and political stability, maintaining domestic and foreign savings deficits at sustainable levels, and controlling fertility rates (Ateş, 1998). In post-war growth movements, after the conditional convergence, education measures, and government policies, the growth rate of the poor countries were faster than the rich (Ventura, 1997)

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CHAPTER 2

2. GENERAL STRUCTURE OF THE FINANCIAL SYSTEM

The financial system as a whole is formed by the unity of many tools, institutions, and markets. Financial institutions; It covers various institutions such as banks, insurance companies, bankers, loan sharks, and exchanges. Financial instruments, on the other hand, cover a wide area where it is found in more holistic instruments such as swaps as well as known instruments such as coins, banknotes, bonds, and stocks.

The financial market is more broadly stated; It is defined as the "institutions that regulate the flows of funds between those who use funds and those who provide funds in a country, the organic tissue consisting of the tools and equipment providing the flow and the legal and administrative rules regulating them" (Tuncer, 1985).

In an economy where investment and savings decisions are made by the units, financial markets provide economic growth by collecting scattered and small amounts of savings and channeling them to investment alternatives that will yield the highest yield, by realizing the efficient use of funds in the country.

The transfer of financial forms takes place through financial assets. Financial assets provide services to the economy by transferring the funds collected from economic units with excess funds to those who will make profitable investments and those who will invest (Champbell, 1993).

Investors or financial intermediaries collect money from firms, government departments, or individuals through direct financial assets. While fund investors can

directly purchase financial assets from borrowers or financial intermediaries, brokers, and dealers make it easier to transfer financial assets.

Although the structure and features of the financial system vary from country to country, the main determinants of the system are:

- System funders (savers)
- Require funds from the system (investment project owners)
- Intermediary financial institutions
- Financial instruments used in fund transfer

The institutions that mediate the fund flow can be counted as commercial banks, investment banks, development banks, stock exchanges, venture capital investment partnerships. In the financial system, the displacement of the funds takes place either directly or indirectly. Direct financing; It is the method directly used by the economic units that supply funds and request funds. Indirect financing, on the other hand, was the financial intermediation between the two segments.

The financial system, in its simplest form, can be divided into two as those using financial services and those providing these services.

2.1 Users of The Financial System

Financial institutions can perform their services through sectors such as governments, businesses, and households.

- Government: Governments, which are the regulators of the financial system, are also customers of this system. All countries benefit from payment services. In developed countries that have completed their industrialization, the budget deficit is met by selling securities, while in developing countries, the budget deficit is usually closed

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by borrowing from banks. In many countries, as in the business world, governments are credit users and use the financial system to fund their spending. At the same time, governments used the financial system for development and other purposes, and loans were given to priority sectors with subsidized interest. State-owned banks and other financial institutions have a direct impact on the distribution of resources, especially in developing countries. The government can take a direct role in resource allocation. As the monetary policy is carried out through my financial system, the public sector has a great influence on the number and distribution of investments in the (Uludağ and Arıcan, 1999).

- Businesses: Companies have a wide range of financial services such as check services, transfer payments, letters of credit, collateral, and accounting. Hence, financial services are more complex. Businesses are credit users, need short-term loans to finance their stocks and long-term loans for capital increase. It also holds plenty of financial assets. The business world includes public and private companies. Since the public sector generally operates in capital-intensive jobs, many large companies operating in the manufacturing industry in developing countries are publicly owned. Many of them work to create employment and provide goods and services at reasonable prices without profit. Since the majority of these institutions have been damaged, they cannot make their investments from their earnings. Hence, they had to borrow from domestic and foreign markets. Some large institutions can provide the financial services they need by themselves. They may also supply some financial services. In other words, they can directly connect to financial markets by presenting their stocks and financing bills to the market. This kind of direct financing is very low in developing countries.

- Household: The household sector consists of individuals and small firms. Their main financial needs are payment services, liquid assets for savings, and small-scale

consumer loans. The department requires convenience, liquidity, trust, and simplicity of transactions.

After making the necessary investment for them, they want to evaluate the increasing part with suitable assets. (Canbaş and Doğukanlı, 1996)

2.2 Financial Service Providers

Institutions providing financial services can be grouped in five groups outside the central bank:

- Deposit and credit institutions,
- Private savings institutions consisting of pension funds and insurance companies,
- Investment institutions,
- Stock market,
- Institutions operating in unorganized markets

The financial system varies from country to country. For example, developing countries hold a larger proportion of financial assets in banks. Comparing the financial systems of developing and developed countries, this ratio is 37% in developed countries and 48% in developing countries. When central banks are included in this comparison, the weight of the banking system in the financial sector increases in developing countries (Canbaş and Doğukanlı, 1996).

Central banks hold 20% of total financial assets in developing countries, compared with 3% in developed countries. The Central Bank provides banking services to the public and other banks, as well as putting the legal currency into circulation and supervising the financial system. Different financial institutions provide complementary and competitive financial services. Contracted savings institutions

provide illiquid savings that meet the long-term needs of customers, while deposit-receiving institutions provide payment tools and the convenience of liquid assets.

Commercial banks facilitate the functioning of the markets by providing payment instruments and appropriate loans to the market makers and market participants. Markets and different financial institutions compete by offering different tools for savings in scarce resources. Currency and capital markets have intensified competition among those who provide these tools. The money market allows commercial banks with a limited number of branches to access all available funds. Since commercial banks specialize in providing loans to large companies, there may be a lot of competition in this type of loan market.

Consequently, competition is needed for an efficient financial system, the system must offer a wide range of services for this. The government should not restrict the growth and diversification of major banking groups but should increase competition by supporting the money and capital markets, and other financial institutions. For the promotion of competition, countries with small-scale financial systems should allow foreign financial services to enter the country. The financial system of developing countries is imperfect or ineffective. An effective financial system supports economic growth by ensuring the circulation of financial resources and allocating them to the most productive places (World Bank, 1989).

2.3 Functions of The Financial System

Determining the position of the financial system in the process of economic development has caused a long discussion in the economic literature. Even these discussions, show the need to understand the importance and functions of the financial system. The theoretical research on the role of the financial system in economic life is closely related to the policy changes implemented by the financial system. Today, the

functions of the financial system that are accepted in the economic development process can be listed as follows (Uludağ and Arıcan, 1999):

- The financial system performs the financial intermediation function.
- It provides financial intermediation costs to be reduced.
- It performs the exchange of goods and services.
- Performs risk transfer and base spread.
- Provides some tools for economic stability

2.4 Financial Intermediation

The task of the financial system is to allocate resources to the person with the highest return in the investment project and to ensure the efficiency of resource allocation. Considering that one of the most important determinants of economic growth is capital accumulation; the importance of this function will be better understood.

Individual depositors are deprived of the opportunity to carefully evaluate their investments, managers, and economic conditions. Depositors face a lack of information when evaluating investments. Therefore, the high cost of collecting information may hinder the allocation of capital to the highest return (Levine, 1997).

Financial intermediaries, on the other hand, increase the average efficiency of capital with their superiority in collecting information and the functions of financing risky but high-return investments.

The more effectively capital can be distributed through financial intermediaries, the higher the economic growth rate will be. As financial development continues, the financial system's financial intermediation function also improves. The financial intermediation process consists of transferring a large number of savings owners to

investors. In the early stages of economic development, brokerage activities are mostly carried out by commercial banks. New types of financial intermediaries emerge in the process of economic development, which are investment banks, insurance companies, stock, and bond exchanges. However, it cannot be said that many and many of its brokers perform a successful finance brokerage function, the problem is in the quality of the services provided and whether the system is operating effectively.

2.5 Minimizing Costs

The development of the financial industry is expected to reduce the cost of financial intermediation. This cost reduction means an increase in the efficiency of the financial sector. Due to the development of the financial sector, it is expected that there will be competition in the services provided by financial institutions. This competitive environment reduces the difference between borrowing and lending interest rates, contributing to the reduction of costs. The more a financial system can reduce the cost of the brokerage, the more efficient it is because it allows more of its savings to be allocated to high-return investments (Darrat, 1999).

The financial system reduces the cost of monitoring and evaluating business managers. For example; managers have a knowledge advantage over those who hold valuable company documents (such as stocks) because they are in the company every day.

Financial institutions can reduce their knowledge advantage by monitoring managers. In this way, it can track whether the loans received are used at their local locations. In this regard, the financial sector can promote capital accumulation, thereby promoting economic growth (Levine, 2004).

2.6 Change of Goods and Services

The financial system allows for the exchange of goods and services. It promotes these changes through new investment tools and markets that can meet the needs of fast-growing economies. It allows capital to globalize as a result of technological developments.

2.7 Risk Transfer and Spread

Risk transfer, a function of my financial system, is the transfer of risk by spreading the risk to the bottom. Individuals and investors tend to avoid risk. However, the degree of desire to avoid risk differs among individuals. When the risk does not spread among many individuals, savers and investors can demand higher returns due to the high risk they take. Therefore, a well-functioning financial system needs to provide tools to enable it to spread risk among many individuals. The system can present a wide variety of assets with different degrees of risk to individuals, and institutions specialized in risk management and determination can perform risk determination according to the preferences of individuals. The fully functioning financial system should reduce the extra premiums to be provided due to the risk of zero (Uludağ and Arıcan, 1999).

2.8 Stability

The financial system provides tools to stabilize economic activity. Every economy faces fluctuations in production, employment, and prices from time to time. In order to prevent these fluctuations, public authorities make various decisions and implement these decisions through policies that affect the money supply. For example, because the unemployment problem in developing countries cannot be controlled by monetary expansion, the financial policies used by these countries for stabilization purposes usually focus on efforts to control inflation (Canbaş and Doğukanlı, 1997).

Various development models have been proposed for developed and developing countries, and capital accumulation has been shown as the main factor of growth. Therefore, if some of the available resources are used for new investment, more capital will be accumulated, which will lead to an increase in income because it will increase productivity. However, since there is a resource problem in undeveloped countries, the theory of development turns into a "cycle of poverty". The importance of the financial system also emerges at this point, since developing countries seem to have a more rational approach to increasing productivity by using existing resources more effectively, as they cannot find new resources that they need without foreign aid.

The theory put forward to increase productivity is financial development and liberalization. The relationship between financial development and economic development has attracted the attention of economists since A. Smith. The "invisible hand" of pro-liberalization economists in this mechanism is the financial system itself. First of all, since the liberalization of the financial sector will increase the interest rates and consequently the returns, the savings will be released from idle forms and added to the financial system. Thus, resources that can be used for investment opportunities will be created, and more importantly, these resources will be utilized in the most profitable investment opportunities. Because it is assumed that institutions that mediate the collection and lending of these resources will evaluate the resources in the investment that will provide the most effective use. Thus, since the resources are used in the best way by withdrawing from inefficient or idle areas, the efficiency of total investments and therefore income will increase.

2.8 Financial System Savings and Investment Relationship

Savings are defined as the unspent part of their income or the postponement of consumption as a result of individuals giving up consumption. At the same time, the

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use of funds to increase production in an economy also creates investments. In order for the savings to be effective in the development of the country, it should be ensured that the projected investments are made by transforming the savings into capital. Economic growth can be achieved by transferring the savings collected in the economy to investment projects. In an economy, the performance of the economy is positively related to the increase in the share of real investments in the Gross National Product.

The effect of financial variables on savings; Ease of access to liquidity and financial markets can make financial instruments attractive to savers. If the services provided to savers increase the net return, saving can be encouraged. The effect of high interest rates on the form of savings is obvious. In this way, savings shift to non-financial assets. This attitude of savers increases the degree of financialization of the economy (Mıhçı, 1999).

The increase in investment not only accelerates economic growth but also increases future production capacity. Increasing investment depends on the amount of savings in the country and how much of these savings can be converted into investment. The savings volume in a country consists of the savings of the individual of the country and all institutions and organizations including the state in a certain period.

2.10 Requirement for The Development of The Financial System

In order for the financial system to produce the expected benefit from itself, in other words, in order for financial development to contribute to economic growth, the financial structure must be sound and not have a feature that deepens the crisis against shocks that may come from outside and inside the economy.

Due to the importance of the financial system in the economy, an unstable financial sector may cause damage to the real sector. Difficulties in financing rational investment

projects under normal circumstances, public and economic instability, and banking crises will all have a negative impact on capital flows. In an economy, measures should be taken to minimize the impact of the crisis caused by the financial system. In addition to the flexibility and rapid recovery of the financial system, the basic conditions for a sound financial system can be listed as follows: (Mishkin, 2000):

• Macroeconomic stability,
• Infrastructure of the financial system,
• Quality of regulation and supervision in the financial system,
• Market Discipline

CHAPTER 3

3. THE ROLE OF MACROECONOMIC STABILITY

An effective and efficient financial structure depends on macroeconomic stability. The monetary and fiscal policies implemented must be consistent and uncertain. This situation is more important for developing countries. A policy implemented due to structural problems in developing countries can have an unexpected effect. However, macroeconomic stability is maintained as a result of regulations in developed countries. Macro-economic instability can lead to financial problems. Economic instability reveals the weaknesses of the financial system, makes the problems in the sector even more problematic and eventually causes bank crises to occur. Macro-economic problems that cause financial instability can be listed as follows (Mishkin F., 2000):

- Increase in interest rates,
- As a result of the taxation of investment instruments in the financial sector, the public,
- increase in borrowing costs and especially in short-term foreign capital rapid action,
- High fluctuation in inflation rate and increase in uncertainty,
- Instability in the implementation of monetary and fiscal policies and inability to see beforehand,
- Unstable fluctuations in the exchange rate.

The common problem of countries with serious banking problems due to the above-mentioned macroeconomic reasons seems to be "inconsistency in expectations and excessive and sharp increases in asset prices". Rises in asset prices create excessive optimism while increasing banks' willingness to lend. When there is an increase in asset prices, the demand for loanable funds is increasing. In this optimism environment, the demand for speculative assets can be financed by the borrower. On the other hand,

borrowers are relieved by the increase in debt-to-income ratio and banks' desire to extend loans increases (Yeldan, 1996).

3.1 The Role of Financial Infrastructure

It includes many elements such as financial infrastructure, credit culture, institutionalization, the definition of private property rights, legal regulations regarding receivable follow-up, and transparency. Transparency and responsibility are the two most important features of well-planned economic and financial policies. Both features ensure that correct and appropriate decisions are made in both the private and public sectors and thus contribute to macroeconomic stability, economic growth, and an increase in welfare. Transparency and responsibility are related to economic policy and decision-making. Both serve to reduce the frequency and severity of future crises. Increasing macroeconomic transparency and accountability encourages policy adjustments to start on time. It also helps to resolve crises by reducing uncertainty (Günay, 2004).

3.2 The Role of Supervision and Regulation

It is a must to regulate and supervise banks and financial institutions for the stability and soundness of the financial system. Despite the importance of supervision and regulation, there is still doubt as to what type of regulation will be successful in practice. Although the necessity of supervision and regulation is imperative, more importantly, it is the responsibility of risk management on the shoulders of the managers of financial institutions. Managers should not be allowed to hide behind supervisory and regulatory agencies by imposing responsibility (Barth et al., 2003).

The need for regulation is great in developing countries, and there is a need for supervisory and regulatory authority to carry out supervision work. However, due to

the rationale of the regulation, making a strict distinction for developed countries is irrelevant. In other words, in developed countries, the financial system is very dynamic, it is in continuous transformation. This change eliminates traditional practices in terms of the regulation (Baştürk, 1999).

Regulatory and supervisory authorities should be independent of political pressures. It should also be conducive to achieving the objectives of their powers or monetary resources. Laws should draw strictly the boundaries of regulation and the objectives of regulation should be clearly defined. The objectives of the regulation should be to correct market shortcomings and errors.

CHAPTER 4

4. THEORETICAL FRAMEWORK

Studies by Gurley and Shaw (1955), Goldsmith (1969) and Hicks (1969) can be shown as pioneering studies that follow the Schumpeterist view, that is, advocating the view that financial development is important for economic growth. According to this view, the development of the financial system enables savings to be transformed into productive investments, and this causes economic growth.

Patrick (1966) argued that the direction of the relationship between financial development and economic growth may change throughout the development process. In the early days of the development process, the formation of financial institutions increases the growth as a result of the transfer of resources from traditional to modern sectors. This view is called the supply-leading hypothesis. However, Patrick argues that high growth in the second stage of the development process will increase the need for financial services and modern financial institutions and calls this view the demand following the hypothesis.

McKinnon (1973) and Shaw (1973) criticize Keynesian policies implemented in the post-World War II period and advocate financial liberalization, which means the abolition of financial system suppression. According to the Keynesian view adopted in the post-war period, the financial system must be suppressed by means such as interest control, reserve requirement ratio, and direct credit programs. These "disrupting the market system" tools are often used by developing countries with budget deficits as a means of financing budget deficits without increasing taxes and causing inflation. However, according to McKinnon (1973), the financial system in developing countries has a very important place in financing investments. Accordingly, investments can be

financed by the savings accumulated in banks. If savings cannot be accumulated in banks, investments cannot be made. This view is called the "complementarity hypothesis" because the savings accumulated in banks and the investments made as a result of using these savings play a complementary role. On the other hand, according to the "debt intermediation" view developed by Shaw (1973), banks that transfer funds between savers and banks increase their investments by borrowing from the savers and by lending to companies.

In the 1980s, van Wijnbergen (1982, 1983), Taylor (1983), and Buffie (1984) criticized the McKinnon-Shaw school. According to this view, the banking system cannot effectively turn the savings into an investment because they are subject to restrictions such as reserve requirements. On the other hand, credit markets, which operate competitively in developing countries and remain outside the corporate structure, operate more effectively in converting savings into investments compared to conventional banks. Therefore, the increase in bank deposits that do not operate effectively will reduce the resources allocated to non-institutional markets that operate effectively and reduce the economic growth rates.

With the developments in the growth literature in the 1980s, financial development started to be included in the internal growth models in the early 1990s (Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991, 1993; King and Levine, 1993b; Pagano, 1993; Bencivenga Smith and Starr, 1995; Greenwood and Smith, 1997). The results obtained from these studies support the hypothesis that financial development increases growth. Accordingly, financial development provides a more efficient distribution of resources.

The financial development has following properties:

i) strengthening of financial contracts,

ii) emergence of certain types of special financial contracts,

iii) increasing volume of financial contracts,

iv) increasing number and size of financial intermediaries (Levine, 2004).

Financial development arises due to problems in accessing information used in financial and physical investment decisions. The information asymmetry between the parties creates legal contracts and corporate financial markets. Although institutional financial markets cause some additional transaction costs in investment decisions, access to the information provided by institutionalization is beneficial because it can prevent bad investments. However, the practice of the concept of financial development becomes complicated due to the very different types of contracts in the financial markets, the increasing number of actors in the market, the differences in legal regulations and practices.

CHAPTER 5

5. LITERATURE REVIEW

Atindehou et al., (2005) analyzed 12 West African countries. Three indicators are used to represent financial development. The number of domestic loans in the economy, liquid borrowing (the ratio of liquid debts of the financial system to GDP), and liquid reserves (the ratio of bank liquid reserves to bank assets: RES). GDP per capita was considered as an indicator of economic growth. In this study, the relationship between financial variables and growth variables was analyzed with the Engle-Granger causality test. A causality was found between growth and credit in Mauritania and Sierra only from countries. At the same time, it was determined that the growth excluding Burkina Faso and Mauritania did not cause liquid borrowing. On the contrary, it was determined that liquid borrowing (LL) contributes to growth in Ivory Coast, Gambia, Sierra Leone, and Mali. In Ivory Coast and Mauritania, it is concluded that RES causes growth, whereas Ghana and Senegal do not have a causal relationship.

Another study was carried out by Ghali (1999) on Tunisia. In the study, the ratio of bank deposit debts to nominal GDP (DL) and the ratio of private sector loans to nominal GDP (CL) was used as financial development indicators. The increases in these two ratios are interpreted as financial deepening. Real GDP per capita was taken as an indicator of economic growth. Annual time series from 1963-1993 period were used in the study. According to the analysis of Johansen causality (cointegration) applied to the variables, there is a long-term relationship between economic growth and financial development for each financial development indicator. Granger causality test, another test, supports that financial development causes economic growth. In short, the high rates of the two financial development indicators mentioned above have also been found to lead to high per capita real GDP (Ghali, 1999).

The research of Arestis and Demetriades (1997) includes Germany and the United Nations. Because there are differences in the financial systems of these countries. In this study, the logarithm of real GDP per capita representing growth, the stock market capitalization rate, and an index of stock market volatility representing financial development were used as indicators. As a fourth variable, the ratio of M2's logarithm to nominal GDP was used for Germany, while the ratio of domestic bank loan to nominal GDP was used for the United Nations.

Kar and Pentecost (2000), using annual data covering the 1963-1995 period, analyze the financial development and economic growth of the relations for Turkey. Cointegration analysis shows that there is a relationship in the long term between financial development and economic growth, error correction model, but vary depending on the financial development indicators used predominantly in Turkey's economy, the demand-following hypothesis is valid.

Choong et al. (2003) Examining the relationship between boundary test (Bound test) approach and stock market development and economic growth in Malaysia. It is estimated that stock market development has a positive and significant impact on economic growth in the long run. Researchers who concluded that stock market development is a cause of economic growth with Granger causality analysis pointed out that financial sector development will accelerate growth if macroeconomic stability is achieved, and liberal foreign trade and investment policies are applied.

Calderon and Liu (2003) studied the relationship between financial development and economic growth in the 1960s and 1994s in 109 developed and developing countries. In the analysis made using panel data, economic growth was measured by the rate of real GDP growth per capita, while financial development was measured by the ratio of M2, which was defined as money supply in a broad sense, and loans to the private

sector, to GDP. In the analysis results, there is evidence that the causality relationship between the variables varies between countries, but generally from financial development to economic growth.

Shan (2005) tested the relationship between financial development and economic growth in China and 10 OECD member countries 1985: I-1998: In the study covering quarterly data of IV period, results of variance decomposition and impact response analysis applied to determine the relationships between variables, financial The causal relationship between development and economic growth is bilateral in the economy of Denmark, America, the UK, Australia and Japan, one- way from economic growth to financial development in South Korea, Italy, Canada, and China, in Finland and Portugal. showed that it is one-way from financial development to economic growth.

Hassan and Islam (2005), with annual data of 1973-2004, estimated whether financial development and trade openness plays a role in reducing poverty by accelerating economic growth. In their study using the Johansen-Juselius cointegration and standard Granger causation techniques. They found that there was no relationship in the short and long term. Based on these results, the researchers stated that financial development and trade openness were not effective in reducing poverty in Bangladesh.

Using panel data, Artan (2007) analyzed the impact of financial development on economic growth in 79 countries with low, middle, and high income in the period of 1980-2002, whereas financial development was positive in middle and high-income countries and positive in low-income countries. It found that it had a negative effect. Namely, a 10% increase in the level of financial development reduces growth by approximately 0.5% in low-income countries, while increasing by 0.6% in middle-income countries and 0.5% in high-income countries.

Cointegration analysis and taking advantage of the error correction model, the relationship between financial development and economic growth in Turkey's economy beat examined Kandıra et al. (2007) measured economic growth, real national income per capita, and financial development with four alternative variables such as the ratio of the Istanbul Stock Exchange (ISE) transaction rate, the ISE transaction volume, the ISE market value and the bank loans given to the private sector to nominal national income. are the complainants. The finding verified that there is a causal relationship between financial development and economic growth in Turkey.

Halıcıoğlu (2007) carried out another investigation into the relationship between financial development and growth in Turkey. Bound test and Granger were conducted for the 1968-2005 period using the analysis of causality and negative financial development and economic growth in the long-term analysis of the results revealed that there is a relationship.

In the study covering the period of 1960-2004, Bader and Qarn (2008) determined whether there was a causality relationship between financial development and economic growth, and six the Middle East and North African countries (Algeria, Egypt, Israel, Morocco, Syria, and Tunisia). Results revealed that the causality is from economic growth to financial development.

CHAPTER 6

6. EMPIRICAL APPLICATION

In this part, the effect of financial development on economic growth is empirically visited. Some factors could affect people who are related to economic growth determinants. In addition, the financial system can be one of those factors because the financial system is to affect determinants' estimations about economic growth directly.

6.1 Data and Methodology

In this section, the database is described, and methodology is discussed with the link between financial development and economic growth in OECD countries. Data is retrieved from the World Bank database and the panel data is created for the period of 1980-2019. Besides, this analysis is applied to OECD countries and the panel data approach is embraced.

6.1.1 Panel Data Analysis

The panel data approach is important because the statistical analysis can be divided into three categories time, and the horizontal section as well as mix data that combine these two types of data. Panel data allow financial-related people to make behavioral models and tests. These models and tests are composed of time series and cross-sectional data and are more complex than these data. Panel data has the following characteristics:

There are numerous explanatory variables' effects in where units, such as firms, countries, and so on, are a matter of experiencing the horizontal sections. Once these

variables are excluded, it will lead to unexpected estimates. In addition, panel data can solve this problem.

- Panel data reduce multicollinearity because variability is created by combining changes in micro-units with changes from one period to another.

- Once time series or horizontal cross-sectional data are not studied separately, panel data can be used in this case. While production functions are analyzed, the problem of separating scale economy from technological change can be an example of this issue.

Also, Dynamic adoption can be better examined by panel data. The Horizontal section's data does not give any detail about dynamics. Time series should be long enough to produce better estimates, and they are usually related to the dynamic behavior.

Here is some advantage of using panel data:

- When panel data analysis is compared with both time series and horizontal sections, it offers a chance for a researcher to work more with a data set.
- This provides to obtain a highly trustable parameter's estimations, the higher degree of freedom, and more reduced multicollinearity between explanatory variables, as well as more trustable estimations can be obtained as a result.
- Panel data analysis allows the researcher to work with economic topics that are impossible to analyze with either horizontal sections or time series. In addition, panel data analysis is one of the most methods to test complex structures and complicated behavior models.

- In time series and horizontal section data analysis, different features of the units that cannot be observed by the independent variables are included in the error term.
- Panel data analysis separates relevant features from error terms by defining a constant for each unit.
- Quantitative and qualitative factors can be determined together in the same model by panel data models

Once the panel data analysis is considered, panel analysis is a statistical method that generally uses econometrics, epidemiology, etc. to study two-dimensional panel data such as cross-sections. Generally speaking, time and the same individual are very important for collecting data because data is collected over time. In addition, there is another kind of analysis, also called multidimensional analysis, which is an econometric method that collects data in more than two dimensions. For example, the data depends on three dimensions, time and individual.

Primarly,the regression model of panel data is shown below:

$$y_{it} = a + bx_{it} + \varepsilon_{it} \tag{2}$$

where; y represents the dependent variable, x represents the independent variable, a and b are coefficients, and time and individuals are represented by i and t respectively. Also ε_{it} represents an error which is curial in the analysis. Also, the error determines which effect to analyze is a fixed effect or a random effect.

In addition, dependent and independent variables are used for modeling that is related to mathematical, experimental, and statistical. The dependent variable depends on other variables in an experiment or questions and that is why it is called the dependent variable. On the other hand, the independent variable does not depend on any other

variables of an experiment or questions. For this reason, it is called an independent variable.

There are three approaches for panel data analysis: independently pooled panels, fixed effects models, also it is called first differenced models, and the random-effects models. To be determined these approaches depend on the objective of the analysis and the problems.

6.1.2 Independent Pooled Panel

In this approach, there is not a unique or singular attribute of individuals in the criteria or measurement set. Also, in time there is not universal effect. In addition, the partial, also known as pooled, estimations for the panel data analysis assume consider that frequency of yiT given xiT optimum particularized for each period. However, this approach might allow for the wrong requirement in the conditional frequency of

$$yi := (yi1, ..., yiT) \ given \ xi := (xi1, ..., xiT) \tag{3}$$

6.1.3 Fixed Effect Models

The fixed effect model is also known as is a kind of changeable variable in time in which represents between asset of prediction and the result of the relationship. There is an important thing of the model is that variable that is not changeable in time to specific to a person, and it should not link to another person because every asset is different than others, and thus, terms of asset and constant of the asset should not be linked. Otherwise, fixed effects cannot be implemented. Also, in general, the data can be grouped following many perceived factors. The group can be designed as random and fixed effects for all groups. In addition, a group fixed quantity is considered a fixed effect model.

The longitudinal investigations for some subjects when it comes to subject-specific is represented by fixed effect. Also, the fixed effects estimator is considered that refers to an estimator for the coefficients in a panel data analysis.

When formal model and assumptions are observed, N refers to observation and T refers to time periods:

$$y_{it} = x_{it}\beta + \alpha_i + u_{it} \qquad (4)$$

The above equation for $t = 1,....,T$ and $i = 1, ... , N$ where:

- i and t is observed by yit

- Time-variant $1 \times k$ regressor vector is represented by x_{it}

- B is the $k \times 1$ matrix of parameters

- Time-invariant particular effect is represented by α_i

- Error term is represented by u_{it}

However, differently, x_{it} and α_i could not be investigated precisely.

More and more, once the fixed effects estimator is checked, is not controlled directly because it cannot be for observable level because fixed effects estimator reduce (might block) effect by using its variables within the transformation that is shown below:

$$y_{jt} - \bar{y}_i = (x_{it} - \bar{x}_i)\beta + (a_i - \bar{a}_i) + (u_{it} - \bar{u}_{it}) \qquad (5)$$
$$\rightarrow \ddot{y}_i t = \ddot{x}_{it}\beta + \ddot{u}_{it}$$

where

$$\bar{y}_i = \frac{1}{T}\sum_{t=1}^{T} y_{it} \,, \bar{x}_i = \frac{1}{T}\sum_{t=1}^{T} x_{it} \tag{6}$$

and

$$u_{it} = \frac{1}{T}\sum_{t=1}^{T} u_{it} \tag{7}$$

Once the equation is looked above, a_i equals to $\bar{a}_i$ because a_i is constant and for this reason the effect is ignored. The fixed estimator can be acquired by an ordinary least squares regression (OLS) of $\ddot{y}$ on $\ddot{x}$.

There are three approaches to the within transformation with variations:

• First one is that it can be added a dummy variable for all individual $i > 1$,

however, in this case the first individual has to be passed because of multicollinearity.

• The second one is that the sequence repetitions approach can be used for global and local estimations.

• The third one is that using nested estimations by using the local estimations and it is programmed in a part of the model. However, in order to have this approach, programming experience is necessary.

Once the first difference estimator is considered, the first difference estimator is a kind of estimator and it is used to solve the problem of excluded variables with panel data in econometrics and statistics. y_{it} and x_{it} are dependent and independent

variables respectively in first difference estimator in order for a group of individual unit $i = 1,....,N$ and $t = 1,....,T$ represents time period. Also, the first difference estimator is achieved by operating a pooled OLS estimation in order for a regression of Δx_{it} and $\Delta_{y_{it}}$. When we look at it for $t = 2,....,T$:

$$y_{it} - y_{i,t-1} = (x_{it} - x_{i,t})\beta + (\alpha_j - \alpha_i) \qquad (8)$$
$$+ (u_{it} - u_{i,t-1}) \rightarrow \Delta_{y_{it}}$$
$$= \Delta x_{it}\beta + \Delta_{u_{it}}$$

β_{FD} represents first difference estimator to be achieved by an ordinary least squares regression (OLS) of $\Delta_{y_{it}}$ and Δx_{it}. Also, once T equal to 2 (T=2), fixed effects and the first difference estimators are numerical same. However, if T is greater than 2 (T > 2), the fixed effect and the first difference estimators are not numerical same. In addition, once the fixed effect estimator is wanted to be more effective than the first difference estimator, the error terms u_{it} should be homoskedastic with no serial correlation.

Similarity of first difference estimator and fixed effect estimator once $T = 2$:

$$FE_{T=2} = [(x_{i1} - \bar{x}_i)(x_{i1} - \bar{x}_i)' + (x_{i2} - \bar{x}_i)(x_{i2} - \bar{x}_i)']^{-1}[(x_{i1} - \qquad (9)$$
$$\bar{x}_i)(y_{i1} - \bar{y}_i) + (x_{i2} - \bar{x}_i)(y_{i2} - \bar{y}_i)]$$

After the equation, the first difference estimator and the fixed effect estimator is numerical same because the fixed effect estimator for doubles data set used in first difference estimator.

Once each $(x_{i1} - \bar{x}_i)$ could be written again as $(x_{i1} - \frac{x_{i1}+x_{i2}}{2}) = \frac{x_{i1}+x_{i2}}{2}$, and this line should be written again:

$$FE_{T=2} = \left[\sum_{i=1}^{N} \frac{x_{i1} - x_{i2}}{2} \frac{x_{i1} - x_{i2}}{2}' + \frac{x_{i2} - x_{i1}}{2} \frac{x_{i2} - x_{i1}}{2}' \right]^{-1} \left[\sum_{i=1}^{N} \frac{x_{i1} - x_{i2}}{2} \frac{y_{i1} - y_{i2}}{2} \right.$$

$$\left. + \frac{x_{i2} - x_{i1}}{2} \frac{y_{i2} - y_{i1}}{2} \right]^{-1} \tag{10}$$

$$= \left[\sum_{i=1}^{N} 2 \frac{x_{i2} - x_{i1}}{2} \frac{x_{i2} - x_{i1}}{2}' \right]^{-1} \left[\sum_{i=1}^{N} 2 \frac{x_{i2} - x_{i1}}{2} \frac{y_{i2} - y_{i1}}{2} \right] \tag{11}$$

$$= 2 \left[\sum_{i=1}^{N} (x_{i2} - x_{i1})(x_{i2} - x_{i1})' \right]^{-1} \left[\sum_{i=1}^{N} \frac{1}{2} (x_{i2} - x_{i1})(y_{i2} - y_{i1}) \right] \tag{12}$$

$$= \left[\sum_{i=1}^{N} (x_{i2} - x_{i1})(x_{i2} - x_{i1})' \right]^{-1} \sum_{i=1}^{N} (x_{i2} - x_{i1})(y_{i2} - y_{i1}) \tag{13}$$

$$= FD_{T=2} \tag{14}$$

Fixed effect estimation result for OECD countries is shown below in Table 1. Besides, the result can be different because of the missing data in the World Bank database. Before detailing, FE estimation should be considered for OECD countries between 1980 and 2020. For FE estimation, the data is considered after 1980 because of the World Bank database

Table 1: Fixed Effect Estimation for OECD Countries

Variable	Coefficient	Std. Error	t-Static	Prob.
C	13025.59 ***	385.7800	33.76430	0.0000
Export	498.8823 ***	37.81030	13.19435	0.0000
Import	-215.4056 ***	39.82026	-5.409448	0.0000
Domestic Credit	59.00868 ***	6.021374	9.799870	0.0000
Private Credit	74.57705 ***	4.362871	17.09357	0.0000
Deflator	-21.98195 **	9.060956	-2.426008	0.0154

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Once fixed effect estimation is investigated for OECD countries, also shown in Table 1, coefficient of import and deflator have a significant relationship to OECD countries. However, the result may not reflect real results without Hausman's approaches. For this reason, fixed effects will be examined further page with Hausman Test. Also, significance of variables such as export, import, domestic, private credit and deflator is 1% on an average.

6.1.4 Random Effect Model

The Random effect model is a kind of statistical model and it is also known as a variance component model. To have the random effect model, the variables should be random. That is why it is called a random effect. Besides, it is the type of linear model and the data follow a hierarchical linear model which means it is considered that the data is analyzed from different populations that are related to hierarchy. In addition, it is used for panel analysis in econometrics once it is considered that the fixed effect is not working. Also, the random effect model is considered a kind of

distinctive case of a mixed model which contains both fixed effects and random effects in a statistical..

Once the heterogeneity is immutable, the random-effects model can manage the unidentified heterogeneity. However, the immutable data can be extracted from longitudinal data by using differencing because constant components will be removed by the first difference that is already taken in time.

There may be two common assumptions for the individual effect. First is the hypothesis of random effects, that is, the unrecognized heterogeneity of individuals and the independent variables. The second is the hypothesis of the fixed effect, that is, the unrecognized heterogeneity of the individual is related to the independent variable. Once the random effect estimator is more efficient than the fixed effect estimator, which means that the random effect assumption is dominant. Once it is not, it means that the random effect estimator is not constant.

Besides, the specific individual component cannot be treat as a parameter and for this reason it cannot be supposed. Alfa will represent the specific individual in equation 15:

$$y_{jt} = \mu + \beta_1 x_{1,it} + \beta_2 x_{2,it} + \cdots + \beta_k x_{k,it} + (\alpha_i - \mu) + \varepsilon_{it} \qquad (15)$$

μ represents impact of average individual. Once μ_{it} is considered that it is equal to $(\alpha_i - \mu)$ and then when the equation will be written again, it will be shown below:

$$y_{jt} = \mu + \beta_1 x_{1,it} + \beta_2 x_{2,it} + \cdots + \beta_k x_{k,it} + \mu_{it} \qquad (16)$$

Random effect estimation result for OECD countries is shown below in Table 2. Before detailing, random effect estimation should be considered for OECD countries between 1980 and 2020. For RE estimation, the data is considered after 1980 because of the World Bank database.

Table 2: Random Effect Estimation for OECD Countries

Variable	Coefficient	Std. Error	t-Static	Prob.
C	13183.41 ***	1868.548	7.055432	0.0000
Export	512.0401 ***	37.62750	13.60814	0.0000
Import	-229.0521 ***	39.68962	-5.771084	0.0000
Domestic Credit	59.05538 ***	5.937045	9.946931	0.0000
Private Credit	75.43418 ***	4.348856	17.34575	0.0000
Deflator	-22.38905 **	9.051982	-2.473387	0.0135

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Once random effect estimation is investigated for OECD countries, also shown in Table 2, coefficient of import and deflator have a significant relationship to OECD countries. It is obtained same result by using fixed effect estimation and random effect estimation in terms of coefficient of import and deflator. However, it is mentioned earlier, the result may not reflect real results without Hausman's approaches. For this reason, random effects will be examined further page with Hausman Test. Also, significance of coefficient of variables is 1% on an average.

6.1.5 Hausman Test

Hausman test is necessary to decide in order to distinguish between random effect model and fixed effect model in panel data analysis. In general, FE is constant and that is why it is preferred. On the other hand, RE is more efficient and for this reason it is preferred. According to hypothesis testing in table 6.1:

Table 3: Hypothesis Test

	H_0 is true	H_1 is false
RE Estimator	Consistent and Efficient	Inconsistent
FE Estimator	Consistent and Inefficient	Consistent

Besides, Karlsson 2014 provides formulization about FE and RE estimates regarding table 6.1. Also, Karlsson defines null and alternative hypotheses both in equation 17 and equation 18:

H_0: The appropriate model is the random effect model. There is not interaction between the error term and the independent variables in the panel data model.

$$\text{Cov} \, (\alpha_i \, , x_{it}) \, = \, 0 \tag{17}$$

H_1: The appropriate model is Fixed effects. The interaction in the panel data between the independent variables and error term is statistical important.

$$\text{Cov} \, (\alpha_i \, , x_{it}) \, \neq \, 0 \tag{18}$$

Besides, Hausman test, which is the best choice to analyze panel data for random effect model and fixed model effect is to research for either two models' parameters over individual effect or unobservable effect that whether they become a correlation.

It is calculated in the x-square indicator, but the statistical matrix format is shown below in equation 19;

$$(\beta^{SE} - \beta^{RE})'[Var(\beta^{SE}) - Var(\beta^{RE})]^{-1}(\beta^{SE} - \beta^{RE}) \qquad (19)$$

Accordingly, the Hausman test statistic is equal to the multiplication of the coefficient matrix formed by the obtained estimators and the inverse of the variance-covariance matrix with the coefficient matrix. (TARI, 2011)

The calculation of the Hausman test can be calculated for OECD countries using World Bank database between 1960 and 2020 and the result is shown below in table 4, 4.1, and 4.2. The data is considered after 1980 because of the World Bank database.

Table 4: Correlated Random Effect – Hausman Test

Test Summary			Chi-Sq. Statistic	Chi-Sq. d.f.	Prob
Period Random			57.651071 ***	5	0.0000
According to above result, estimated period random effects variance is zero.					
Period random effects test comparisons:					
Variable	Fixed	Random	Var(Diff.)	Prob	
Export	1427.687 **	1390.370999 **	358.685799	0.0488	
Import	-1241.07	-1204.815	799.416940	0.1997	
Domestic Credit	46.510867	47.47.535947	1.174215	0.3442	
Private Credit	169.949791 ***	156.487620 ***	21.908659	0.0040	
Inflation Def.	-82.896000 ***	-60.723528 ***	29.880782	0.0000	

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Once Table 4 is examined, again it obtained that import and inflation deflator has a significant relationship to OECD countries. Also, according to the test summary, estimated period random effects variance is zero as well as Table 4 and Table 4.1 provide that Table 1 and Table 2 values that are related to fixed effects and random effects are near to accuracy.

Table 4.1: Period Random Effect Test Equation

Dependent Variable: GDP				
Method: Panel Least Squares				
Periods and Cross-section included 41 and 38, respectively				
Total panel (unbalanced) observations: 1493				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	11008.47 ***	995.7267	11.05571	0.0000
Export	1427.688 ***	67.27149	21.22278	0.0000
Import	-1241.077 ***	79.15658	-15.67875	0.0000
Domestic Credit	169.9498 ***	9.058140	18.76211	0.0000
Private Credit	169.9498 ***	9.058140	18.76211	0.0000
Inflation Deflator	-82.89600 ***	20.11597	-4.120905	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Table 4.1 is examined, the p-value is obtained 0 which means that p-value (Prob.) is 1% on an avarage when reported.

Table 4.2: Effects Specification (Period Fixed (Dummy Variables))

Root MSE	13823.37	R-squared	0.595772
Mean dependent var	28742.44	Adjusted R-Squared	0.583201
S.D. dependent var	21749.36	S.E. of regression	14041.38
Akaike info criterion	21.96773	Sum squared resid	2.85E+11
Schwarz criterion	22.13129	Log likelihood	-16352.91
Hannan-Quinn criter.	22.02868	F-statistic	47.39253
Durbin-Watson stat	0.151315	Prob(F-statistic)	0.000000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The Hausman test statistic shows a x-square distribution with k degrees of freedom under the null hypothesis of "the random effects estimator is correct." In the case of implementation, it can be determined that the error component of the random effects model has nothing to do with the independent variable. In this case, the fixed-effects model will be the first choice.

Table 5: Summary Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Real GDP	1,888	27904.99	18899.87	9442924	111968
Domestic Credit	1,341	6.700.651	4.432.482	.1861522	3.089.784
Private Credit	1,063	6.279.222	414.568	8.603.164	2.520.816
Deflator	1,845	9.512.241	2.736.442	-9.729.899	6.786.085
Import	1,738	3.581.458	2.228.511	3.671.072	1.871.654
Export	1,339	89.98093	57.02824	.2302239	298.0918

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

As a second step, correlation between independent variables is checked to see if there is any sign of multicollinearity. As a general rule of thumb, it is admitted that if the correlation between two independent variables is larger than 80%, then it implies a multicollinearity. Table 5 reveals that export is highly related with private credit. As theory suggests, one of them should be dropped to stay away the adverse effect of multicollinearity.

Table 6: Correlation Table

	Real GDP	Domestic credit	Private credit	Deflator	Import	export
Real GDP	1.0000					
Domestic credit	0.6395	1.0000				
Private credit	0.4899	0.7482	1.0000			
Deflator	-0.2402	-0.2266	-0.2016	1.0000		
Import	0.2283	0.2309	0.0679	-0.0735	1.0000	
Export	0.5935	0.9237	0.8496	-0.1301	0.1542	1.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

Stationary is a phenomenon that needs to be checked before running any econometric analysis. To do that, Fisher test and it turns out that other than domestic credit and deflator, all variables have non-stationarity.

To remedy this non-stationarity problem, first difference is taken, and the result is added to the right-most column of the related variables. Eventually, after taking difference, all variables become stationary.

Table 7: Real GDP

	Statistic	p-value	After first difference
Inverse chi-squared(74) P	302.455	10.000	0.0000
Inverse normal Z	70.454	10.000	0.0000
Inverse logit t(174) L*	75.627	10.000	0.0000
Modified Inv. chi-squared	-35.966	0.9998	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The significance of the p-value is out of the possibility gap once the result is examined for Real GDP. That is why significance of the p-value cannot be marked.

Table 8: Domestic Credit

	Statistic	p-value
Inverse chi-squared(74) P	1.348.067 ***	0.0000
Inverse normal Z	21.062	0.9824
Inverse logit t(174) L*	0.4565	0.6757
Modified Inv. chi-squared	49.983 ***	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The result is examined in terms of Domestic Credit and once p-values is checked, the significance level of the p-value can be obtained as %1 on an average.

Table 9: Private Credit

	Statistic	p-value	After first difference
Inverse chi-squared(74) P	131.184	10.000	0.0000
Inverse normal Z	52.482	10.000	0.0000
Inverse logit t(174) L*	55.457	10.000	0.0000
Modified Inv. chi-squared	-30.055	0.9987	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The significance of the p-value is out of the possibility gap once the result is examined for Private Credit. That is why significance of the p-value cannot be marked.

Table 10: Deflator

	Statistic	p-value
Inverse chi-squared(74) P	2.963.688 ***	0.0000
Inverse normal Z	-97.588 ***	0.0000
Inverse logit t(174) L*	-126.344 ***	0.0000
Modified Inv. chi-squared	182.786 ***	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The result is examined in terms of Deflator as well as the table provides that the significance level of the p-value is %1 on an average.

Table 11: Import

	Statistic	p-value	After first difference
Inverse chi-squared(74) P	559.124	0.9421	0.0000
Inverse normal Z	14.848	0.9312	0.0000
Inverse logit t(174) L*	14.049	0.9191	0.0000
Modified Inv. chi-squared	-14.868	0.9315	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The significance of the p-value is out of the possibility gap once the result is examined in terms of Import. That is why significance of the p-value cannot be marked.

Table 12: Export

	Statistic	p-value	After first difference
Inverse chi-squared(74) P	812.879	0.2628	0.0000
Inverse normal Z	28.792	0.9980	0.0000
Inverse logit t(174) L*	22.478	0.9871	0.0000
Modified Inv. chi-squared	0.5991	0.2746	0.0000

***, ** and * indicate significance at 1%, 5% and 10%, respectively.

The significance of the p-value is around is cannot be marked because it is out of range of possibility values.

6.1.6 Panel Data Analysis Result

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Table 1 and Table 2 are analyzed for OECD countries and the coefficient is gained as negative for import and deflator that were -215.4056 and -21.98195, respectively for fixed estimation, and were -229.0521 and -22.38905, respectively for random effect estimation. According to the result, the coefficient of import and deflator have a significant relationship to OECD countries in terms of the negative relationship.

However, random effect estimation and fixed effect estimation might not reflect correct results without the Hausman test, for this reason, the correlated random effect is analyzed by using the Hausman test and according to Table 4, the estimated period random effects variance was zero. Further information by analyzing Table 4, import and inflation deflator has negative results -1241.07 and -82.896000, respectively for fixed effect and -1204.815 and -60.723528, respectively for a random effect. In this case, the import and inflation deflator are valid results, and they are linked significantly with OECD.

In addition, according to table 4.1, the coefficient of import and inflation deflator is gained, and their values are -1241.077 and -82.89600, respectively. In this result, also import and inflation deflator have a significant relationship to the real GDP.

As a result, Table 13 indicates the result of the panel data analysis for OECD countries. The results show that private credit, deflator, import and export rate are all have statistically significant relationship with the Real GDP. In other words, the estimated coefficient of domestic credit is not statistically significant, but the estimated coefficient of private credit and deflator show negative relationship with real GDP. Moreover, import and export rate indicates positive nexus with real GDP implying that an increase in import and export rate trigger an increase in real GDP. However, it is not the case with finance-related variables such as private credit, which distorts the economic growth.

That being said, it can be concluded that financial development affects the economic growth via various channels in OECD countries.

Table 13: Panel Data Analysis Result

Variables	(1) Real GDP
Private Credit	-19.18***
	(4.054)
Domestic Credit	4.397
	(39.68)
Deflator	-1.950***
	(0.657)
Import	57.98***
	(8.917)
Export	6.227**
	(2.932)
Constant	507.2***
	(157.9)

Standard errors in parentheses

$$*** \ p < 0.01, ** \ p < 0.05, * \ p < 0.1$$

CHAPTER 7

7.Conclusion

In this study, the relationship between financial development and economic growth is analyzed using panel data analysis for OECD countries. The main purpose of the analysis is to identify the existence of the relationships between financial development indicators and economic growth. For this purpose, panel data analysis covering the period 1960-2020 are applied and it turns out that there is a statistically significant relationship between financial development indicators and economic growth.

However, this analysis can be improved in several ways. A better understanding of the role of the financial system in the economic growth process will be a guide for policymakers. The findings of studies showing that some financial development indicators affect economic growth negatively increases the importance given to the financial system in policymaking. The increasing number of studies show that the impact of the financial system on economic growth is limited, and this decreases the number of decisions that take into account the financial system in policymaking.

In this research, panel data analysis is used to investigate OECD economic growth and many factors play a role in the economic situation. Also, OECD financial development is a crucial factor in time through capital markets. Investors would like to decrease their risk by investing in different ways, however, at this point financial system plays a big role on investors because the financial system is being asked to be stable.

In addition, the economic growth model is affected by financial development recently because of different types of variables. The moment determining economic policies, the relationship between financial development and economic growth over OECD countries is so important. In this study, this situation is analyzed empirically using the World bank database and the period is between 1980 and 2020. Some data could not be accessed because of World Bank data, however, this study shows that financial

development and economic growth for OECD countries are affected by different types of variables such as internal nature, external nature, and so on. Last but not least that capital, labor, and productivity affect the OECD countries' economies directly as well as they play a role in growth dynamically throughout credit channels. For that reason, especially, these three variables so curial for OECD countries.

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