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KASTAMONU UNIVERSITY
SOCIAL SCIENCES INSTITUTE
DEPARTMENT OF ECONOMICS



**THE EFFECT OF CREDIT COMPOSITION ON ECONOMIC
GROWTH: EVIDENCE FROM TURKIYE**

BETÜL İSMİÇ

MSC THESIS

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JULY-2023
KASTAMONU

UNDERTAKING

I declare that all information in the thesis were obtained and presented in the frame of ethical behavior and academic regulations, and all kinds of statements and reports which do not belong to me in this study -prepared in accordance with the rules of thesis writing- were fully referenced to the source of knowledge.

Betül İSMİÇ

ÖZET

YÜKSEK LİSANS TEZİ

KREDİ KOMPOZİSYONUNUN İKTİSADİ BÜYÜME ÜZERİNDEKİ ETKİSİ: TÜRKİYE'DEN BİR KANIT

BETÜL İSMİÇ

KASTAMONU ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ
İKTİSAT ANA BİLİM DALI
DANIŞMAN:DR. ÖĞR. ÜYESİ SEDEF ŞEN

Teorik ve ampirik literatür finansal gelişim ve reel ekonomi arasındaki ilişkiyi araştırırken girişimci/işletme ve hanehalkı kredilerinin tekil rolleri üzerine vurgu yapmaktadır. Ancak literatürdeki birçok çalışmada finansal gelişimin bir bütün olarak ele alındığı, finansal gelişimi oluşturan öğelerin tekil etkilerine odaklanılmadığı görülmektedir. Literatürde, özel sektöre verilen banka kredilerinin, işletme ve hanehalkı kredileri olarak ayrıştırılması kredi kompozisyonu olarak ifade edilmiştir. Bu ayrıştırma bize finansal sistemin reel ekonomiyi hangi kanallar yoluyla etkilediği hakkında bilgi sağlayacaktır. Bu çalışmada Türkiye’de 1986-2021 dönemi için işletmelere ve hanehalklarına kullandırılan kredilerin ekonomik büyüme üzerinde oluşturacağı kısa ve uzun dönem etkiler araştırılmıştır. Türkiye bağlamında bu ilişkinin incelenmesi önemlidir. 2008 küresel krizinden sonra Türkiye’ye düşük maliyetlerle büyük miktarlarda yabancı sermaye girişi gerçekleşmiştir. Türkiye’nin yabancı kaynaklar açısından zenginleşmesi bankaların verdiği krediler yoluyla Türkiye’deki yerleşiklerin bu kaynaklardan yararlanmasını sağlamıştır. Türkiye ekonomisinde son yıllarda hızlı kredi büyümesi ve kredilerin Gayri Safi Yurtiçi Hasıla’ya oranlarının artması, kredilerin çeşitli makroekonomik değişkenleri etkileme gücünü de arttırmıştır.

Literatürde finansal gelişme ve büyüme arasında sıkı bir ilişki olduğu açıkken, bankalar tarafından kullandırılan kredinin türü ile iktisadi büyüme arasındaki ilişkinin incelendiği çalışma sayısının yok denilecek kadar az olması dikkat çekicidir. Kredi türünün çeşitli makroekonomik değişkenler üzerindeki etkilerine dair yapılan çalışmaların ilki Beck, Büyükkarabacak, Rioja ve Valev (2012) tarafından gerçekleştirilmiştir. Yaptıkları analizlerde hanehalkı ve işletme kredilerinin büyüme üzerindeki etkisini ilk kez sistematik bir şekilde inceleyerek bu alandaki en kapsamlı çalışmalardan birini ortaya koymuşlardır. 1994-2005 döneminde 45 gelişmiş ve gelişmekte olan ülkenin verilerden yola çıkarak yapılan çalışmada, işletme kredilerinin ekonomik büyümeyi teşvik ettiği, hanehalkı kredilerinin ise büyümeyi desteklemediği sonucuna ulaşmışlardır. Bu çalışma sonrasında yapılan sınırlı sayıda çalışma da panel veri analizi kullanılarak gerçekleştirilmiştir. Zaman serileri analizi kullanılarak yapılan iki çalışma Majeed, Iftikhar ve Atiq (2019) ve Şkare, Sinkovic ve Rochon (2019) olmuştur. Majeed vd. (2019) ARDL modeli kullanılarak Pakistan için yaptıkları analizde, işletme kredilerinin Pakistan’ın ekonomik büyümesine olumlu ve önemli bir etkisi olduğunu teyit ederken, hanehalkı kredilerinin ekonomik büyümeye katkı sağlamadığı sonucuna ulaşmışlardır. Diğer bir zaman serisi çalışması olan Şkare vd. (2019) Johansen eşbütünleşme testi ile Polonya için yaptıkları analizde hem işletme hem de hanehalkı kredilerinin büyüme üzerinde ciddi tasarrufu olduğu sonucuna ulaşmışlardır. Türkiye için zaman serileri analizi

kullanılarak kredi türünün iktisadi büyüme üzerindeki etkisinin incelendiği bir çalışmaya rastlanılmamıştır.

Analizde kısa ve uzun dönem ilişkilerin varlığının tespit edilebilmesi amacıyla Gecikmesi Dağıtılmış Otoregresif (ARDL) modele dayalı sınır testi yaklaşımı kullanılmıştır. ARDL eş bütünleşme testi diğer eş bütünleşme testlerine göre birçok açıdan daha avantajlı olduğu için tercih edilmiştir. Çalışmadan elde edilen sonuçlar, incelenmekte olan ilişkinin kredi türüne bağlı olarak önemli ölçüde farklılık gösterdiğini işaret etmektedir. İşletme kredilerinin ekonomik büyümeyi pozitif yönde etkilediği görülürken, hanehalkı kredilerinin uzun vadede ekonomik büyümeye katkı sağlamadığı belirlenmiştir. İşletme kredileri ve büyüme arasında kısa ve uzun dönemde çift yönlü nedensellik ilişkisi mevcut iken, hanehalkı kredileri ve büyüme arasında bir nedensellik bulunamamıştır. İşletme kredilerinin ekonomik büyüme üzerinde pozitif yönlü etkisinin olması, artan işletme kredilerinin daha uygun yatırımlar ürettiğine işaret etmektedir. Ayrıca, Türkiye’de ekonomik büyümenin özel sektöre verilen toplam banka kredilerinden etkilenmediği sonucuna ulaşılmıştır. Bu sonuç kredi kompozisyonunun ekonomik büyüme üzerindeki etkisinin incelenmesinin önemini vurgulamaktadır.

ANAHTAR KELİMELE:Finansal Gelişme, Ekonomik Büyüme, Hanehalkı Kredileri, İşletme Kredileri.

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ABSTRACT**MSC THESIS****THE EFFECT OF CREDIT COMPOSITION ON ECONOMIC GROWTH:
EVIDENCE FROM TURKIYE****BETÜL İSMİÇ****KASTAMONU UNIVERSITY INSTITUTE OF SOCIAL SCIENCE****DEPARTMENT OF ECONOMICS****SUPERVISOR:ASSIST. PROF. DR. SEDEF ŞEN**

The literature explores the link connecting financial development and the real economy, emphasizing the singular roles of entrepreneur/enterprise and household credits. Many studies in literature, however, examine financial development as a whole and neglect to analyze the individual influences of its elements. A credit composition is a measure of how bank credits are divided between enterprises and households. We will gain insight into the channels by which the financial system affects the economy through this decomposition. This study looked into the short and long-term influences of credits extended to enterprises and households on economic growth in Turkey between 1986 and 2021. A thorough examination of this link in the context of Turkey is necessary. In the aftermath of the 2008 financial crisis, Turkey realized large inflows of foreign capital at low costs. The enrichment of Turkey in terms of foreign resources enabled the residents of Turkey to benefit from these resources through the credits given by the banks. The rapid credit growth in the Turkish economy in recent years and the increase in the ratio of credits to Gross Domestic Product have also increased the power of loans to affect various macroeconomic variables.

It is perceptible from the literature that financial development and economic growth have a strong tie, but it is noteworthy that there are relatively few studies that examine the tie connecting the type of credit and growth. The first study on the influences of credit type on various macroeconomic variables was conducted by Beck, Büyükkarabacak, Rioja and Valev (2012). For the first time, they systematically examined the influence of household and enterprise credits on growth in one of the most comprehensive studies in this field. Researchers found that enterprise credits stimulate economic growth, while household credits do not, based on data from 45 developed and developing countries in the 1994-2005 period. This study was trailed by a limited number of studies that used panel data analysis. Time series analysis was employed in two studies by Majeed, Iftikhar, and Atiq (2019) as well as Škare, Sinkovic, and Rochon (2019). A study conducted by Majeed et al. (2019) in Pakistan using the ARDL model found that enterprise credits were positive and significant for Pakistan's economic growth, but household credits did not. In their analysis for Poland using the Johansen cointegration test, Škare et al. (2019) concluded that business and household loans have a significant influence on economic growth. There has been no study that examines the influence of credit type on economic growth using time series analysis for Turkey.

The analysis investigated short and long-term links using an autoregressive distributed lag (ARDL) model based on bound testing. The ARDL cointegration test was chosen because it is more advantageous than other cointegration tests in many respects. Based on the study's findings, the link under consideration appears to differ significantly depending on the type of credit involved. A positive influence of enterprise credits on economic growth has been determined, but household credits are not long-term contributors to economic growth. There is a two-way causality for enterprise credit and growth in the short and long term while no causality link was detected for household credit and growth. Enterprise credits positively affect economic growth, indicating that more appropriate investments are made when enterprise credits increase. Moreover, the total private bank credits in Turkey have not been found to have an influence on the growth of the economy. In light of this finding, it is imperative that we examine the influence of credit composition on economic growth.

KEYWORDS:Financial Development, Economic Growth, Household Credits, Enterprise Credits.

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FOREWORD

The liberalization and evolution of countries' money and capital markets have made financial development an important research area. There has also been a growing interest in this field, as many influential economists of the 20th century have asserted that financial development has an impact on growth. Researchers have tried to find out whether there is an association between financial development and economic growth through both theoretical and empirical investigations. It is the goal of this study to investigate the link between credit composition and economic growth. It is believed that the tie connecting credit composition and growth may provide insights into the finance-growth relation.

I would like to express my deepest gratitude to my supervisor, Assist. Prof. Dr. Sedef ŞEN, for sharing her knowledge and time with sincerity and patience while preparing this thesis. As a guide and a light during my academic journey, she has been an exemplary role model for me, and without her support, I would not have been able to succeed. I would like to thank my colleague Tuğba Yılmaz for her support, sincere help and patience for my questions. I am grateful to my parents, Mr & Mrs. Yurdakök, for raising and supporting me all my life with love and encouragement. Lastly, many thanks to my husband Mr.İsmiç and my son, Salih, for always being with me and supporting me in each step of my life.

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Kastamonu, 2023

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LIST OF ABBREVIATIONS

Abbreviations

ADF	: Augmented Dickey Fuller
ARDL	: Autoregressive Distributed Lag
BRSA	: Banking Regulation and Supervision Agency
CBRT	: Central Bank of Republic of Turkiye
CV	: Critical Values
DF	: Dickey Fuller
DV	: Dependent Variable
EC	: Enterprise Credit
ECM	: Error Correction Model
ED	: Economic Development
EG	: Economic Growth
EU	: European Union
FD	: Financial Development
FI	: Financial Intermediary
FS	: Financial System
GDP	: Gross Domestic Product
GMM	: Generalized Methods of Moments
GNP	: Gross National Product
HC	: Household Credit
IMF	: International Monetary Fund
ISE	: Istanbul Stock Exchange
IV	: Independent Variable
LT	: Long Term
OECD	: The Organisation for Cooperation & Economic Development
OLS	: Ordinary Least Squares
PC	: Private Credit
PP	: Phillips Perron
SDIF	: Savings Deposit Insurance Fund
ST	: Short Term
VAR	: Vector Auto Regression
VECM	: Vector Error Correction Model
WB	: World Bank

1. INTRODUCTION

One of the most important goals of economics, which seeks ways to meet unlimited needs with limited resources, is to build a welfare society by raising the living standards of individuals. One of the ways to raise the living standards of individuals is by increasing the per capita income level; increasing per capita income is possible by increasing production. The increase in the production of goods and services is one of the most fundamental issues that the concept of economic growth (EG) is concerned with. Thoughts and policies that will boost EG have always been important in economics.

One of the factors that play a significant role in increasing production is capital. The effective conversion of individuals' savings into capital and investments depends on robust financial systems (FSs) in countries. FS maximizes efficiency while minimizing risk for savers by reducing the costs of obtaining and assessing information through financial intermediaries (FIs). An efficient FS that provides more investment in the country's economy will also accelerate EG.

While researchers offer different answers to the question of why countries are growing at different levels economically, one point that has recently been noted has been the role of the FS in the growth process. The manner of the link between the development of the FS and EG is quite clear; developed countries have developed FS. Therefore, policies to develop the FS are expected to increase EG (Khan and Senhadji, 2003). A significant number of empirical studies assess the impact of the functioning of the FS on EG.

Banks are considered one of the most significant elements of the FS. They support private businesses and provide credit for household expenses. The provision of private credit (PC) to businesses and households by banks is considered one of the most critical factors contributing to EG (Majeed, et al., 2019). It is through two channels that the credit supply influences EG. According to one view, increases in credit supply have a favorable impact on the economy primarily via increasing demand, particularly from households. Another view suggests that positive credit shocks can also boost

labor productivity at enterprises, thereby contributing to EG. It may be due to the easing of borrowing restrictions for enterprises or to a more effective allocation of resources among them that labor productivity is increasing (Irandoost, 2021).

A look at credit composition and how it affects EG can provide insight into why countries grow economically at different levels. Furthermore, countries may figure out whether the private sector or household credit (HC) has more impact on EG. The separate influences of household and enterprise credit (EC) markets have rarely been explored, in spite of the fact that a fundamental body of literature has examined how the development of credit markets impacts EG by analyzing an aggregate measure of private sector credit allocations (Sassi and Gasmi, 2014). A better understanding of how FS promotes EG can be achieved by decomposing overall bank lending into its constituent parts. The fact that EC and HC have different influences on growth may be of great relevance to policymakers looking to maximize the outcomes of policies in the financial sector on the real economy (Beck, Büyükkarabacak, Rioja, and Valev 2012).

This study is aimed to find out the impact of EC and HC separately on EG; therefore, we can identify which credit types are more influential in encouraging EG in Türkiye. In the context of Türkiye, exploring this link is of particular interest. Firstly, the banking sector in Türkiye is essential for credit to enterprises and households. The size of EC to gross domestic product (GDP) in Türkiye rose between 1990 and 2020 and peaked at 89.6 % in 2021. Similarly, the size of HC to GDP in Türkiye rose between 1990 and 2020 and peaked at 17.5 % in 2020. Secondly, Türkiye was able to attract large amounts of foreign capital at relatively low costs because of the 2008 global crisis. When Türkiye became abundant in foreign resources, making it possible for Turkish residents to benefit from those resources through the credit provided by banks. As the Turkish economy has come across a swift credit growth in recent years, and as the ratio of credit to GDP has risen, the power of credit to influence macroeconomic variables has also increased. Thus, this study was inclined to investigate credit composition in more detail and to pay greater attention to it in the coming years. Thirdly, in Türkiye, studies analyzing the influence of bank credit on EG have largely focused on overall PC. It is notable that few studies examine the link between credit

types and EG. This study aims to reveal the disaggregated influence of private sector credit in households and enterprises on the EG of Türkiye. In that sense, this study aims to fill the gap in the literature on finance-EG by examining the disaggregated PC to GDP.

In the first part of this study, a conceptual framework is created. Information about the concept of a FS and the components of the FS are studied. The FS's operation, functions, and features are discussed in detail. The ongoing section explains the definition and measurement of financial development (FD), the link between FD and EG within the growth models' structure, the transmission channels of FD on EG, and the link between FD, credit composition, and EG in Türkiye. The literature review has been done about the studies examining the link between FD and EG as well as credit composition and EG that constitutes the scope of the study. The last section demonstrates the methodology used in econometric analysis, findings, and discussion.

2. OVERVIEW OF THE FINANCIAL SYSTEM

This section discusses the concept of the FS, its components, and how it works while also looking at its features and functions.

2.1 Concept of the Financial System

Various definitions exist for the FS. FS can be expressed as a collection of people, institutions, markets, instruments, and organizations that perform financial functions. (Afşar and Afşar, 2007). Another definition emphasizes that the FS comprises the markets on which bonds, stocks, and other securities are purchased and sold, interest rates are determined, and financial services are provided to the public (Rose and Marquis, 2008). A different definition suggests that domestic savings and foreign savings (external debts) transferred to the country are the major sources of financing for the FS, together with the functions of markets and intermediaries (Öçal and Çolak, 1999).

Those who actively participate in the economy, including the people, companies, government, and foreigners, are divided into two groups, those with surplus funds and those needing them. Accordingly, if one assumes that total revenues and total expenditures for the current period are equal, then the amount of funds needed for the current period equals the amount of idle funds, resulting in economic efficiency. Likewise, the FS facilitates the transfer of idle funds to those with a fund deficit, known as fund transfers (Tunay, 2005). Fund transfers occur when units with savings do not have active investment opportunities, and those with active investment opportunities receive the funds transferred. Therefore, financial markets have a crucial role in facilitating the efficient allocation of capital in the economy, which contributes to high productivity and efficiency (Mishkin, 2004). To build a successful FS, five key elements need to be in place as follows:

“(a) a sound public finance system and effective debt management; (b) a stable monetary system; (c) a wide range of banks, some with a domestic or international orientation, and perhaps some with both orientations; (d) a well-functioning securities market; and (e) a central bank to stabilize domestic finances and manage international financial relations (Rousseau and Sylla, 2003, p.374).”

For the FS to function efficiently, safely, and transparently, several legal and institutional arrangements need to be in place. Economic policies can be implemented by determining the legal framework of the FS through laws and regulations prepared by state authorities. Supervision institutions keep the markets under control and ensure the smooth operation of the system (Afşar and Afşar, 2007).

2.2 Structure of the Financial System

The structure of the FS comprises four components: financial institutions, financial markets, financial assets/instruments, and financial services. These four elements constitute the foundation of an FS, and it is through them that the system grows.

Financial Institutions: Institutions that mediate financial transactions are referred to as financial institutions. Financial institutions, which mediate financial transactions, would not exist if the financial markets were free from perfect competition, i.e., if everyone had access to all the information at all times. The absence of financial institutions would result in significantly higher costs for information and transactions in financial markets (Günel, 2010). Financial institutions play the role of intermediates, changing one set of financial securities' qualities into another set of characteristics. This process is called financial intermediation (Kidwell, Blackwell, Whidbee, and Sias, 2012).¹

¹ In the section entitled "Operation of the FS," information is provided about financial intermediation and its functioning.

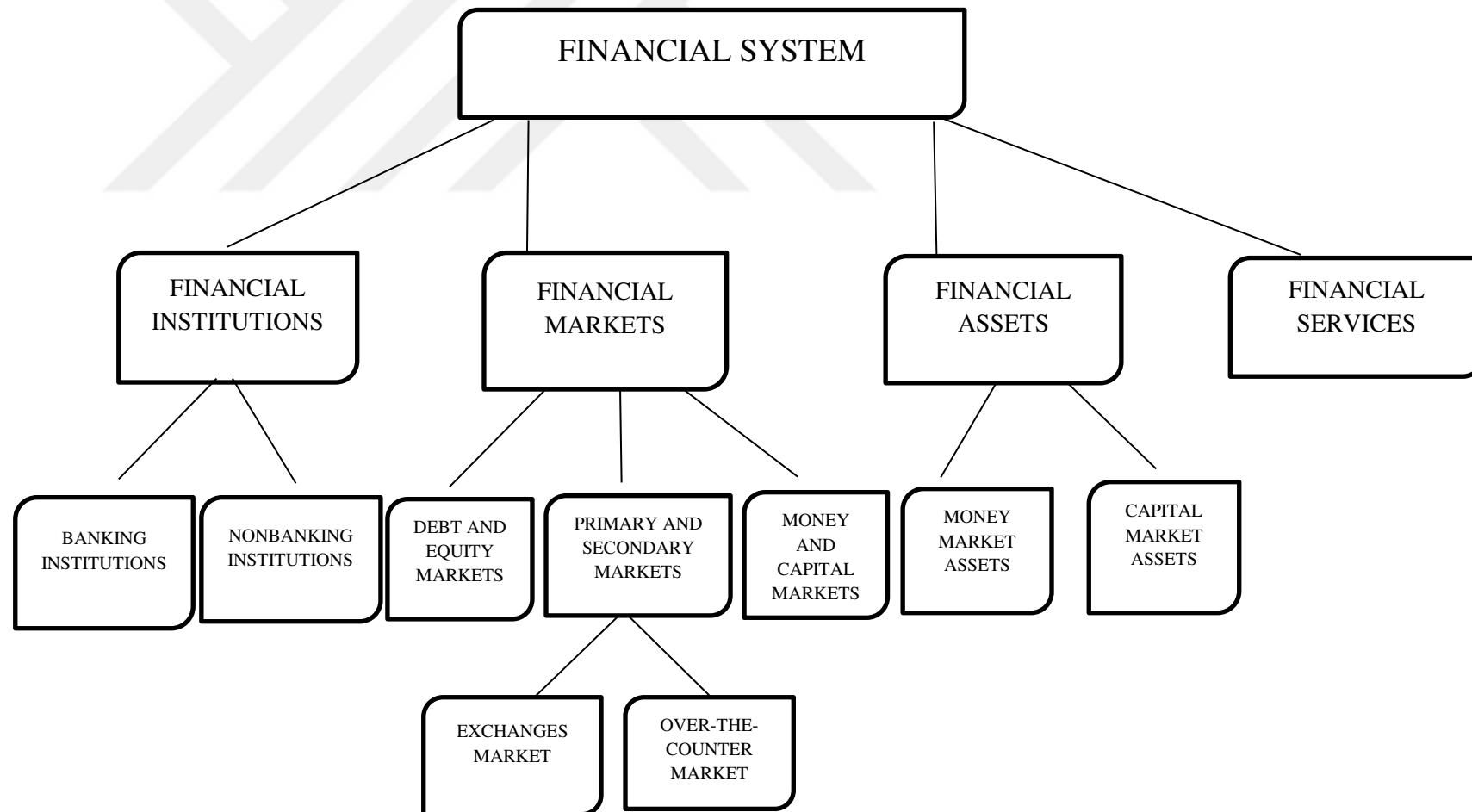


Figure 2.1 The structure of the financial system (Author's drawing based on the works of Mishkin (2004) and Günel (2010))

Financial institutions are classified as banking institutions (or depository institutions) and nonbanking institutions (non-depository institutions) (Howells and Bain,2005). Banking institutions are FIs that collect funds from the public and companies under the guise of deposits and disburse them as loans to the public and companies. Banks are the primary constituent of this group of institutions². Generally, banks are intermediaries who pay their customers' interest on their deposited funds and lend them to those needing them (Tunay, 2005). The common classification of banks in many countries comprises retail banking, corporate banking, and investment banking (Howells and Bain,2005).

Nonbanking institutions do not use deposits as the source of the funds they distribute during the fund transfer process. Depending on how they collect and use funds, these organizations are generally classified as contractual saving institutions or investment intermediaries. Contractual saving institutions are FIs that assess funds they provide in periodic installments according to agreements with their savers. Life insurance companies, pension funds, and property and liability insurance companies are all examples of contractual saving institutions. The term "investment intermediary" refers to various types of intermediaries, such as financing companies, intermediary institutions, mutual funds, securities, and real estate investment trusts. (Tunay, 2005).

The term 'institutional investor' is usually used to describe these institutions. They invest in various types of securities by pooling savings from households and businesses. The fact that they can buy and sell in large quantities allows them to enjoy low transaction costs. Furthermore, they provide the advantage of professional analysts who should have better information when selecting assets than private investors. (Howells and Bain,2005).

Financial Markets: A financial market³ is a platform on which financial instruments representing financial rights are purchased and sold (Aydın, 2016). Mishkin (2004) divides financial markets into four broad categories as money and capital markets, debt

² There is a tendency for the markets of certain countries to be classified as bank-based in the FS. In the bank-based FS, banks hold a large portion of the market.

³ It is common to express some countries' markets as market-based in the FS. Capital market institutions play a large role in market-based FS.

and equity markets, primary and secondary markets, and exchanges and over-the-counter markets.⁴

Money and capital markets classify securities based on their maturity. Money markets are financial markets where short-term (ST) debt instruments are traded, typically those with a shorter maturity than one year. On the other hand, longer-term debt and equity securities, typically those with an original maturity of one year or more, are traded on the capital market (Mishkin, 2004).

There are three key distinctions between money and capital markets (Erdem, 2014):

- Due to their short duration, securities traded in money markets are less risky than those exchanged in capital markets. Prices experience relatively more minor ups and downs because of this.
- Money market products often have better liquidity than securities market instruments. There is a greater volume of transactions. The cost of buying and selling units is, therefore, lower.
- Money market instruments have lower information costs than capital market instruments since the funds have a shorter tenure, and the borrowers are frequently well-known individuals.

Debt and equity markets classification is based on the type of financial assets traded on the market (Sarıkamış, Ceylan, Aydın, and Coşkun, 2004). In order to obtain funds from the financial markets, fund requesters have two options. The most typical approach is borrowing. It is possible to borrow money through a loan from a bank or via debt instruments such as bonds and commercial papers. As a matter of fact, this method is typically used in the debt market. Stock issuance is the second technique to raise money. In exchange for shares, shareholders become entitled to the issuer's profits and assets. Profit sharing is taken from earnings as long as the business

⁴ The financial markets can be classified in several ways. Some conditions influence the naming of these markets, including the legal nature of the receivable, the direction of a public offering, the market's order, and the borrower's borrowing period. (Tiryaki, 2012).

continues to exist, as shares do not mature until the business ceases to exist. Markets like this are referred to as equity markets (Coşkun, 2010).

Investing in a corporation's equity instead of its debt comes with the disadvantage that equity holders have a residual claim; the corporation has to pay all its debt holders before paying their equity holders. Due to the fact that equities confer ownership rights on the holders, equity holders directly benefit from any increase in the corporation's profits or assets. As their payments are set, debt holders are not included in this benefit (Mishkin and Eakins, 2006).

Primary and secondary markets are another financial market classification involving transactions regarding money and capital market instruments. A primary market is one in which new securities are issued on a regular basis. Term secondary markets refer to markets where current securities are traded. A bond or equity security issued by the Treasury or a stock issue by a company is a primary market transaction. A secondary market transaction, however, is when individuals or institutions buy or sell existing stocks or treasury papers (Günel, 2010).

A secondary market is a place where securities sold on the primary market are bought and sold, so the income from their sale in this market goes to the security owner, not the company that issued the security. Thus, the secondary market is not a place where the economy's savings are distributed to finance companies and governments. Nevertheless, secondary markets facilitate primary market transactions. Secondary markets have a beneficial role in promoting the transfer of funds to the primary markets. Funds intended for ST investment can flow into long-term (LT) investments through these markets (Başoğlu, Ceylan, and Parasız, 2009).

Exchanges and over-the-counter markets are a classification of secondary markets. Regarding where financial instruments are purchased and sold, secondary markets may be divided into two categories. Exchanges and over-the-counter markets fall under this category. An exchange is an organized market where specific amounts of trade occur. The prices in these markets, where many buyers and sellers participate, are primarily determined by perfect competition. A key aspect of exchange markets is that they

create a continuous market for buying and selling financial instruments. This will enable investors to turn their assets into cash when needed. Stock exchanges are the most widely known exchange markets (Erdem, 2014).

Unlike exchanges, over-the-counter markets have no specific venue and strict working procedures, where transactions are carried out through bargaining. Rather than having a central location, transactions are handled through a computer or telephone and fax network. The stock exchange generally trades the stocks and bonds of large companies registered there. Nevertheless, it will be easier to understand how high the trading volume of these markets is since foreign currencies and Treasury notes, as well as stocks of small and little-known companies that are not listed on the stock exchange, are widely traded in over-the-counter markets. Low transaction costs and low formality, combined with high risk, characterize these markets (Erdem, 2014).

Financial Assets: Financial assets are claims against the income or wealth of businesses, firms, households, or government units, usually in the form of certificates and receipts, but sometimes also in the form of computer files, often created due to lending money (Rose and Marquis, 2008). A financial asset has the task of ensuring that capital flows from savers to those who need it to spread the risk between investors and savers and to maintain the flow of capital from the savers (Bakkal and Korkmaz, 2011).

Financial assets are distinctive due to their general characteristics. Financial assets act as a store of value and promise owners future rewards. Ultimately, it is the issuer of the security who holds the key to its value and the key to its market value. Since the market determines the value, as opposed to physical goods, financial assets do not depreciate. Their value as a commodity is minimal, and they are inexpensive to transport and store (Rose and Marquis, 2008).

Money and capital market assets are the two most common types of financial assets. An asset of the money market is one that is held for a short period of time. Usually, these are debt instruments that mature within one year. Their trading volumes are

relatively high, their maturities are brief, and their risks are minimal (Erdem, 2014). Listed below are the types of money market assets and their issuers.

Table 2.1 Money market assets

ASSETS	ISSUERS
Treasury Bills	Governments
Certificate of Deposit	Banks and Saving Institutions
Financing Bills	Banks, Finance, and Other Companies
Eurodollar Deposits	International Banks
Acceptance Credit	Banks
Central Bank Funds (Interbank Market)	Depository Institutions
Repo Agreements	Companies and Financial Institutions

Source: Günal, 2010

Financial instruments that are held for a more extended period of time are capital market assets. Equities and debt instruments with maturities over one year fall into this category. There is a relatively high risk of default, long maturity, and a slightly lower trading volume for debt instruments traded here (Erdem, 2014). Below is a table that shows the types of capital market assets, their issuers, and their maturities:

Table 2.2 Capital market assets

ASSETS	ISSUERS	MATURITY
Government Securities	Governments	1-30 years
Municipal Bonds	Municipalities	10-30 years
Corporate Bonds	Companies	10-30 years
Mortgage Securities	Individuals and Companies	15-30 years
Stocks	Companies	-

Source: Günal, 2010

Financial Services: As the term implies, financial services refer to products and services provided by financial institutions to facilitate various financial transactions and activities. Despite banks' significant role in the FS, some other organizations also play major roles through their financial services (Günal, 2010). Several prominent financial services are offered, including leasing, factoring, asset management, and

insurance. The leasing method provides the lessee with all kinds of usage rights in exchange for the determined rents, but the leasing company retains ownership of any investment goods. At the end of the lease period, the ownership of the goods is transferred from the leasing company to the lessee for the value determined in the lease. The factoring industry deals with purchasing ST promissory receivables from credit sales to commercial enterprises that sell goods or provide services domestically and internationally (Coşkun, 2010).

Insurance companies provide coverage for determinable risks incurred by individuals and companies. Insurers place tremendous importance on the financial health of the insurance company since an insurance contract represents a promise to pay the insured in the event of a catastrophe. Investment information and advice are provided by asset management companies to their clients, such as detailed research reports written by security analysts and simple guides to stocks and bonds. Incentives and management fees provide revenue for these companies, which serve individual investors and institutions (Kidwell et al., 2012).

2.3 Operation of the Financial System

Financial markets⁵ are the mechanism that allows those with extra money to lend it to those who lack it, and that is where the market comes into play and allows lending to work. Funds are transferred in exchange for documents in these marketplaces between people who want cash and those who give cash. The entire FS comprises investors who provide capital to financial markets, people and businesses who need money, financial assets they offer to the market, and intermediary institutions (Başoğlu et al., 2009). When there are no financial markets, it is impossible to transmit funds from one investor to another; in this case, both parties could suffer. Therefore, to promote economic efficiency, financial markets are vital (Mishkin, 2004). The accompanying figure provides a schematic representation of this system:

⁵ Despite their similarities, the FS and the financial market are two distinct concepts as discussed under the title of the structure of the FS. The former is a broader term, while the latter refers to a more specific term. However, the two terms are mostly used in the literature interchangeably. Since Mishkin discussed the operation of the FS considering the financial market, we preferred to stick to his perspective here.

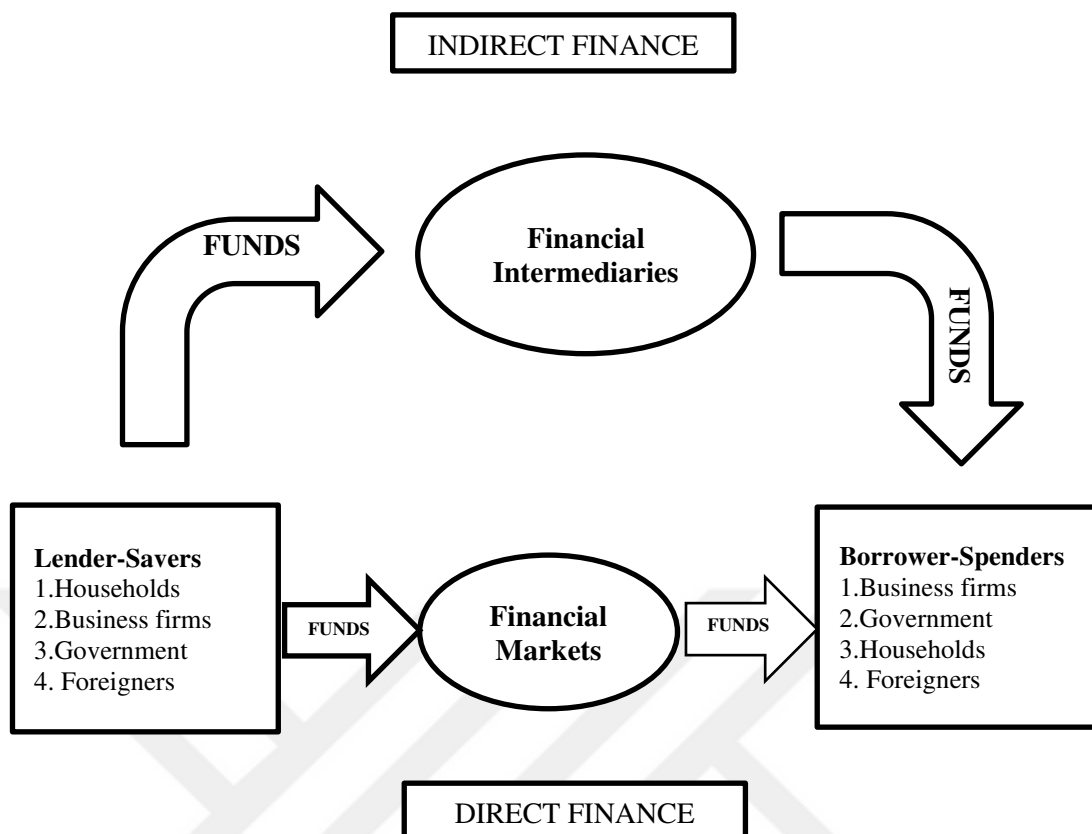


Figure 2.2 The flow of funds through the financial system (Mishkin, 2004)

Lender-savers, those who have put aside and are granting funds, are on the left, while borrower-spenders, who must borrow funds to finance their spending, are on the right. Households are the biggest lender-savers, but business firms, the government, foreigners, and their governments, may also have excess funds they can lend out. While businesses and the government account for the majority of borrowing-spending, households and foreigners also borrow for car, furniture, and house purchases. From lender-savers to borrower-spenders, funds flow as shown by the arrows (Mishkin, 2004).

The process of fund transfer involves direct financing and indirect financing. Direct financing involves people in financial need selling securities to lenders directly on the market and returning their debt with future income. The indirect financing method consists of the saver transferring funds to the FI and those in need of funds obtaining them through FIs. Thus, financial markets facilitate the establishment of monetary relations between people with surplus funds and those who need them (Öçal and Çolak, 1999). The indirect method requires FIs to act as a bridge between lenders and

borrowers by transforming financial claims into something appealing to both parties. Money transfers cannot occur unless both parties are satisfied simultaneously (Kidwell et al., 2012).

Intermediaries operate on the demand and supply sides of the financial markets by issuing attractive financial claims and making loans available to other customers (Rose and Marquis, 2008). FI can offer both fund suppliers and fund requesters a number of benefits (Coşkun, 2010):

- *Reducing fund costs:* They provide substantial cost savings to fund suppliers and buyers by managing portfolios, conducting market research, doing financial analyses, and investing on their behalf.
- *Making quantity adjustment:* Financial institutions adjust the amount by presenting funds in varying amounts to units with different demands.
- *Setting a maturity:* It is possible for financial institutions to provide financial instruments of different maturities to both fund providers and fund suppliers.
- *Adjusting the risk:* In financial institutions, risk can be adjusted to a greater degree than in a single unit, easing the risk distribution.
- *Providing financial advisory services:* Both fund providers and fund requesters can benefit from the services that financial institutions offer, such as portfolio analysis, market analysis, and financial analysis.

It is common for financial markets to encounter some market frictions, including asymmetric information and transaction costs. Financial markets are characterized by asymmetric information since lenders have a more in-depth understanding of borrowers than borrowers do. The asymmetric distribution of information in the financial markets causes adverse selection and moral hazard problems. Information about borrowers must be collected by financial resource providers and monitored regularly to avoid these issues. Consequently, high costs are incurred. A bank or other FI is one of the most effective solutions to the information problem in financial markets because they have a significant knowledge advantage. The banking industry specializes in the collection of any kind of information. Banks, therefore, have a much greater understanding of companies than savers. (Cengiz, 2010). It is essential for

banks to screen loan applications to substantiate that the finest opportunities are granted to the projects they grant loans to due to the information asymmetry (Singh, 1992, qtd. in Kpodar and Singh, 2011:4).

2.4 Functions of the Financial System

The numerous functions and services provided by FS contribute positively to economic activity. It is imperative that the FS can perform certain functions so as to be effective in promoting EG. The study by Levine (1997) summarizes these functions well. Five categories were used by Levine (1997) to distinguish the FS's functions are:

- Facilitating risk management
- Allocation of resources
- Monitoring managers and exerting corporate control
- Mobilization of savings
- Easing the exchange of goods and services

Risk Management: An approach to risk management in finance involves applying an analytical approach to uncertainties in operations, credit, reputation, portfolios, and liquidity. Risk management is generally concerned with mitigating and minimizing risk rather than eliminating it and developing countermeasures to protect against it (Tarantino and Cernauskas, 2011). In order to facilitate risk management, appropriate financial instruments must be used to distribute risk. Hedging, diversification, and underwriting are three different methods used in risk management (Aras and Müslümov, 2003).

There are idiosyncratic risks and liquidity risks associated with risk management (Levine, 1997). In the context of financial assets, the risk is a chance to see how they will change in comparison with our expectations and how their value will change as well. People and institutions have different risk-taking abilities and risk-averseness. It is in the interest of these economic units to keep possible risks and costs as low as possible (Erdem, 2014). Agents with idiosyncratic risk may hesitate to invest substantial amounts of their wealth in illiquid assets if they worry, they may need these

funds before they mature. The FI can better predict and adjust its investment portfolio to accommodate early withdrawals due to idiosyncratic events than an individual saver (Greenwood and Jovanovic, 1990)

Liquidity refers to agents' ability to quickly transform financial instruments into purchasing power at settled prices and at a reasonable cost. An asset's conversion into a medium of exchange involves uncertainties that generate liquidity risk. There is a potential for liquidity risks to be exacerbated by informational asymmetries and transaction costs. It is through market frictions that financial markets are able to develop institutions that augment liquidity in the markets (Levine, 2005).

The FS is capable of mitigating the risks fallen with specific projects, firms, industries, regions, and countries. The banking system, mutual funds, and the securities market all provide avenues for trading, pooling, and diversifying risk in various ways (Levine, 2005). According to Bencivenga and Smith (1991), banks have a crucial role in promoting EG by contributing liquidity and enhancing the composition of savings. Some investors also find stock markets appealing because they allow them to put money into the high-return projects and then sell them promptly to acquire cash when necessary (Ang, 2008a).

Allocation of Resources: A fact about real world FIs is that they generate costly data on potential borrowers. This information is used to determine whether a loan is to be allocated as well as the terms that will apply (Boyd and Prescott, 1986). Through financial intermediation, borrowers seeking to increase their investments in real assets can borrow at a lower rate and receive a more favorable term than if they were borrowed directly from lenders. Instead of holding FI obligations, private borrowers' creditors would surely insist on higher interest rates and stricter terms if they held the obligations offered by FIs. The increase in financial intermediation and efficiency of financial institutions, therefore, creates an expansionary influence in the economy (Tobin and Brainard, 1963). In the absence of intermediaries, each investor must pay a fixed cost for information. The FIs can fill this role for all their members instead of individuals or groups doing it themselves. Reducing information acquisition costs can

enhance the allocation of resources by smoothing the acquisition of information about investment opportunities (Levine, 1997).

Monitoring Managers: A sound understanding of corporate governance and financial factors is key to understanding EG in general. Both savings and allocation decisions are influenced by how effectively capital providers monitor and determine how firms use that capital (Levine, 2005). The financial statements of a company are the basis for major decisions, including capital raising, debt covenants, and executive remuneration. Managers prepare the financial statements for both internal and external stakeholders to provide them with information. Statements provide information that can help external investors make more informed investment decisions. Managers control how the company's specific information is reported and collected, and they have the option to present the company's earnings in a manner that will benefit the company or themselves (Ghazali, Shafie, and Sanusi 2015). External investors, however, must collectively incur a fixed cost to observe the real returns on their own projects in their investments. Managers can observe returns to their individual projects in the firm for free but external investors should employ prudent auditing strategies in this scenario to reduce dissipative costs (Bernanke and Gertler, 1989).

There may be a diminution in the cost of monitoring firms as a result of the increased availability of FI services (Ang, 2008a). FI can save money on monitoring costs if borrowers have to obtain funds from many outside sources. Investors or project owners are able to borrow from the savings of many individuals through FIs. An intermediary holding a diversified portfolio does not need to be monitored by the saver. Investing in a well-diversified portfolio allows the intermediary to meet its depositors' expectations, and depositors can never worry about monitoring the bank's performance. By lowering monitoring costs, well-diversified FIs can encourage efficient investments (Levine, 1997).

Mobilization of Savings: One of the basic principles of market economies is the assumption that many sources of savings end up in the FS, where they are recycled into loans for consumption, production, new investment projects, or government

deficits. These include household savings, retained profits by firms, pension funds from the private and public sectors, and budget surpluses (Tanzi, 1991).

A growing economy requires increased savings as well as increased investment. An effective FS makes it possible for economic units to be directed towards saving when such a system is in place (Afşar and Afşar, 2007). The FS induces the mobilization of savings by pooling the savings of diverse households and making these aggregate funds available for granting. Due to the expansion of FS, more deposits will come from savers, and more funds will be available for investments as well. As a result, financial intermediation activities are facilitated, and the FS is deepened (Ang, 2008a). Intermediation activities are made possible and relatively efficient by banking systems. Essentially, this system acts as a sponge that absorbs savings and lends them to the areas where they will be most beneficial. A rate of interest is the primary instrument for allocating funds and is assumed to determine a person's propensity to save (Tanzi, 1991).

The effectiveness of FS in pooling individual savings can have a profound impact on the development of economies. Furthermore, better savings mobilization can help to allocate resources, boost technological innovation and directly promote capital accumulation. The FS may thus contribute to the adoption of better technologies and promote growth by effectively mobilizing funds for projects (Levine, 1997).

Easing the Exchange of Goods and Services: There is a significant connection between exchanging goods and services, specialization, and innovation. Transaction costs can be lowered through financial arrangements that upgrade specialization, technological innovation, and growth (Levine, 2005). In a market-based environment, it is possible to specialize to a greater extent. With the advancement of production technologies, they typically require an increasing level of specialized inputs and produce an increasing level of specialized outputs. These specialized goods and services can be traded between agents for the purpose of monetizing these technological advances to increase their profits (Greenwood and Smith, 1997).

A greater degree of specialization requires a greater number of transactions. The greater specialization will be facilitated by financial arrangements that lower transaction costs. Hence, markets encouraging the exchange of goods and services contribute to productivity gains. In addition, these productivity gains may positively impact the evolution of financial markets. The high income per capita implies that fixed costs associated with establishing markets are less burdensome when compared to lower income per capita. The evolution of financial markets can thus be influenced by EG (Levine, 1997).

Banks and other FIs play a significant role in facilitating the exchange of goods, services, and assets by handling a number of financial transactions (Aras and Müslümov, 2003). The credit facility is offered in conjunction with a payment guarantee as a means to facilitate a transaction of such a nature (Ang, 2008a). Typically, these funds are used by entrepreneurs to undertake larger-scale activities than what can be afforded by a small number of individuals (Greenwood and Smith, 1997).

2.5 Characteristics of the Financial System

FS is multidimensional. Four major characteristics of FS are particularly important: Financial depth, financial access, financial efficiency, and financial stability (Čihák, Demirgüç-Kunt, Feyen, and Levine, 2012). Aside from these four characteristics, including financial innovation in this discussion is also appropriate. This section of the study explains what characteristics of the FS mean, describes them in detail, and shows how they contribute to EG.

Financial Depth: Financial depth can be defined as the ratio between financial throughput and final output in the most general sense (Trew, 2008). As another definition suggests, it stands for the size of financial transactions compared to the real economy. An expansion of financial assets relative to real assets can also be interpreted as part of this process (Hamori and Hashiguchi, 2012).

The deepening of the FS can be expressed as the expansion of the FS, the diversification of financial instruments, and the availability of a broader range of

financial services to everybody. (Erdem, 2014). There is a deepening in quality in the financial markets when the following conditions are met (Popiel, 1990 qtd. in Nzotta and Okereke, 2009:57):

- Various instruments are available to savers and investors with different liquidity characteristics, yields, maturities, and levels of risk, including debt instruments, equity instruments, and quasi-equity instruments.
- Different financial instruments are traded in their sub-markets.
- There is an integration of mature, domestic and international financial markets.
- Through financial instruments, financial markets are linked.
- Market makers and FIs connect the markets through various financial institutions.

Popiel's conclusions align with Shaw (1973), who argues that investment in real finance and wider markets contribute to financial deepening (Nzotta and Okereke, 2009). Shaw (1973) defines financial deepening as substantial rises in the ratio of a country's financial assets to GDP (Moore, 1986).

An increased ratio of financial transfers to the real economy will lead to financial deepening, which will increase EG. A low ratio leads to weak financial deepening and weak EG because real resources are lacking (Erim and Türk, 2005). The funds created within an FS without depth remain within the system. Essentially, the funds remain in the system in an undesirable manner and are turned into financial gains, i.e., money is earned from money. The insufficient financing of real sector investments negatively impacts EG in LT as a result (Öztürk, Barışık, and Darıcı, 2010).

Financial Access: The term "financial access" stands for the provision of financial services of reasonable quality and at reasonable costs, where reasonable quality and reasonable costs are measured in relation to some objective standard, and costs are based on all economic and noneconomic expenses (Claessens, 2006). Obtaining a satisfactory level of financial access is a function of the availability of appropriate financial services tailored to meet each individual's needs, as well as the cost-effectiveness of the services offered (Le, Chuc, and Hesary, 2019).

Access to financial services may be facilitated in several ways by a well-functioning FS. It prevails over market friction and effectively provides financial services to small and medium-sized companies and households (Čihák et al., 2012). There are a great possibility that micro- and small businesses, and the talented poor will be especially impacted by imperfections within the financial markets, such as information asymmetries and transaction costs. Due to the lack of collateral, credit histories, and connections, these parties have only their own savings and earnings and are unable to access inclusive FS (Beck, Demirgüç-Kunt, and Honohan, 2009).

Globally, financial access has become a major issue for policymakers to consider when planning strong growth policies. From a theoretical perspective, financial access has been argued to be the catalyst for EG. In addition to making capital formation more accessible, the financial sector encourages innovation, efficiency, and investment that leads to EG. As the economy grows, the banking sector appears to be more specific and cost-effective as it encourages capital accumulation and attracts business competition among banks, resulting in greater investment and growth (Sulong and Bakar, 2018).

Financial Efficiency: Financial efficiency can be defined as the ability to convert resources into capital most efficiently. Therefore, the financial sector is most efficient if it allows for a least price for intermediates and diminishes the comprehensive cost of capital to its ideal level (Blejer, 2006). The cost of intermediating credit is the primary measure of efficiency regarding intermediaries (Čihák et al., 2012). The banking system, for example, is efficient when banks perform their financial intermediation function with the least amount of resources (Ural, 1999).

A stable and efficient FS supports EG, whereas a poorly developed and inefficient FS negatively impacts EG. The efficiency of FIs is one requirement for this. A key component of FS efficiency is information gathering. In financial markets, asymmetric information, externalities, and imperfect competition can result in inefficient allocation of capital and other undesirable influences, such as fraud in banks or low liquidity that harm growth. The legal and institutional arrangements in place to address several of these market deficiencies can also contribute to EG (Afşar, 2007).

Financial Stability: Achieving financial stability involves many angles of finance, making it difficult to define. Market structures and financial institutions impact financial stability on a micro level. The payment system's functionality and monetary stability play a critical role in financial stability on a macro level (Creel, Hubert, and Labondance, 2015). The concept of financial stability is not static but rather occurs along a continuum. For the FS to remain stable, all of its components must function correctly. A monetary system, as well as the agreements, conventions, and institutions that govern it, along with private financial processes, institutions, and conventions, are also included. A country's financial stability or instability can be caused by either private institutions and actions or official institutions and actions (Schinasi, 2004).

A stable FS is one that is not subject to excessive volatility, stress, or economic crises. Despite its simplicity, this narrow definition fails to recognize the positive impact of a well-functioning FS on the economy. A variety of links exist between financial markets, infrastructures, and institutions operating within legal, fiscal, and accounting frameworks associated with financial stability (Gadanecz and Jayaram, 2008). As a broad definition, financial stability stands for the ability of a FS to withstand shocks and unravel financial imbalances, assuring that the financial intermediation process does not suffer disruptions that could hinder the allocation of savings to profitable investment opportunities (ECB Report, 2007).

The definition of financial stability offered by Schinasi (2004) is that it is a condition in an economy whose pricing, allocation, and risk management mechanisms work well enough to boost EG. Schinasi (2004) indicates the importance of five key principles while defining financial stability:

- Different aspects of finance are considered in the definition of financial stability, containing financial infrastructure, financial institutions, and financial markets. Private and public entities have a crucial role in the financial infrastructure and the markets.
- Besides verifying that finance adequately allocates resources and risks, mobilizes savings, and facilitates wealth accumulation, evolution, and growth, financial

stability also implies that the payment system throughout the economy is functioning smoothly.

- In addition to preventing actual financial crises, financial stability also stands for the ability of financial institutions to restrict, contain, and deal with disparities before they threaten their own existence or economic structure.
- The importance of financial stability should be framed in terms of its potential repercussions for the real economy. Unless disruptions in financial markets or individual financial institutions are expected to damage the economy as a whole, they need not be considered menaces to financial stability.
- It is crucial to think of financial stability as occurring along a continuum. In other words, each component of the FS does not need to perform at peak efficiency continuously for the system to be stable; it can sometimes operate on a spare tire.

Financial crises are often the result of instabilities in the FS, and EG is adversely affected by financial crises (Manu, Adjasi, Abor, and Harvey, 2011). Financial stability can be ensured by focusing on five distinct factors:

“a) asymmetric information and agency problems in financial contracts, b) the potential for sudden and dramatic reappreciations of market risk, c) adjustments in credit supply as a critical channel by which market risk becomes systemic, d) bank funding conditions as major determinants of bank lending decisions, e) central bank liquidity as a substitute for market liquidity when private credit disappears (Christiano, Motto, and Rostagno, 2010, p.5).”

The stability of an FS enriches economic performance in many dimensions, while the instability of an FS reduces economic performance (Schinasi, 2004).

Financial Innovation: Normally, innovation refers to a new product or process eligible for patent protection. Using patent data to define innovations in real-sector industries has been criticized by economists who have studied real-sector innovation. The term 'financial innovation' has been used to refer to specific developments in financial markets and instruments (Ben-Horim and Silber, 1977). Financial innovations lead to the origination and growth of new financial instruments, technologies, markets, and institutions. The innovation can be split into product or process innovations, with the product being characterized by derivative contracts, new corporate securities, or new types of pooled investment products, while the process improvement is characterized

by changes to the way securities are distributed, transactions are processed, or prices are set. (Tufano, 2003).

It is possible to upgrade the performance of the economy in general -and EG in particular- in three ways through innovations in financial products and services (Merton, 1992):

- New securities or products to meet investor or issuer demands for market completion that offers an expanded set of circumstances for risk-sharing, risk-pooling, hedging, and intertemporal or spatial resource transfers.
- A reduction in transaction costs or an increase in liquidity.
- Identifying and diminishing agency costs that originate from informational imbalances connecting trading parties or inadequate monitoring by principals of their agents' performance.

There are numerous dissimilar sorts of financial products and financial institutions in the real economy that employ a variety of business processes. A growing literature on financial innovation examines some of these practices, explains why we observe a growing diversity of practices, and discusses the implications for both the private and social sectors (Tufano, 2003).

3. FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

This section aims to discuss the definition and measurement of FD, the role of FD in EG models, how FD influences EG considering the transmission mechanisms, and the state of Turkish FD, credit composition, and EG.

3.1 The Definition of Financial Development

As a concept of FD, it is tough to define it from a single point of view since the concept can be viewed from a number of different angles. An improvement in FI services in terms of quantity, quality, and efficiency is generally defined as FD (Choong and Chan, 2011). According to the World Bank Group's Global Financial Development Report (2019), FD is the process of diminishing the costs associated with acquiring information, enforcing contracts, and transacting.

A FS's evolution is also expressed by a combination of depth (the size and liquidity of markets), accessibility (the accessibility of financial services by individuals and companies), stability (the absence of excessive volatility, stress, or economic crises), and efficiency (the ability of institutions to supply financial services at a low cost and with feasible revenues, and the level of activity on capital markets). (Svrydzhenka, 2016). A further aspect of FD is that it is not only concerned with the development of institutions, but it also emerges as a concept that encompasses the evolution of financial markets as well.

3.2 Measurement of Financial Development

An ideal approach would be to construct measures capable of capturing the specific functions performed by the FS. A comparative evaluation should therefore be possible of the efficacy of the FS regarding the research of firms, the identification of profitable ventures, the management of risks, the mobilization of savings, and the facilitation of transactions. There would be an enormous challenge in attempting to measure these services accurately in any single country; even more difficult would be attempting to do so across an entire cross-section of countries at once (Levine, 1999). A number of

factors make it difficult to construct variables that capture the evolution of finance. A broad variety of financial institutions and agents provide the provision of financial services. Banks and stock markets illustrate important roles in this regard. Various aspects of FD need to be considered to get a comprehensive picture, such as what role banks play in the financial sectors of the study countries or whether the stock market plays the same role (Samargandi, Fidrmuc, and Ghosh, 2015).

Empirical researchers examined whether different financial intermediation indicators are appropriate, while theoretical economists modeled the hypothetical link between FD and EG. Research on this issue has been focusing on the monetary aggregate measures. Various studies have examined alternative sets of monetary aggregates to study the tie between financial intermediation and EG. Some indicators have been proposed as proxy indicators for financial intermediation, depending on the particular characteristics of the FS. It is relevant that the variables were chosen to reflect the size, efficiency, and/or relative importance of various FIs within the FS as a whole (Choong and Chan, 2011). Those who conduct research on FD use a variety of definitions in an attempt to verify the robustness of the findings. Moreover, indicators vary depending on the type of FS a country has, such as a banking system or a stock market (Valickova, Havranek, and Horvath, 2015).

The Lynch (1996) study suggests that a comprehensive set of indicators should be established to specify how effectively the FS is functioning, including aspects such as credit intermediation, liquidity management, and risk management, as well as price setting and price flexibility. Lynch (1996) has identified five categories of FD indicators. These include quantity measures, structural measures, price measures, product range measures, and transaction cost measures.

Quantity Measures: This category of indicators can be divided into three categories: Monetary aggregates, credit aggregates, and capital market indicators. Monetary aggregates are among the most popular quantity indicators (Oruç and Turgut, 2014).

A measure of monetary aggregates is the ratio between narrowly defined money supply (M1) and broad money supply (M2) to national income. An important indicator of the

depth of the FS is the M2/GDP ratio. Furthermore, it expresses the degree of monetization of the economy as well as the ratio of the broadly defined money supply to income. It provides information regarding the use of banking services by households. Another monetary criterion ratio is the M3/GDP ratio. This shows the ratio of the size, which is made up of the repo and some bank funds, as well as the M2 money stock, to the GDP. A high ratio indicates that the financial markets are developing (Öztürk et al., 2010).

M2 or M3 are not very precise proxy measures for FD, according to Ang and McKibbin (2007), since they reflect how many transaction services the FS provides rather than its ability to convey funds between depositors and investment opportunities. Khan and Senhadji (2003) contend that money is utilized as a store of value in economies where the FS is underdeveloped, so researchers are focusing their attention on M3, the liquid liabilities of banks. In addition to overcoming some shortcomings, M3 still incorporates M2 and may be governed by other factors as well. In this regard, private sector lending has been favored as a means of enhancing FD.

For credit aggregates, the ratio of total domestic credit volume to national income, the ratio of credits given to the private sector to national income, and the ratio of credits given to the private sector to the total amount of domestic credit can be defined (Meçik and Karabacak, 2011). The share of credits given to the private sector in GDP and total domestic credits are two variables widely used in the applied literature for the abovementioned measures of monetary aggregates. Private sector credits indicate the financial sector's ability to pay for the private sector and have a crucial role in enhancing FD (Özmerdivanlı and Akel, 2019). Using this indicator, we can measure more accurately how FIs channel funds to the private sector since it keeps out credit to the public sector. However, this only indicates partial FD, as it only reflects developments in the banking sector, ignoring the stock market and bond market development (Khan and Senhadji, 2003).

A mature financial sector tends to place more emphasis on financial institutions other than banks and financial markets, so bank money and credit-based measures of development tend to have a downward bias. An indicator of development should be

based on a wider definition of financial assets (Lynch, 1996). Indicators of the capital market comprises the share of stock market capitalization in GDP, stock market turnover, stock market activity, and share of bond market capitalization in GDP. It is evident that the size of the capital market increases in tandem with these variables' values (Özmerdivanlı and Akel, 2019). Stock market capitalization is a measure of capital mobilization and risk diversification based on the value of listed shares divided by the value of the GDP (Demirgüç-Kunt, 2006). Liquidity is more closely associated with stock market turnover and activity. Stock market activity refers to the value of traded shares relative to GDP, whereas turnover ratio refers to the value of traded shares relative to listed shares (Valickova et al., 2015). Divided by GDP, the total amount of outstanding domestic debt securities issued by private and public entities are used to determine bond market capitalization (Beck, Demirgüç-Kunt, and Levine, 2009).

Structural Measures: These measures aim at helping interpret the structure of the FS and to control the significance of each element. Lynch (1996) introduced three measures for this aim: Broad/narrow money ratios, securities market outstanding/broad money ratios, and derivatives turnover ratios to underlying instruments turnover ratios.

In the rationalization of the ratio of broad to narrow money ($M2/M1$), broad money ($M2$) is expected to reflect a greater array of money substitutes than narrow money ($M1$) (Ansong, Marfo-Yiadom and Ekow-Asmah, 2011). An economy's level of FD should be positively correlated with its ratio of broad money to narrow money (Outreville, 1999). An indicator of a healthy balance connecting FIs and markets for securities is the securities market to money market ratio ($SEC/M2$). SEC refers to the total amount of equity, bond, and ST debt securities outstanding. By measuring the ratio of derivative turnover to market turnover in underlying instruments, it is possible to measure the relative significance of off-balance sheet risk management products versus cash trading in the instruments on which the derivatives are based. Market stability and efficiency are required for derivative instruments and escalate in prominence as underlying markets meet these criteria. The development of the financial sector is thus indicated by a positive trend. The turnover of derivatives is

computed by the notional turnover of equity futures and options contracts, as well as exchange traded interest rates (Lynch, 1996).

Financial Price: It is mainly a measure of the real interest rate on a deposit. The most significant financial price is the real deposit interest rate. Real interest rates must be positive to achieve substantial financial deepening (Lynch, 1996). Real interest rates have a crucial role in FD, financial deepening, and intermediation, which is why researchers commonly use these rates as financial variables in empirical studies (Demetriades and Luintel, 1996; Khan, Qayyum, and Sheikh, 2005; Takyi and Obeng, 2013). It is based on McKinnon-Shaw's theory that real interest rates are a suitable financial variable (Erim and Türk, 2005).

A solid association connecting financial intermediation and the real interest rate, which is supposed to be a measure of financial repression, as explained by the McKinnon-Shaw hypothesis. A positive real interest rate increases credit availability for the private sector by stimulating financial savings and financial intermediation. The result is an escalation in investment and growth, which stimulates economic activity. Although the hypothesis emphasizes the influence of real interest rates on savings volume as the main channel of transmission, it is also known that positive real interest rates escalate the efficiency with which investible funds can be allocated, thereby boosting EG (De Gregorio and Guidotti, 1995). By increasing financial saving mobilization and capital productivity, a positive real interest rate promotes FD and growth (Khan et al., 2005).

Due to high inflation rates, McKinnon-Shaw's hypotheses suggest that ceilings on interest rates often bring about negative real interest rates, which discourage saving and induce excess investment. As real interest rates fell, investment volume decreased, and so did capital productivity since low productivity investments could become profitable when real interest rates were low. For FD to take place and, therefore, for growth to occur, it was essential that interest rate ceilings were removed (Law and Habibullah, 2009).

The volatility of real interest rates in market-oriented FS should be lower than that of nominal rates in controlled systems. The presence of dissimilarity in inflation across countries and over time, which makes comparisons difficult. As financial pricing efficiency improves, it is reasonable that nominal interest rate variability will be reduced to some extent (Lynch, 1996).

Product Range: In spite of the fact that no ratio can be used to measure the diversity of financial products in a FS, it is possible to obtain information as to the diversity of financial products by examining the number of instruments used in the financial sector (Özmerdivanlı and Akel, 2019). Financial products can be categorized as business-financing, investment, and foreign exchange and risk management. Credit intermediation, savings, and risk management are all covered in this category, from the least sophisticated products to the most advanced (Lynch, 1996).

As FS prospers and market fragmentation is diminished, financial products become extra sophisticated, primarily due to more accurate estimation of financial risks. In addition, borrowing and investing options are widened, resulting in better products that fit borrower and investor needs, encouraging greater financial sector use. Financial products allow price arbitrage to be carried out across multiple time frames, markets, and countries through financial products. It is possible to gain valuable insight into a country's FD and consistency in pricing by studying its product range (Lynch, 1996).

In most developed countries, major financial centers serve much of the domestic market's financial needs, and these centers go in for varying degrees for the services of foreign clients in their respective countries. Savings and borrowing funds are transferred between investors and borrowers through financial centers, which must offer various products at competitive rates to satisfy investors' and borrowers' diverse needs. Moreover, they should be able to supply a wide financial service that can converge the needs of investors, borrowers, businesses, governments, and individuals alike. A number of services are available, including bond and equity markets, domestic and international banking, derivative instruments, and advisory services (Pilbeam, 2018).

Transaction Cost: It is a cost associated with economic exchanges, which is the cost of carrying out the transaction. Transaction costs are important factors to check out when rationally evaluating a potential transaction. Costs associated with transactions can be described as those associated with the information processing needed to coordinate the efforts of people and machines involved in the primary process (Swamy and Tulasimala, 2012).

In order to impede the direct pooling of resources and investment of society's savings, financial markets, and institutions are created to enhance the influences of information and transaction costs (Demirgüç-Kunt, 2006). Therefore, it is crucial for the evolution of the financial sector to minimize the costs involved in accumulating savers' deposits and transmitting them to those eager to pay a good return with a low possibility of non-payment. As a result of the differences in elements for the formation of financial sector to population, it is impossible to estimate financial intermediation transaction costs across countries accurately. It is often used to estimate them by using bank interest rate margins (Lynch, 1996).

Using interest income minus interest expenses divided by interest-bearing assets, the net interest margin of a country measures the difference between what banks expend to providers of funds and what they acquire from firms and other users of bank credit. The net interest margin is averaged over all banks in the country. There is a tendency for net margins to be used as a measure of efficiency although they could actually reflect differences in bank activities rather than differences in efficiency or competitiveness. A country's net interest margin tends to decline as its income increases, indicating that banks are more efficient as they develop (Demirgüç-Kunt, 2006).

As an extension to the classification made by Lynch (1996), in the second part of the study, we mentioned that there had been a classification done about the characteristics of the FS by Čihák et al. (2012) as well. For each of the four characteristics (depth, access, efficiency, and stability), Čihák et al. (2012) present FD indicators separately for financial institutions and financial markets.

Various indicators are used to measure financial depth, and Čihák et al. (2012) categorize some of these measures for financial institutions and financial markets. According to Čihák et al. (2012), an important variable in the empirical literature on FD for financial institutions is PC, represented as deposit money bank credit to the private sector as a percentage of the economy and stock market capitalization to GDP is most commonly used as a measure of stock market size. Indicators of financial depth are as follows:

“Indicators of financial depth for financial institutions: private sector credit to GDP, financial institutions’ assets to GDP, M2 to GDP, deposits to GDP, and gross value-added of the financial sector to GDP. Indicators of financial depth for financial markets: stock market capitalization plus outstanding domestic private debt securities to GDP, private debt securities to GDP, public debt securities to GDP, international debt securities to GDP, stock market capitalization to GDP, and stocks traded to GDP (Čihák et al., 2012, p.9).”

FD has often neglected the access dimension, primarily because there are serious data gaps in terms of the number of people who use financial services, their type of services, and their price, as well as a lack of systemic information regarding the barriers to broader access. To ascertain the causes of all barriers to financial inclusion, it is necessary to examine all these dimensions, as well as the notion of financial access (Beck et al., 2009). The following are some significant indicators of financial access:

“Indicators of financial access for financial institutions: accounts per thousand adults (commercial banks), branches per 100.000 adults (commercial banks), % of people with a bank account, % of firms with a line of credit (all firms), and % of firms with a line of credit (small firms). Indicators of financial access for financial markets: % of market capitalization outside of the top 10 largest companies, % of value traded outside of top 10 traded companies, government bond yields (3 months and 10 years), the ratio of domestic to total debt securities and the ratio of private to total debt securities(domestic) (Čihák et al., 2012, p.9).”

Several efficiency measures are suggested by Čihák et al. (2012) for financial institutions. These are some important indicators for measuring efficiency:

“Indicators of financial efficiency for financial institutions: net interest margin, lending-deposits spread, non-interest income to total income, overhead costs (%of total assets), profitability (returns on assets, return on equity) and no one indicator (or Herfindahl or h-statistics). Indicators of financial efficiency for financial markets: turnover ratio (turnover/capitalization) for the stock market, price synchronicity(co-movement), private information trading, price impact, liquidity/transaction costs, quoted bid-ask spread for government bonds, turnover of bonds (private, public) on the securities exchange and settlement efficiency (Čihák et al., 2012, p.9).”

Some of the most important indicators can be found below regarding financial stability. The most important indicator is z-score:

“Indicators of financial stability for financial institutions: z-score (or distance to default), capital adequacy ratios, asset quality ratios, liquidity ratios, other (net foreign exchange position to capital, etc.). Indicators of financial stability for financial markets: volatility (standard deviation/average) of stock price index, sovereign bond index, skewness of the index (stock price, sovereign bond), vulnerability to earnings manipulation, price/earnings ratio, duration, the ratio of short-term to total bonds, correlation with major bond returns (Čihák et al., 2012, p.9).”

Lastly, we can refer to the financial innovation indicator, which was included in the FS characteristics section. Laeven, Levine, and Michalopoulos (2015) measure financial innovation by how rapidly countries adopt a certain innovation related to the screening of borrowers, such as sharing information about creditors.⁶ A measure of financial innovation can be found in improving the screening technology, where financial innovation is based. The PC to GDP ratio is used for FD as an alternative measure of financial innovation within the study. As an alternative indicator of financial innovation, this metric measures the advancement of the FS.

3.3 The Role of Financial Development in Economic Growth Models

A brief definition of EG is presented in this section of the discussion, and attention is emphasized on the role of FD in growth models. Various approaches integrating finance into growth models will be examined, including the Keynesian model, the Neoclassical model, the McKinnon-Shaw model, and the Endogenous model.

EG stands for an escalation in the production of goods and services in a particular country during a given period. Economics' growth discipline is primarily concerned with the increase in production, and the increase in production that is taken into consideration in the growth analysis is the LT increase in production (Bocutoğlu and Berber, 2014). Labor, capital, natural resources, technology, and knowledge make up the production resources of a country, which change annually. A growing economy occurs when these resources are available in greater quantity and quality. Having the

⁶ The PC bureau is an organization that provides credit information about individuals and businesses. Typically, private banks create them to share credit information about their borrowers' creditworthiness (Laeven, Levine and Michalopoulos, 2015).

ability to express growth in numbers, the main indicators of a growing economy are the increase in production volume and national income (Yardımcı, 2006).

Keynesian Model: The concept of interest rates is a central part of the Keynesian model. Keynes argues that the interest rate depends on the manner in which the control over future consumption is reserved, i.e., whether the individual wishes to hold the money in liquid form (cash) or whether he or she is willing to surrender control of cash for a period of time. This factor is referred to as liquidity preference by Keynes. Liquidity preference refers to a potentiality or functional tendency, which determines the quantity of money that the public will hold when interest rates are fixed; therefore, if r is the interest rate, M is the quantity of money, and L is the liquidity preference function, then, it is defined as $M=L(r)$. Keynes also indicates that individuals hold cash for a variety of reasons, including transactional, precautionary, and speculative motives (Appelt, 2016).

Keynes questioned the rationale for holding money, which generates no income. In response, he noted that money serves as a bridge between the dead hands of the past and the more uncertain future that lies ahead. When such circumstances exist, individuals will part with their money, but only if offered an attractive price. Thus, Keynes' theory of money emphasizes the role of interest rates as incentives to overcome people's liquidity problems. According to his theory, the real sector of the economy is no longer hidden behind money. Rather, the rate of interest affects the demand for money. As a result, investment, aggregate demand, and equilibrium levels of output are directly affected by the supply and demand for money (Johnson, Ley, and Cate, 2001).

Financial repression is originally popularized by McKinnon and Shaw to describe Keynesian policies (Villanueva and Mirakhor, 1990). Keynesian 'financial repressionist' ideology dominated FD policies in the early post-war decades. Various restrictions are imposed on the FS, including interest rate controls, high reserve requirements, and directed credit programs. In developing countries, these distortionary policies were favored as a means of financing fiscal deficits without increasing taxes or inflation (Ang, 2008b).

Neoclassical Model: Neo-classical growth theory emerged from empirical studies conducted by Solow (1956) and Swan (1956). There are two basic predictions of the neo-classical theory. According to this model, the savings rate, stable capital-labor force, and per capita income values are directly proportional. Therefore, a country with more savings will be more capital-intensive and wealthier at a steady state than one with less savings. Although the savings rate increases, the steady-state growth rate remains unchanged. The model is expressed in decreasing returns to scale, which means that when it becomes stationary, the changes in technology and population growth rate are the main factors determining EG. On the other hand, both elements are not determined within the model and are added exogenously (Aksu, 2014).

The assumption underpinning this model for FD is that money and capital are substitutes. As a result, money increases reduce the demand for physical capital. Holding a large real cash balance will therefore prevent capital accumulation (Ang, 2008a). According to the neoclassical model of investment, investment is primarily determined by output levels and user costs of capital. A positive link exists between private investment and output, but a negative tie exists between private investment and user cost of capital. Models assume frictionless capital markets and easy access to finance. Credit markets may be imperfect, preventing firms from borrowing as much as they would like to. Investment projects will be discouraged by such a constraint in general (Ang, 2008b).

McKinnon-Shaw Model: The McKinnon–Shaw model critiques the financial repression policies implemented by governments in developing countries during the 1960s and 1970s, including the high reserve requirements, interest rate ceilings, administrative credit allocation, and other distortions imposed by governments during this period. Nominal interest rate ceilings are believed to stifle financial deepening and, therefore, EG by repressing the FS. Low or negative real interest rates are essentially the result of a rate ceiling, which has two negative influences. Firstly, it reduces savings, thereby reducing loanable funds that can be borrowed through formal FS. The second reason is that low real interest rates influence capital's marginal productivity. There is no incentive for bankers to ration credit based on marginal productivity. Their rationing is at the discretion of the individual, which thwarts the

efficient allocation of investible funds. These detrimental influences are further exacerbated by high reserve requirements and directed credit programs (Andersen and Tarp, 2003).

Both Keynesian and neoclassical models are criticized by McKinnon (1973) for assuming that capital markets are competitive. When efficient FS is absent in developing countries, money and capital are complements, according to McKinnon's complementarity hypothesis. Due to fragmented economic conditions and a lack of external financing, entrepreneurs are forced to accumulate funds in monetary assets to finance investments. In this regard, money and capital are complementary assets in that money is a means of accumulating capital. A debt intermediation view of Shaw (1973) is one in which the private sector's internal debt is used to create loans to the private sector. Financial intermediation between savers and investors is greater when the money stock is higher than economic activity. Therefore, it is necessary to have high-interest rates to encourage more savings (Ang, 2008a).

Endogenous Model: Several ideas regarding the limitations of the neoclassical model have had a significant influence on the evolution of endogenous growth models. Based on the neo-classical growth model, production is determined by the amount of capital, labor, and technological progress of an economy. Assuming that technology does not advance, and the labor force does not increase at any rate, per capita production is determined only by the amount of capital per capita. A rising per capita capital stock leads to diminishing marginal returns, resulting in less and less output. In this regard, higher capital accumulation due to higher savings can only have a temporary impact on the economy. The development of technology is essential to achieving LT growth (Ang, 2008a).

There has been a revival of interest in FD with the emergence of endogenous growth theory. The theory suggests that the financial sector plays a major role in stimulating growth by more efficiently allocating resources, accumulating physical and human capital faster, and advancing technology more rapidly (Samargandi et al., 2014). In order to understand how FD affects economic development (ED), Pagano (1993) introduces a simple model of endogenous growth that can be used to explain the link

between them. FD may affect EG by either increasing capital productivity, improving FS efficiency, or increasing savings rates. Generally, FSs are efficient if they allocate funds to projects with the highest marginal product of capital. The more efficiently capital is allocated, the more productive capital will be, and therefore the greater the economy will grow as a result of the increased productivity of capital (Tsuru, 2000). It is, however, costly since a cost is incurred in selecting a profitable project from a number of alternatives. On the other hand, FIs reduce these costs, facilitate the transfer of more resources to investments, and contribute positively to growth. Essentially, these are the principles on which endogenous growth models are based (Atay, 2020).

Neo-classical and endogenous growth theories differ primarily in whether policy changes have LT influences on growth. In contrast to neoclassical theory, which argues that policy changes will not affect EG in LT, the endogenous growth theory contends that policy changes matter. There was a challenge posed by endogenous growth theory to neoclassical growth theories. In accordance with endogenous growth theory, technological change is a result of the efforts of profit-maximizing firms to develop new designs, and technological advancement is an endogenous outcome of EG because financial resources are available to finance new research and development projects. (Kar, Peker, and Kaplan, 2008).

If there is endogenous growth, the growth rate of the economy will change permanently, as ever-increasing returns can be assumed to increase as the return to knowledge or other resources is increased. Under neoclassical growth theory, which assumes a decrease in return on investment for all, it will only create a temporary shift in growth. The growth rate of GDP is regressed on the level of FD in Beck, Levine and Loayza (2000). Their approach is consistent with the endogenous growth theory since an increase in the level of development will have a permanent positive effect on growth. On the other hand, Arestis, Demetriades, and Luintel (2001) regressed GDP levels on FD levels. Using error correction specifications, the authors predict that a one-time improvement in financial intermediation will only increase growth temporarily. Their proposed model is consistent with neoclassical theory (Bijlsma and Dubovik, 2014).

A number of studies have tested the link between FD and EG, but empirical findings are sensitive to how the models are selected and the equations are specified. Models based on endogenous growth provide an excellent explanation for the tie between these two variables. FD and EG are positively associated in the literature of endogenous growth models due to the ability of FIs to correct market failure resulting from informational problems, production externalities, banking sector policies, and stock market capitalization. There are several pioneers of these studies, including Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Demetriades and Luintel (1996), and Levine (1991) (Choong and Chan, 2011).

3.4 Transmission Channels

There are different financial transmission channels to explain the characteristics of EG patterns of countries. Theoretical literature posits that FD influences EG through two evident but supplementary channels, total factor productivity and capital accumulation (Ehigiamuseo and Samsurijan, 2021).

Total Factor Productivity Channel: There is a close link between this transmission channel and allocative efficiency. Thus, how production factors are distributed, in whose possession they are determined, and how much they return to production. Multifactor productivity is at its highest level when the economy is in the optimal state, and it cannot be further increased through market transactions (Abramova, Artemenko, and Krinichansky, 2022).

Two aspects of the financial sector seem to be particularly important. First, the financial sector is responsible for channeling savings into investments. The second aspect is that financial sector development can be viewed as a proxy for economic efficiency on a broad scale. It follows that the level of FD influences the rate of LT growth and total factor productivity (Neimke, 2003).

There is an important element of the factor productivity channel that can be considered important as well, and that is the use of innovative financial technologies to reduce the problem of information asymmetry (Ehigiamuseo and Samsurijan, 2021). There is a common way to calculate the total factor productivity growth in the national income

accounts by multiplying the difference between the real GDP growth and the real capital growth times the capital contribution to the national income accounts (Beck, Levine, and Loayza, 2000).

Capital Accumulation Channel: Another transmission channel of FD on EG is capital accumulation. A key reason for this is that the intensity and quality of the system's functioning determine the national saving rate, the rate of capital accumulation, and the size of intersectoral capital flows. The rate of capital accumulation relies on the savings rate, the ability to reallocate savings, and the cost of transforming savings into investments. There are many opportunities for diversifying the investment portfolio within specific types of FSs when they are associated with a sounder saving system, capable of providing effective compensation mechanisms, and offering a wide range of investment portfolio diversification mechanisms. This aspect of the FS contributes to keeping the savings rate at a level that covers the demand for resources and prevents unexpected drops in savings. To maintain a high LT average EG rate, it is necessary to provide a reliable and stable source of capital at the expense of domestic savings (Abramova et al., 2022).

In addition to the two distinct transmission channels of total factor productivity and capital accumulation, the literature also emphasizes different channels for the impact of FD on EG, including technological innovation, investment efficiency, indirect and direct channels, as well as monetary condition channels such as inflation and interest rates.

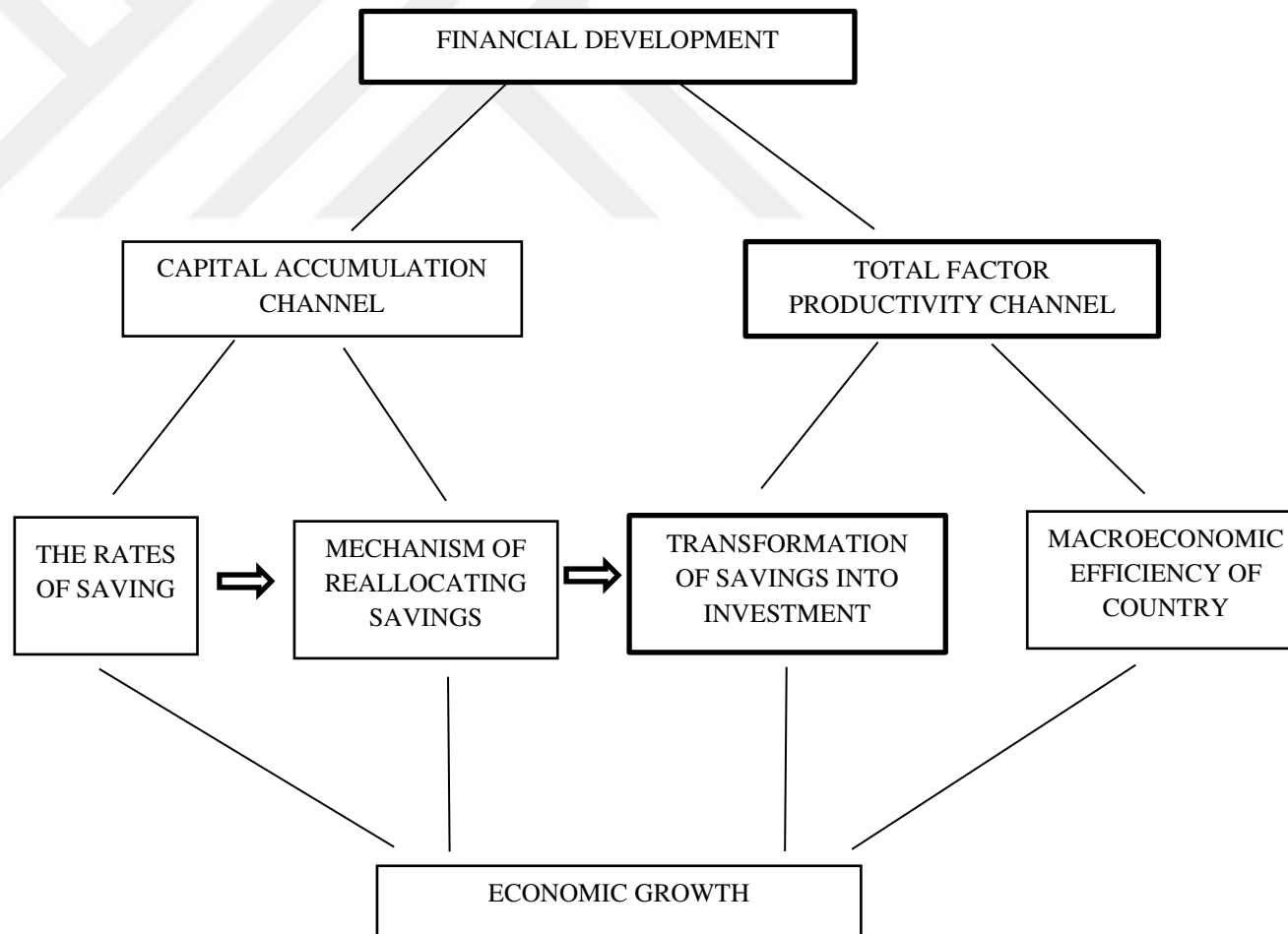


Figure 3.1 The theoretical framework of two distinct transmission channels (Author's construction)

Technological Innovation Channel: Levine (1997) examines the channel of capital accumulation to affect EG together with the channel of technological innovation. A technological innovation is an idea or process that is developed and disseminated to produce or provide new products, services, or techniques (Hirsch-Kreinsen, 2011). In technological innovation, inventing new products and processes is the key to growth models. Using these models, financial functions alter technology's rate of innovation in order to influence steady-state growth (Levine, 1997). A well-known part of technological innovation is the uncertainty it involves, similar to the uncertainties associated with the course of the innovation process, as well as the difficulty in predicting the costs associated with it. As a result of the high degree of information asymmetry between the financiers and innovators, they may act opportunistically on the part of the innovators and select risks adversely on the part of the financiers (Hirsch-Kreinsen, 2011).

At this point, for the most promising innovative technologies to be applied, the role of intermediaries should be emphasized. In particular, investors benefit from information since it allows them to gain a better understanding of the technology landscape. Intermediaries help investors save time and money through the collection and analysis of information that allows them to focus their resources on what makes them the most money. People can gain access to other people's wealth when they invest through an intermediary (Greenwood and Jovanovic, 1990). FD increases private savings and capital productivity by increasing investments, raising the social marginal productivity of capital, and altering private saving rates. Additionally, it provides information for evaluating alternative investment projects (through intermediaries), allocates financial resources to projects that have a high marginal product of capital, and influences risk sharing by encouraging individuals to invest in riskier but more productive technologies (Ehigiamuseo and Samsurijan, 2021).

The Efficiency of Investment Channel: De Gregorio and Guidotti (1995) assert that the dominant transmission channel from FD to EG is the efficiency of investment rather than the volume of investment. It is suggested in the study that although the literature indicates a strong positive link between the extent of FD and EG, different transmission channels were proposed in different studies. In their study, they mostly

focus on Goldsmith's theory on the link between FD and the efficiency of investment. According to their research, only one-fourth of the influence of FD on growth is explained by the quantity of investment; the rest is accounted for by increased investment efficiency. There is an increasing emphasis on investment efficiency in low- and middle-income countries compared to high-income countries.

Direct and Indirect Channels: Besides the transmission channels mentioned above, Prasad, Rogoff, Wei, and Kose (2003) claim that financial integration may affect growth in developing countries through direct and indirect channels. Direct channels entail an augmentation of domestic savings, reduced capital costs due to better risk allocation around the world, technology transfer, and the stimulation of the financial sector in the country. There are a variety of indirect channels that can be used, among them a specialization, a commitment to better economic policies, and better policies that signal more capital flows into new businesses.

Monetary Condition Channels: Abramova et al. (2022) stress a different point for transmission channels in their study. The monetary conditions, including price stability, the value of money, and the dynamics of monetary aggregates, affect other macroeconomic variables and are critical to sustaining EG and activity. It is asserted in their study that although the impact of monetary aggregates on the economy is quite well studied, the impact of monetary conditions on the parameters of transmission mechanism 'FD-EG' has hardly ever been practically discussed in the literature. In this context, it is asserted that the influences of inflation and interest rates on transmission are worth discussing.

As a result of the high inflation rate and the inflation expectations, the savings rate decreases due to the lack of favorable conditions for saving. Inflation-prone countries face barriers to foreign direct investment and cannot provide adequate domestic supply in the capital market; therefore, businesses there lack the funds to finance capital investments (Abramova et al., 2022). Rousseau and Wachtel (2002) use data for FD, inflation, and EG for 84 countries from 1960 to 1995 and shows that there is an inflation threshold for the finance-growth relation between 13 and 25 %. The finance sector does not increase the EG if inflation exceeds the threshold.

It is beneficial for the financial sector to operate in an environment with low interest rates. Similarly, historical examples point out that rates may rise to double-digit levels for a short period, usually dominated by accelerated inflation or downward pressure on the exchange rate or decline to zero. During periods of this kind, economic units receive distorted signals, which is enough to make it difficult for the finance-growth transmission mechanism to function as it should, causing them to behave in a riskier manner or to allocate their incomes in a more cautious manner (Abramova et al., 2022). Ang and McKibbin (2007) use time series from 1960 to 2001 for Malaysia and find that raising real interest rates has a negative impact on the evolution of the financial sector.

Credit Composition Channel: Two channels by which credit supply influences real EG can be distinguished in order to comprehend how credit composition affects EG. One view is that positive credit supply shocks boost EG mainly by boosting the demand for credit among households. Therefore, EG is influenced by HC through the consumption channel. In alternative scenarios, positive credit supply shocks can increase the productivity of labor in enterprises, which in turn improves the economy as a whole. The rise in labor productivity may be explained by the removal of enterprise borrowing constraints or the allocation of resources more efficiently among firms. As a result of improvements and increases in EC, EG is facilitated through investment channels (Irandoost, 2021). The flow of the credit composition channel is illustrated in Figure 3.2.

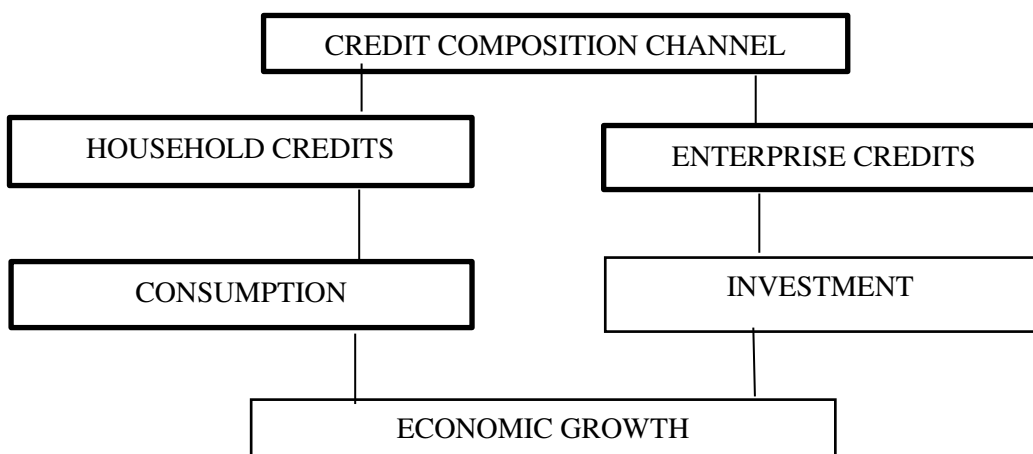


Figure 3.2 The theoretical framework of credit composition channel (Author's construction)

3.5 Credit Composition and Economic Growth

Credit generally refers to the rights or opportunities that banks grant to private or legal individuals based on law or internal regulations and policies (Erdem, 2014). Most of the funds that banks collect are allocated by the banks as credits, and the amount and maturity of the credit are determined by the investor's demand. There is a common practice of discussing credit composition in terms of the distribution of two types of credit across the banks in the economy. These two main categories of credits are ECs (working capital credits, project credits, and open credits) and consumer credits (installment credits, mortgage credits, auto credits, etc.) (Günel, 2010).

EC is an important tool for meeting a company's small volume, ST funding, and LT capital needs. A large number of companies make LT credit agreements with their banks and use credits within the limits set by the bank for a specified period of time (Tunay, 2005). Consumer credit is defined as credit used by individuals or households to purchase goods and services unrelated to investment or productive activities (Mengüç, 2017). The provision of consumer credits allows consumers to meet their various needs in a timely manner, supports consumption, revitalizes the economy, and ensures the sustainability of the savings of depositors (Bayar and Varışlı, 2020).

Credit plays an important role in alleviating liquidity constraints among individuals and companies, easing consumption, and meeting the financing needs of the real sector, especially in developing countries, at a lower cost through the provision of credit (Demirezen, 2015). The availability of credit to households and enterprises has been enhanced by improved risk assessment and pricing of risk, increased lending to households without strong collateral, the increasing securitization of loans, and the emergence of markets for riskier corporate debt. Credit usage may contribute to a diminution in economic volatility by reducing the sensitivity of household and business spending to changes in income and cash flow. Hence, negative shocks would be less likely to trigger fluctuations. A greater level of borrowing, however, may also contribute to increased volatility by enabling households and businesses to buy capital goods more rapidly when their target stocks of those goods escalate (Dynan, Elmendorf, and Sichel, 2006).

It is of great importance that the FS is robust, that there is a large credit volume, and that this is reflected in the volume of credit and contributes to EG (Özen and Vurur, 2013). When financial or economic crises strike, a majority of developed countries use expansionary monetary policies to promote consumption and investment. Real interest rates are lowered not only to increase inflation but also to increase credit demand. In most countries, using credit to finance investment and consumption is considered one of the most significant driving forces for the economy and the consumer (Irandoost, 2021). On the other hand, when bank credit is rapidly expanded to the private sector, macroeconomic stability may be affected by stimulation of aggregate demand in excess of potential output and overheating, as bank lending fuels consumption and/or import demand, which has an impact on the external current account balance, inflation, and currency stability. As the current account deficit worsens, it may subsequently result in the reduction of external credit lines and foreign liquidity, thus deteriorating the condition of the banking system and triggering a full-blown economic and financial crisis (Hilbers, Otker-Robe, Pazarbasioglu, and Johnsen 2005).

A bank credit channel describes how monetary policy practices affect aggregate demand in the economy, and thus GDP, by affecting credit volume (Togan and Berument, 2011). Bernanke and Blinder's study (1992) is one of the first to examine the bank credit channel comprehensively. The study argues that banks can extend credit to customers who might not otherwise be able to get credit in the open market due to the expertise they have acquired in evaluating credit applicants and monitoring loan performance. By reducing reserves and loans, the Federal Reserve reduces spending by customers who depend on bank credit, and thus, aggregate demand falls as well. In this way, a new channel has been opened for Federal Reserve policy to reach the real economy in a more targeted manner.

A previous section of the study stated that private sector credits, which represent EC and HC as a whole, are a leading indicator of FD in the literature. However, several reasons make it important to explore the composition of PC in emerging countries. Firstly, the effects of the increased level of HC in emerging economies remain unclear. In one sense, better access to credit helps credit-constrained households smooth out their consumption; on the other hand, it increases spending and declines saving. In

addition, higher levels of total PC are not necessarily correlated with higher levels of credit extended to enterprises. A rise in HC as a percentage of total PC has the potential to prevent investment, especially in developing countries where stock markets are not well developed to facilitate investment (Büyükkarabacak and Krause, 2009). The two types of credit appear to have some fundamental differences in their dynamics, and their impact on ED is expected to be different. Understanding credit composition and its effects on EG allows us to comprehend the tie between FD and EG better.

3.6 Financial Development and Economic Growth in Türkiye

The Turkish economy has undergone different economic periods with different characteristics based on the changing conditions of the time and international conditions. Several factors shaped the formation and development of the FS, including the circumstances and the policies implemented as a response to the problems of the period. Identifying the current structure and governance of the Turkish FS requires a thorough understanding of its development. FS development in Türkiye can be divided into several sub-periods. In this study, the historical development of the banking sector and stock market, as well as their institutional structure for the period following 1980, will be discussed together with the course of EG. 1980 is considered the beginning of this discussion because the post-1980 period marked a period of liberalization and opening up in economic policies.

Before the 1980s

Turkish FS is widely believed to have been repressed before 1980. Important examples of financial repression include the following: ceilings on deposits and lending rates and negative real interest rates; credit rationing and subsidized credits to priority sectors; excessive taxation of financial incomes and transactions; high liquidity and reserve requirements and intermediation costs; excessive reliance of corporations on credits rather than equity finance and direct security issues, and low-quality bank portfolios; undeveloped capital markets; excessive reliance of the banking sector on Central Bank for deficit financing; entry barriers to foreign banks; restrictions on external financial operations, and foreign asset holdings. Consequently, growth was

adversely affected due to inefficiencies and distortions in resource allocation (Akyuz, 1990).

During the 1980s

During the 1980s, the planned economy, with its heavily restricted banking sector, gave way to changes caused by the attempts at liberalization in the Turkish economy, aligned with the rise of neoliberalism worldwide (Akin, Aysan, and Yildiran, 2008). As part of a joint program implemented by the World Bank (WB) and the International Monetary Fund (IMF), Türkiye's closed, inward-oriented economic structure will be stabilized and liberalized in order to transition to an outward-oriented development path. As a model of success for other less developed countries, the WB and IMF presented Türkiye as an example. (Demir, 2004). Türkiye's economy underwent gradual liberalization as part of this broad program by the WB and IMF. Many components of the new economic program included liberalizing foreign trade, removing exchange rate controls, adopting special policies to attract foreign direct investment, liberalizing market interest rates to stimulate private savings, privatizing state economic enterprises, and moving income transfers to public spending instead of price mechanisms. (Onis, 1998 qtd. in Demir, 2004:853).

As there is insufficient development of nonbank FIs in our country, the banking sector forms the basis of the Turkish FS and plays a crucial role in its development. Since the 1980s, the banking sector, the most important component of our FS, has entered a rapid development phase as the country strives toward becoming a free market economy (Ural, 1999). From 1980 to 1989, several restrictions on domestic and external financial intermediation were removed, or at least minimized, to liberalize the repressed domestic FS. Even so, during the entire liberalization process in the 1980s, the number of banks increased from 43 in 1980 to 66 in 1990, with 5.954 branches growing to 6.560 and a rise in employees from 125.312 to 154.089 during the same period. In the meantime, the number of foreign banks in Türkiye increased from 4 to 23 between 1980 and 1990 (Kibritçioğlu, 2005).

As part of the post-1980 period of liberalization in our country, the Capital Market, the Istanbul Stock Exchange (1986) (ISE), the Interbank Money Market (1986), the Foreign Exchange Market, and the Banknotes Market (1988) were established. Following the efforts to establish a gold exchange, the Istanbul Gold Exchange started operating, the Savings Deposit Insurance Fund (SDIF) was established, and the Uniform Chart of Accounts was implemented. After 1984, when residents in Türkiye could open Foreign Exchange Deposit Accounts, this account, which had not previously been available, exploded in popularity (Ural, 1999).

Table 3.1 and Figure 3.3⁷ illustrate the GDP growth rate of the Turkish economy between 1980 and 1989. The Turkish economy, which is in the process of development, aims for rapid growth in order to close the welfare gap between it and developed nations (Eğilmez, 2019). During the 1980s, the country's markets were open to the world, and capital flowed into the country, resulting in high growth rates between 1981 and 1988. The highest growth rates for this period of time were 7.01 % in 1986 and 9.49 % in 1987. Nevertheless, this growth wasn't sustainable, and by the end of the 1980s, the economy started to deteriorate.

Table 3.1 GDP growth rate (%) in Türkiye: 1980-1989

Years	GDP Growth Rate
1980	-2.45
1981	4.86
1982	3.56
1983	4.97
1984	6.71
1985	4.24
1986	7.01
1987	9.49
1988	2.32
1989	0.29

Source: WB, 2023

⁷ The data provided in this section is obtained from World Bank, World Development Indicators and Global Financial Development databases.

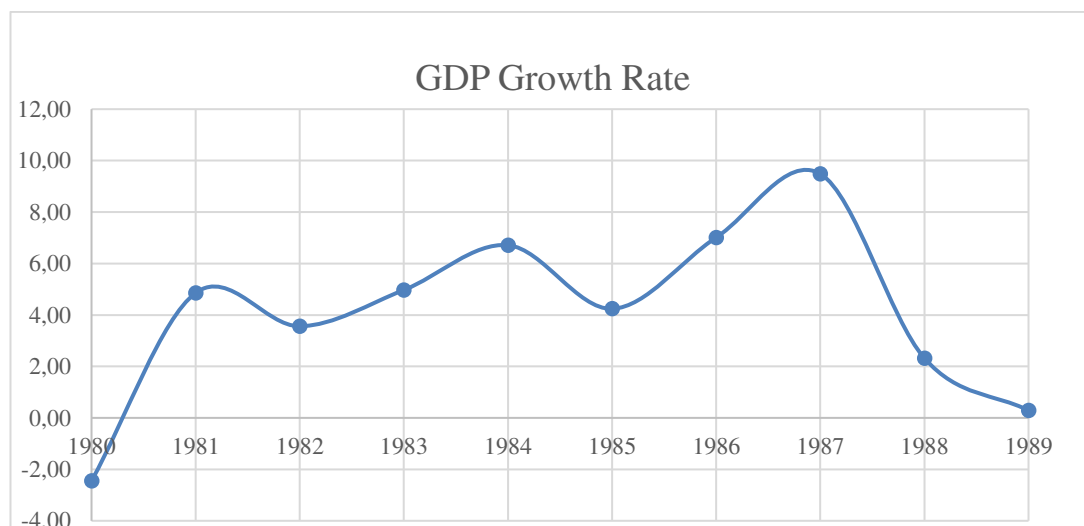


Figure 3.3 GDP growth rate (%) in Turkiye: 1980-1989 (WB, 2023)

Table 3.2 and Figure 3.4 show the development of the banking sector in Turkiye between 1980 and 1989. The ratio of financial resources allocated to the private sector by domestic money banks as a share of the GDP was around 18 % during the 1980s; thus, the share of PC is not high. The bank credit to bank deposits ratio shows banks' financial health. The ratio was high in 1980, around 100 %, indicating capital adequacy issues⁸. Bank deposits to GDP show the ability of banks to attract funds. Between 1980 and 1989, the steps for liberalization and removing restrictions on the FS gradually increased this ratio.

Table 3.2 Development of the banking sector in Turkiye:1980-1989

	Private Credit by Deposit Money Banks to GDP (%)	Bank Credit to Bank Deposits (%)	Bank Deposits to GDP (%)
1980	13.59	100.99	13.46
1981	16.65	92.32	18.03
1982	18.48	85.67	21.58
1983	20.76	99.21	20.93
1984	17.85	83.08	21.48
1985	17.43	81.45	21.39
1986	19.65	78.67	24.98
1987	20.58	78.88	26.09
1988	17.33	69.92	24.78
1989	16.64	70.74	23.52

Source: WB, 2023

⁸ It may point out that banks are not fully mobilizing their resources if the ratio is low. Therefore, having a low or high ratio is not ideal.

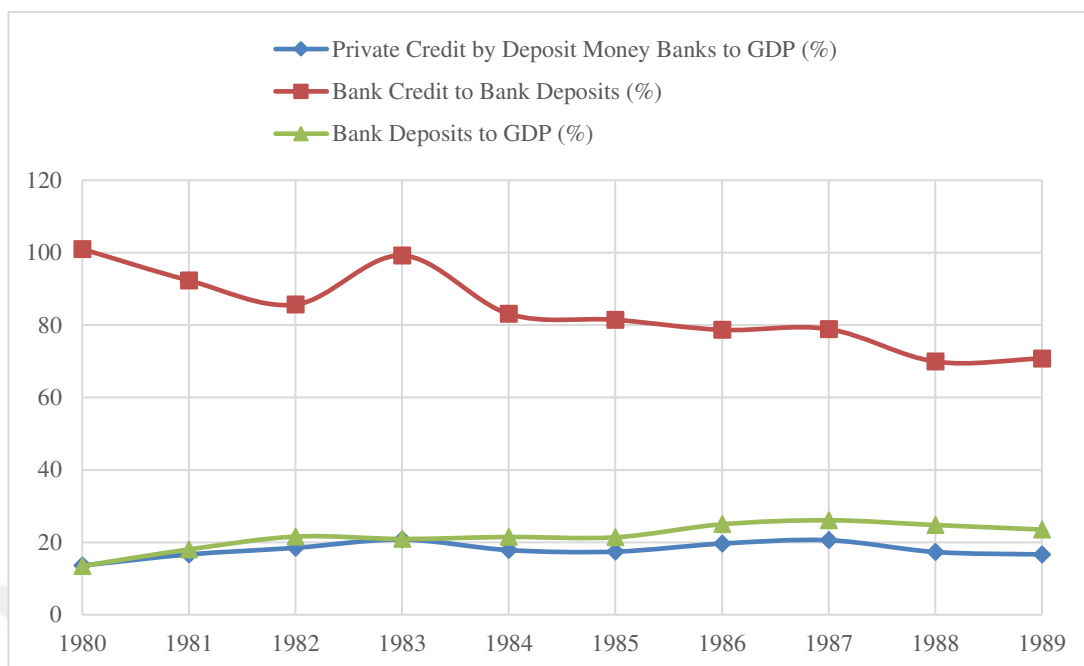


Figure 3.4 Development of the banking sector in Turkiye:1980-1989 (WB, 2023)

In Figure 3.5, GDP growth rates and banking sector indicators for the period 1980-1989 are shown together for Turkiye.

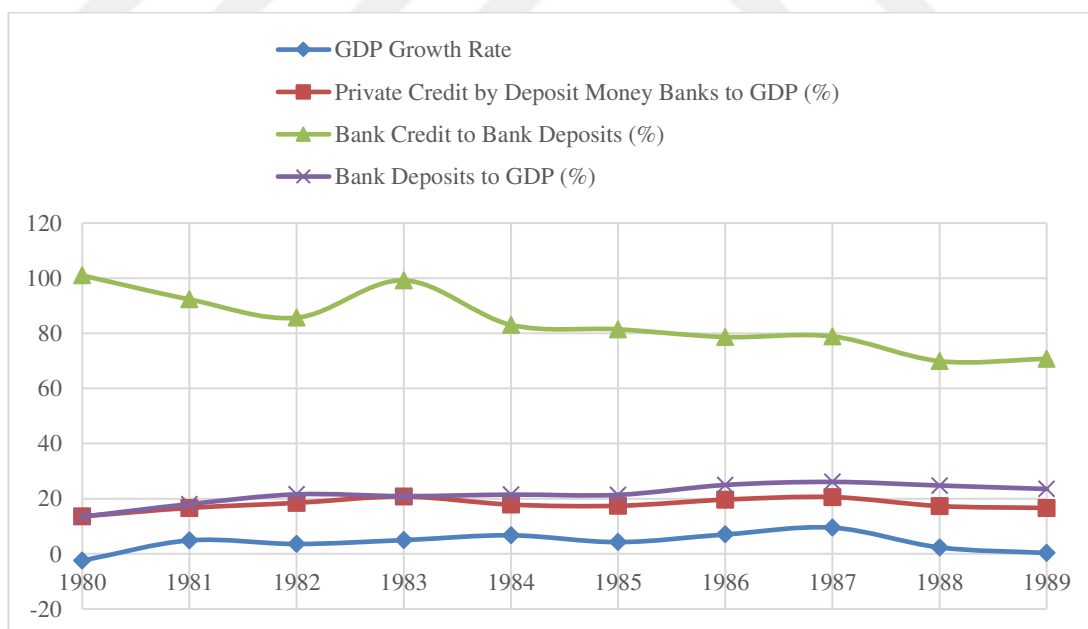


Figure 3.5 Movement of GDP growth rate and banking sector: 1980-1989 (WB, 2023)

During the 1990s

During the 1990s, inflation was high, public expenditures increased, and borrowing by the public sector was excessive. Commercial banks, which depend on ST capital inflows for deficit financing, provided the government with most of its deficit financing during this decade. Banks had a little role as FIs; they lent to the government at high rates and borrowed from abroad, exposing themselves to serious currency risks. Also, state banks were widely used by the government to carry out political goals, constituting a significant portion of the banking sector. To cover duty losses, they borrowed at high-interest rates for short periods of time, exposing themselves to interest rate risks (Akin et al., 2008).

Given the circumstances, during the 1990s, Turkish banking suffered from depression. It was understood that the banking system needed restructuring, especially after the 1994 crisis, but radical steps were always put off. Following the economic crisis in the country in the first three months of 1994, which affected all sectors of the economy, three commercial banks were transferred to the SDIF on the grounds that their financial conditions had deteriorated. With the economic environment becoming increasingly uncertain, this contributed to a loss of confidence in the sector to a great extent, posing the threat of large deposits leaving the sector. With the decision taken by the Council of Ministers on May 5, 1994, all deposits in Turkish lira and foreign currency in the nature of savings deposits were placed under state guarantee (Tunay, 2005).

EG rates also reflected the fluctuating economic conditions of the 1990s. The GDP growth rate was 9.26 % in 1990, which is the highest for this period, but it was almost 1 % in 1991 and negative in 1994 and 1999. Table 3.3 and Figure 3.6 show GDP growth rates in Turkiye for the 1990-2000 period.

Table 3.3 GDP growth rate (%) in Turkiye: 1990-2000

Years	GDP Growth Rate
1990	9.26
1991	0.72
1992	5.03
1993	7.65
1994	-4.67
1995	7.87
1996	7.37
1997	7.57
1998	2.40
1999	-3.26
2000	6.93

Source: WB, 2023

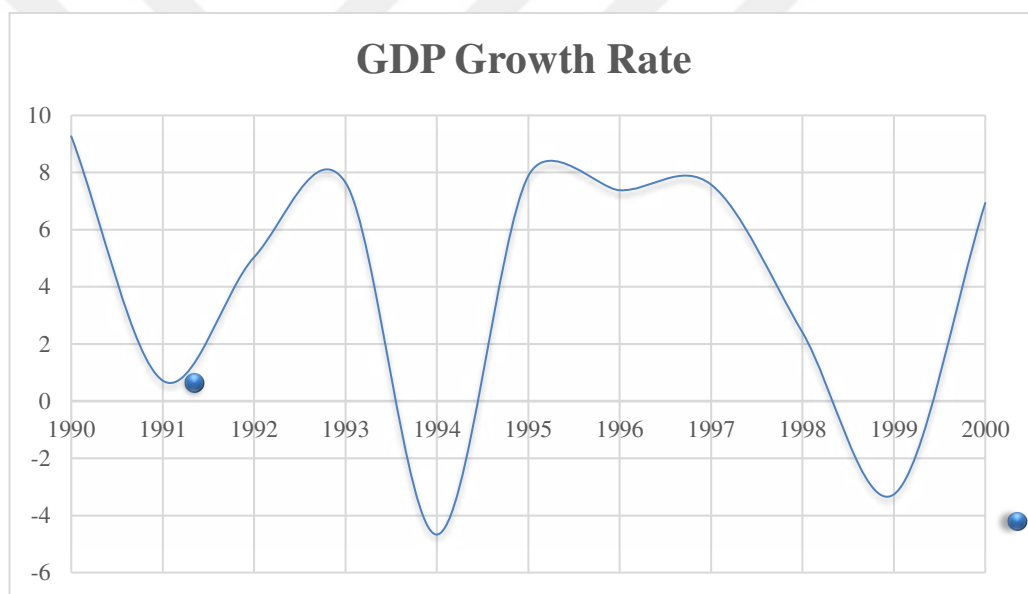


Figure 3.6 GDP growth rate (%) in Turkiye: 1990-2000 (WB, 2023)

The PC to GDP ratio provides similar results as the 1980s, as shown in Table 3.4. The bank credit to bank deposits ratio was the lowest in 1999 at 44 %. The ratio of bank deposits to GDP has a similar trend as it did in the 1980s until 1995, but after 1995, it slowly started to rise, which is a positive sign for the banking sector in Turkiye.

Table 3.4 Development of the banking sector in Turkiye: 1990-2000

	Private Credit by Deposit Money Banks to GDP (%)	Bank Credit to Bank Deposits (%)	Bank Deposits to GDP (%)
1990	16.67	80.72	20.66
1991	17.17	70.83	24.24
1992	17.94	72.10	24.89
1993	18.12	80.90	22.40
1994	15.94	55.11	28.92
1995	18.49	62.49	29.58
1996	22.83	66.74	34.21
1997	26.30	75.92	34.64
1998	16.77	63.23	26.52
1999	16.20	44.60	36.32
2000	17.25	54.58	31.61

Source: WB, 2023

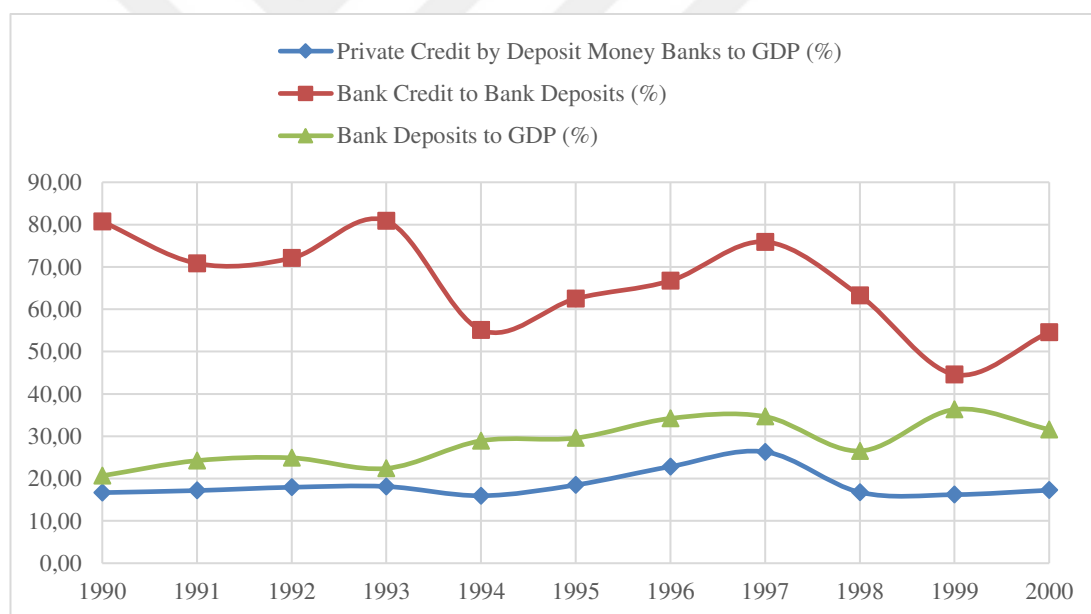


Figure 3.7 Development of the banking sector in Turkiye: 1990-2000 (WB, 2023)

In Figure 3.8, GDP growth rates and banking sector indicators for the period 1990-2000 are shown together for Turkiye.

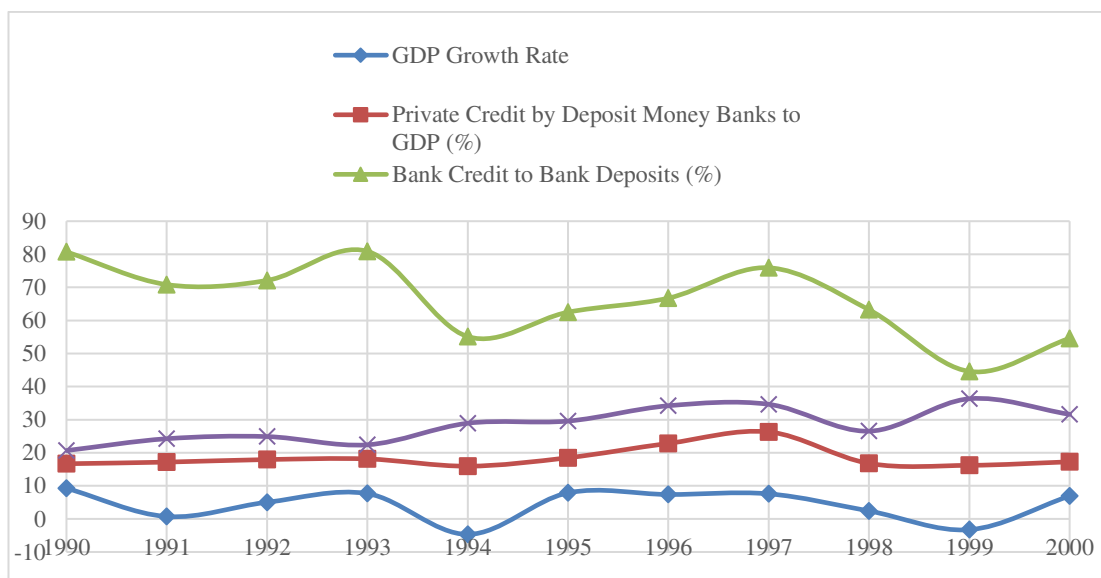


Figure 3.8 Movement of GDP growth rate and banking sector: 1990-2000 (WB, 2023)

Earlier in this study, it was noted that the ISE was established in 1986. It was recognized by the United States Securities and Exchange Commission as an international securities market in 1993. ISE was then the third country among emerging stock markets to hold this title (Aytekin, 2018). Table 3.5 and Figure 3.9 indicate that stock market capitalization, which shows the total value of all listed shares, is increasing over time; highest in 1999 at around 44 %. The turnover ratio of the stock market has fluctuated continuously over the years for this period. Stock price volatility is between 40 and 65 in this time span. In a stock market, volatility is an important indicator. A high level of market volatility prevents risk-averse small investors from investing in the market. It, however, leaves the market to the initiative of speculators, who hope to gain high returns in the ST by predicting sudden price movements in their favor (Aytekin, 2018).

Table 3.5 Development of the stock market in Türkiye: 1993-2000

	Stock Market Capitalization to GDP (%)	Stock Market Turnover Ratio (%)	Stock Price Volatility
1993	20.32	43.70	41.63
1994	16.53	100.29	55.65
1995	12.26	244.99	50.53
1996	16.70	119.53	39.77
1997	32.18	71.51	39.78
1998	12.19	169.92	51.69
1999	43.96	60.32	64.44
2000	25.41	238.08	57.68

Source: WB, 2023

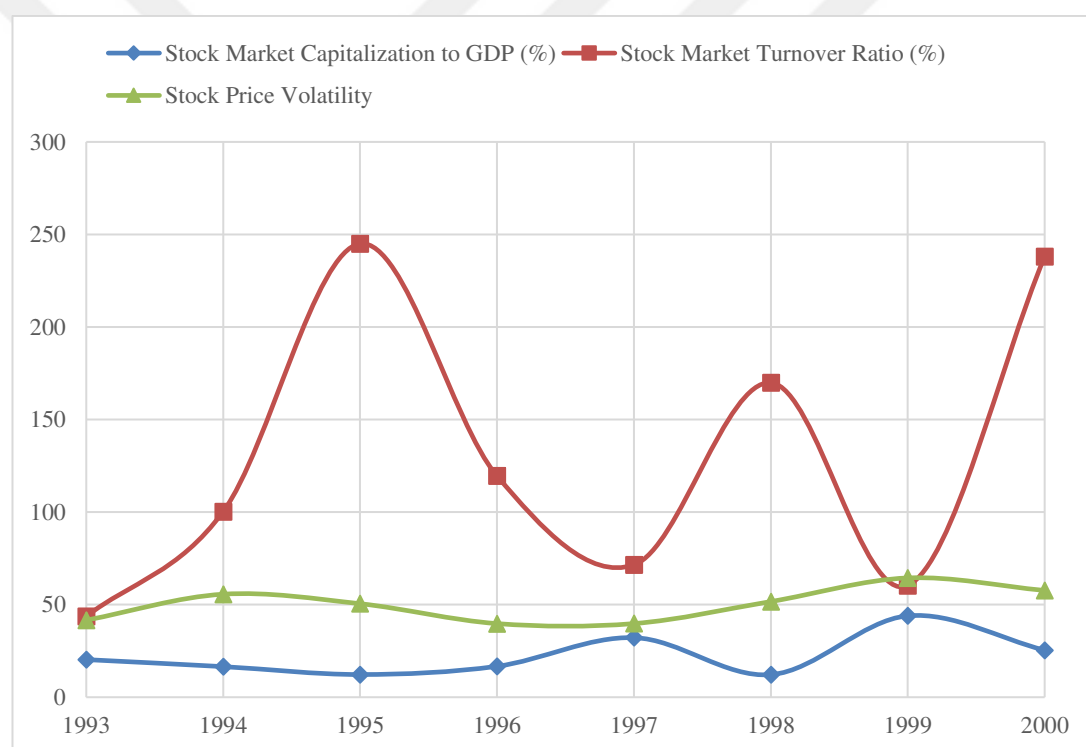


Figure 3.9 Development of the stock market in Türkiye: 1993-2000 (WB, 2023)

During the 2000s

Following the signing of the "Stand-by" agreement with the IMF in 1999, positive results were observed in the first half of 2000 regarding ensuring price stability and a sustainable public borrowing system. Inflation and domestic borrowing interest rates have decreased. It was the second half of 2000 that was marked by a negative situation as a result of delays in structural adjustment arrangements and a drop in inflation that

was less than expected, as well as an increase in public goods and services as much as the increase in inflation. As a result, the banking sector was shaken in November 2000. In the aftermath of large fluctuations, many banks suffered losses and were unable to remain in the market. The February 2001 crisis, which started in the financial sector and then spread rapidly to the real sector, occurred due to an increase in the negative fluctuations experienced in the previous year (Yetiz, 2016).

Essentially, the 2001 financial crisis can be classified as a financial crisis. In the wake of the crisis, Türkiye, which was on a joint program with the IMF, retained the IMF's financial assistance to support the measures taken post-crisis. Türkiye has emerged from this crisis in a manner that can be considered rapid (Eğilmez, 2019). As part of its comprehensive Bank Restructuring and Rehabilitation Program, the government strengthened the private banks, resolved banks transferred to SDIF through mergers, sales, and liquidations, and restructured state banks operationally and financially in preparation for privatization, as well as created legal and institutional frameworks to increase supervision and audit in the sector and make the sector more competitive and effective. A substantial burden was imposed on the economy and public finances as a result of the implementation of this restructuring program. With more than 37.000 employees, the SDIF took over 20 banks between 1997 and 2002 and created more than 10.000 jobs in their new banks. This period also saw a downturn in the number of banks and branch offices (Kibritçioğlu, 2005).

Türkiye's banking sector entered the growth period in 2004 after a period of recovery and stabilization. Turkish EG reached 9.3 % this year, whereas the global economy grew by 5.1 %. This year saw a significant increase in bank branches and employees, and it continued after this year. The most significant change in 2005, however, was the sudden rise in foreign bank entry. Five major foreign bank entries occurred in 2005, and this trend continued until 2007 when global liquidity conditions began to deter further entry. International investors were more confident in Turkish banks by 2005 (Akin et al., 2008).

In the United States, a financial crisis started in 2007 and spread to the real sector over time, eventually encompassing all economies and countries around the world. Like

elsewhere in the world, Türkiye was also heavily affected by the global financial crisis during the years 2008-2009. As a result of the global financial crisis, the Central Bank of the Republic of Türkiye (CBRT) lowered its policy interest rate promptly, executed supportive public finance policies, ensured that the interbank money markets operated efficiently and smoothly, and established credit support mechanisms for the private sector (Arabacı, 2017). As a result of the economic policies adopted following the 2001 financial crisis, the Turkish financial sector has remained more resilient to the global financial crisis in 2008. In contrast, the real sector of the economy cannot be said to be as strong as the financial sector. Due to the decline in foreign and domestic demand, the Turkish economy's production, export, and unemployment indicators were adversely affected. Due to the increased perception of risk and uncertainty, and the shrinking of credit facilities, the financial crisis manifested itself in a reduction in economic activity (Karakurt, 2010).

As illustrated in Figure 3.10 and Table 3.6, Türkiye's EG rate was -5,75 % in the 2001 financial crisis and -4.82 % in 2009, a year after the global crisis, which resulted in a negative growth rate for two years. Following the global financial crisis, the economy developed rapidly, and growth reached around 11% in 2011. When Turkish growth is analyzed in two separate periods, before and after the 2001 crisis, it is obvious that before the 2001 crisis, it was largely based on public borrowing and budget deficits, and after the 2001 crisis, it was a growth model largely based on current account deficits and private sector borrowing (Eğilmez, 2019).

Table 3.6 GDP growth rate (%) in Türkiye: 2001-2011

Years	GDP Growth Rate
2001	-5.75
2002	6.44
2003	5.76
2004	9.79
2005	8.99
2006	6.94
2007	5.04
2008	0.81
2009	-4.82
2010	8.42
2011	11.20

Source: WB, 2023



Figure 3.10 GDP growth rate (%) in Turkiye: 2001-2011 (WB, 2023)

In the banking sector, both PCs and bank deposits have increased in these years, as shown in Table 3.7 and Figure 3.11. The bank credits to bank deposits ratio is low in the beginning due to the 2001 crisis, but it also recovers by 2004.

Table 3.7 Development of the banking sector in Turkiye: 2001-2011

	Private Credit by Deposit Money Banks to GDP (%)	Bank Credit to Bank Deposits (%)	Bank Deposits to GDP (%)
2001	14.91	35.89	41.55
2002	14.05	38.35	36.65
2003	14.01	44.09	31.78
2004	16.57	53.42	31.02
2005	21.22	59.00	35.97
2006	24.72	66.29	37.29
2007	28.02	72.06	38.88
2008	30.90	71.58	43.16
2009	34.53	71.54	48.27
2010	41.60	84.96	48.97
2011	46.16	99.56	46.36

Source: WB, 2023

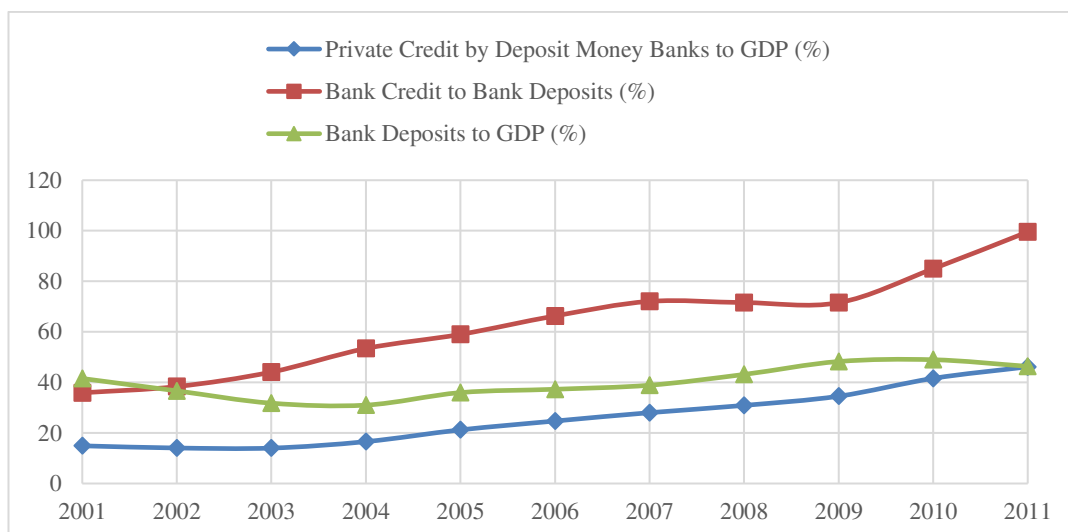


Figure 3.11 Development of the banking sector in Türkiye: 2001-2011 (WB, 2023)

In Figure 3.12, GDP growth rates and banking sector indicators for 2001-2011 are shown together for Türkiye.

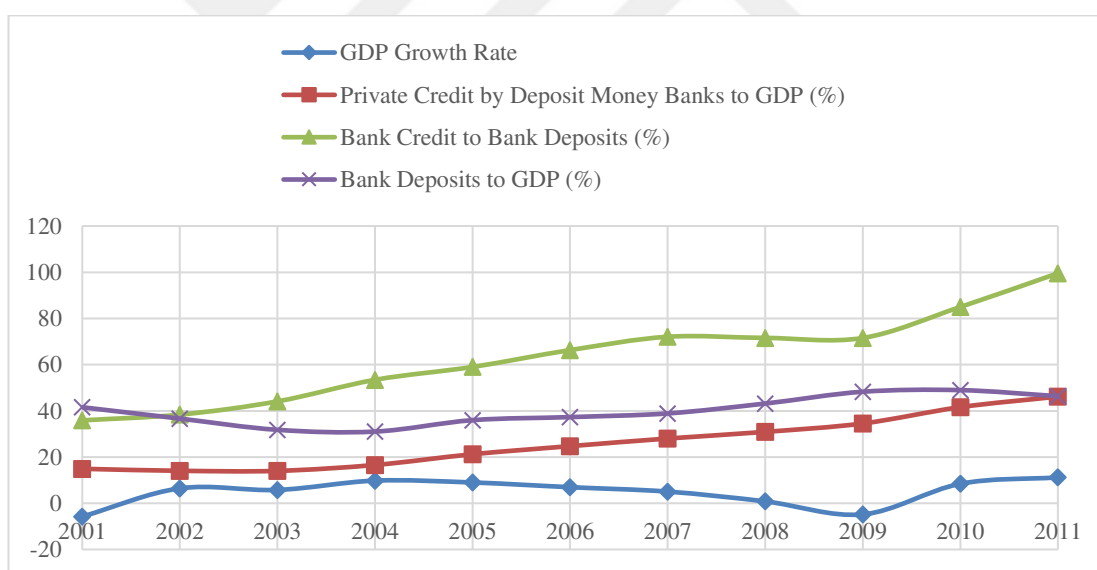


Figure 3.12 Movement of GDP growth rate and banking sector: 2001-2011 (WB, 2023)

Stock market turnover has a more stable trend for this period of time, and stock market volatility decreases, especially by 2004 as well. Stock market capitalization fell below 20 % in the 2008 global crisis. Table 3.8 and Figure 3.13 illustrate the stock market's performance in the 2000s.

Table 3.8 Development of the stock market in Türkiye: 2001-2011

	Stock Market Capitalization to GDP (%)	Stock Market Turnover Ratio (%)	Stock Price Volatility
2001	23.98	135.73	64.32
2002	15.01	188.57	55.69
2003	21.73	143.50	44.97
2004	24.04	149.09	37.79
2005	31.60	124.83	27.79
2006	28.88	140.77	27.05
2007	41.76	114.15	28.50
2008	15.26	188.15	32.80
2009	35.68	134.98	39.91
2010	38.92	133.33	28.97
2011	23.49	183.21	23.91

Source: WB, 2023

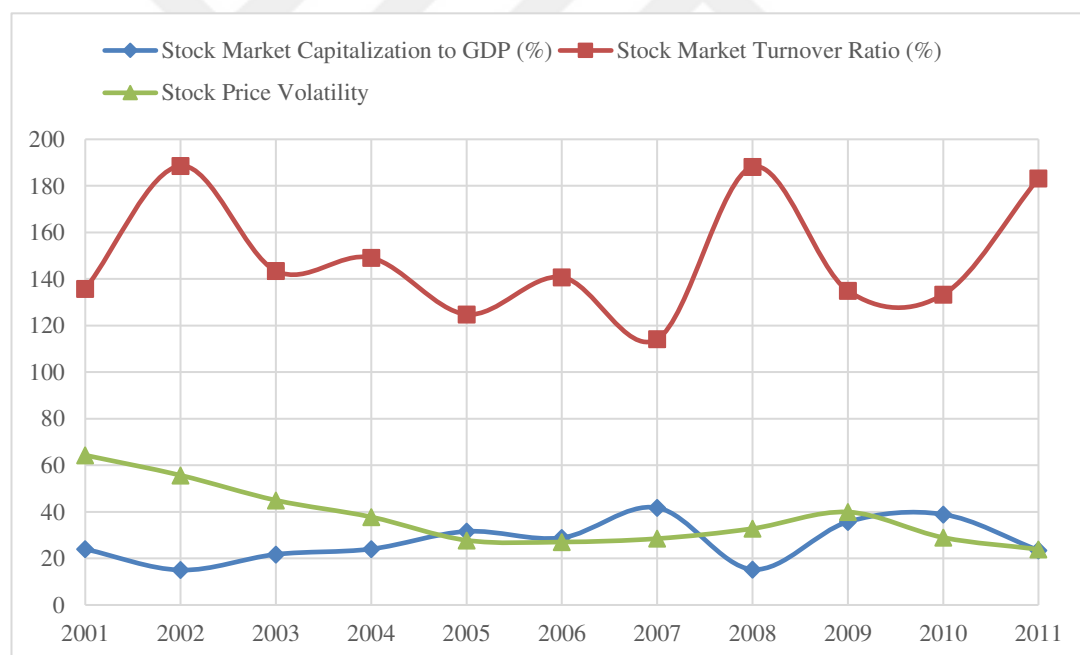


Figure 3.13 Development of the stock market in Türkiye: 2001-2011 (WB, 2023)

Since 2008, there have been important driving factors for capital flows to emerging countries like Türkiye due to low-interest rates and quantitative easing policies in advanced countries. In addition, capital flows in these countries were strongly influenced by strong domestic fundamentals. However, these capital inflows have posed important challenges to the stability of Türkiye's finances (Aysan, Fendoglu and Kilinc, 2014). In a country where capital flows are surging, the economy is overheated.

EG is high when the economy overheats, but the downside risk is that individuals and firms will become more indebted. Rapid capital outflows in this context are likely to lead to recession and contraction of the economy. As a result, the CBRT began to use macroprudential measures in late 2010 and emphasize financial stability risks in order to prevent economic overheating (Yağcı, 2018).

During the 2010s

At the end of 2010, the underlying trend of PC growth reached 40%. At the same time, the real value of the Turkish lira increased rapidly. Economic overheating and a sharp widening of the current account deficit accompanied these developments. There was a sharp decline in the quality of external finance, which may be even more important. Most of the current account deficit was funded by either ST or portfolio flows by the end of 2010, leaving the economy vulnerable to sudden changes in global sentiment (Kara, 2016). A new policy framework was implemented by the CBRT in late 2010 to contain the influences of volatile ST capital flows. As an objective of the new framework, financial stability has been incorporated, as well as price stability. A new policy tool, the interest rate corridor, was introduced at the same time as the reserve option mechanism by the Central Bank (Aysan et al., 2014). The former seeks to smooth capital flows, while the latter seeks to weaken the link between capital flows and domestic macroeconomic indicators. These unconventional instruments generally aim to reduce the policy trade-offs associated with volatile capital flows by dampening their amplifying influences (Kara, 2016).

Even though these measures were implemented without opposition from political parties, macroprudential measures to avoid overheating the economy caused a decline in EG. During 2010 and 2011, the Turkish economy experienced exceptional growth rates of 9.2 % and 8.8 %, but these exceptional growth rates declined to 2.1 % in 2012, resulting in negative feedback from political leaders. Since this date, politicians have criticized the Central Bank's policies constantly, and in 2014, the policy interest rate was raised to 10 % from 4.5 %, resulting in severe discussion and political conflicts regarding macroprudential policies. (Yağcı, 2018).

Türkiye was the target of a failed coup attempt in 2016. Economic indicators were negatively affected by the coup attempt in 2016, which resulted in a perception of uncertainty about Türkiye that did not disappear immediately following the coup attempt. Tourism has been adversely affected by the political and economic uncertainty environment, and the producer and consumer price indices have been indirectly affected by fluctuations in the exchange rate. The decline in tourism revenues reduced the contribution of the tourism sector to exports and the GDP. In response to the coup attempt, Türkiye was unable to receive LT and ST capital flows. Depreciation of the Turkish lira against other foreign currencies, on the other hand, affected both the producer price index over imported inputs as well as the consumer price index over imported consumption items. There has been an upward trend in both producer and consumer inflation since the second half of 2016. The inflation rate reached double digits and then exceeded 20% in the period of 2016-2018 following the coup attempt (Gülcan, Akgüngör, and Kuştepelı, 2020).

Table 3.9 GDP growth rate (%) in Türkiye: 2012-2022

Years	GDP Growth Rate
2012	4.78
2013	8.48
2014	4.93
2015	6.08
2016	3.32
2017	7.50
2018	2.97
2019	0.78
2020	1.94
2021	11.35
2022	5.60

Source: WB, 2023

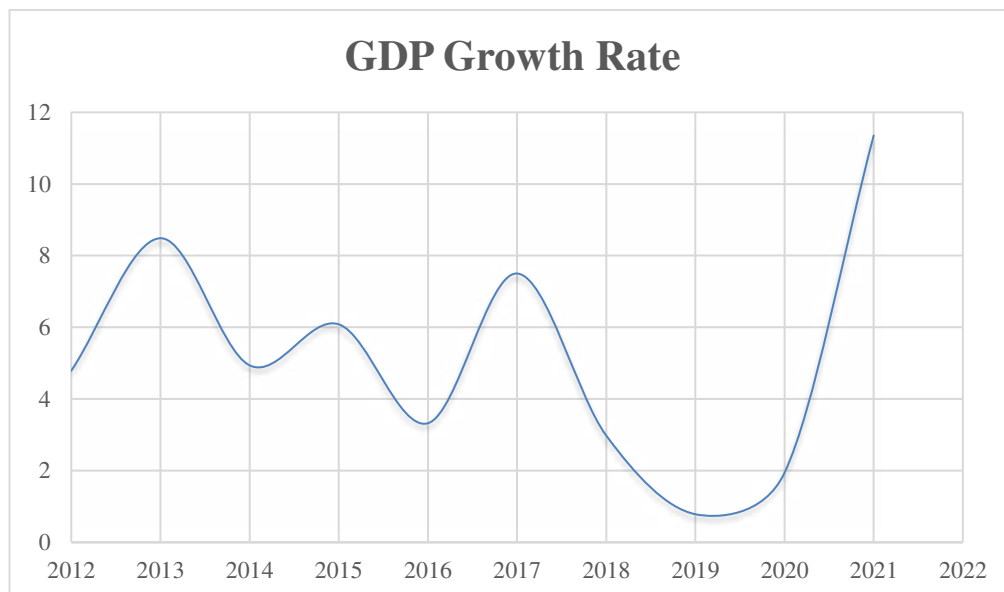


Figure 3.14 GDP growth rate (%) in Turkiye: 2012-2022 (WB, 2023)

Recently

In the period from 2018 to 2021, Turkiye experienced the first and most serious currency crisis under the floating exchange rate system. In 2018, the exchange rate crisis evolved into a partial economic crisis, and Turkiye entered a period of high inflation. In recent years, Turkish high-growth models based on foreign finance, low exchange rates, and high-interest rates have started to lose their function largely due to global and local economic and political developments. Thus, Turkiye, which became more vulnerable to fluctuations in exchange rates, was unable to avoid the crisis. Following the rapid rise of exchange rates, the crisis began to develop in the form of capital outflows, a low growth rate, a high inflation rate, high-interest rates, high foreign debt, policy uncertainty, elections, an immigration crisis, and conflict-like situations with western allies (Şanlı, 2021).

When considering the growth rates of Turkiye in 2019, it is evident that there has been a decline this year by the influence of the currency crisis. The Coronavirus outbreak in 2020 accelerated the decline seen in the previous year. By March 2020 in Turkiye, several precautions had been taken to combat the pandemic. The period with precautions has resulted in a significant slowdown in growth. The growth rate recovered to 11 % in 2021. In February 2022, The Russian Federation's occupation of Ukraine coincided with a period in which the world's economies were trying to recover

from the economic consequences of the Covid-19 crisis. The Turkish economy grew at a slower rate than expected, falling to 5.60 % in 2022. Figure 3.14 and Table 3.9 above provide information regarding GDP growth rates for the 2012-2022 period.

Table 3.10 provides information regarding banking sector development for the 2012-2021 period; PCs continued to grow, which is a positive sign for the economy. The bank deposits to GDP ratio increased above 50 % for the first time in 2019, and it had an upward trend after that.

Table 3.10 Development of the banking sector in Türkiye: 2012-2021

	Private Credit by Deposit Money Banks to GDP (%)	Bank Credit to Bank Deposits (%)	Bank Deposits to GDP (%)
2012	48.73	108.10	45.08
2013	56.72	120.16	47.20
2014	59.64	128.28	46.49
2015	62.60	132.33	47.30
2016	65.28	130.79	49.91
2017	65.94	135.21	48.77
2018	63.17	128.99	48.98
2019	61.83	113.47	54.49
2020	70.92	112.31	63.15
2021	66.50	96.99	68.57

Source: WB, 2023

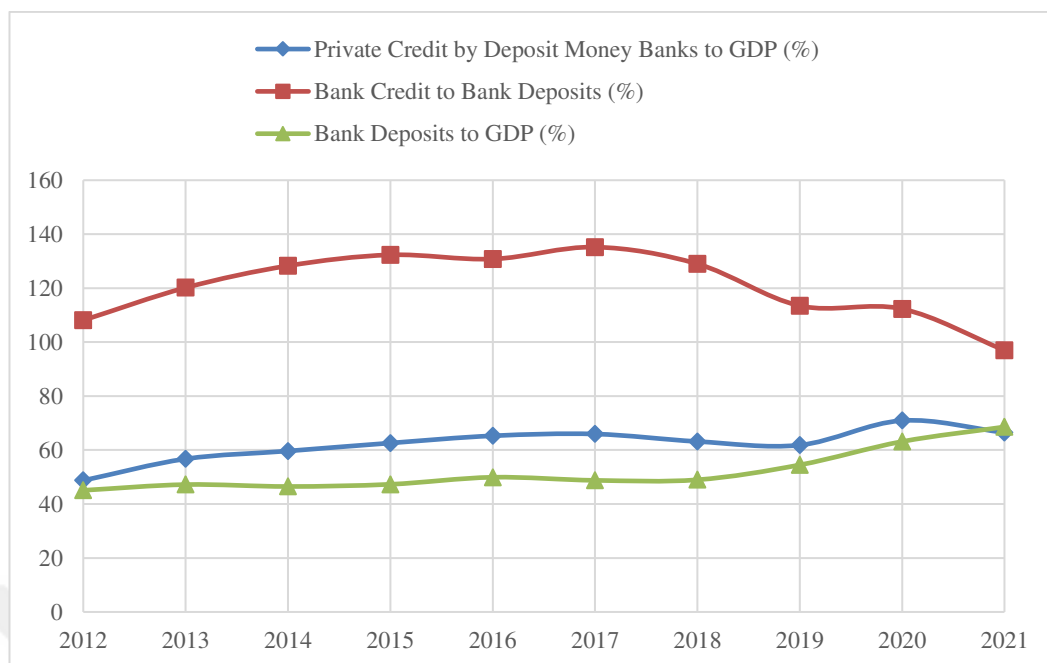


Figure 3.15 Development of the banking sector in Türkiye: 2012-2021 (WB, 2023)

In Figure 3.16, GDP growth rates and banking sector indicators for the period 2012-2022 are shown together for Türkiye.

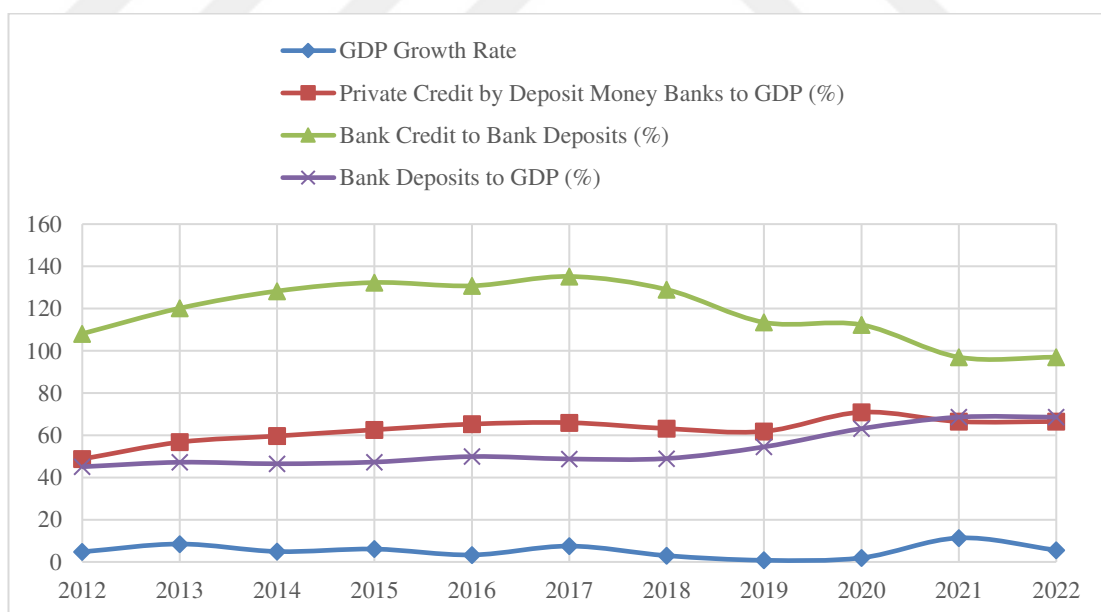


Figure 3.16 Movement of GDP growth rate and banking sector: 2012-2022 (WB, 2023)

Stock market capitalization ranges between 20 % to 35 %. Stock price volatility is around 23 on average. The development of the stock market in Türkiye for 2012-2021 is shown in Table 3.11 and Figure 3.17.

Table 3.11 Development of the stock market in Türkiye: 2012-2021

	Stock Market Capitalization to GDP (%)	Stock Market Turnover Ratio (%)	Stock Price Volatility
2012	35.80	113.87	24.74
2013	20.44	191.19	22.36
2014	23.41	168.25	27.72
2015	21.85	185.15	21.68
2016	19.75	164.07	22.37
2017	26.49	165.84	19.54
2018	19.17	247.76	18.32
2019	24.31	187.94	22.34
2020	32.98	365.77	24.24
2021	28.65	276.85	24.64

Source: WB, 2023

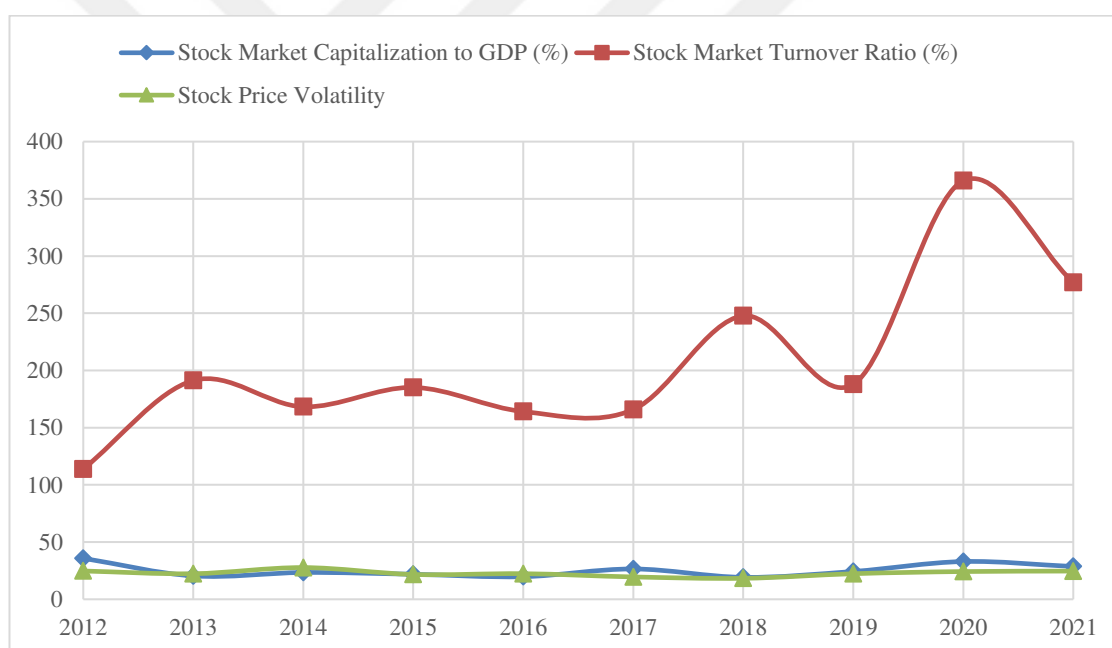


Figure 3.17 Development of the stock market in Türkiye: 2012-2021 (WB,2023)

3.7 Credit Composition in Türkiye

In recent years, the Turkish economy has experienced rapid growth in credit, and the proportion of credit to GDP has increased as well, increasing the extent to which it can influence macroeconomic variables, and therefore, resulting in a greater focus on credits by monetary authorities and economists working on the subject. It is possible to gain insight into why countries grow economically at different rates by

understanding how credit composition affects EG. Therefore, this section explores the link between credit composition and EG in Turkiye based on recent data.

Figure 3.18 illustrates the development of total bank assets, total credits, and total deposits in Turkiye from 1998 to 2021. It is evident from the data that the assets/GDP ratio, as well as the credits/GDP ratio, have both increased significantly since 2008. Comparatively, the deposits/GDP ratio continues a more stagnant course, indicating that savings have not increased significantly. As of 2021, the assets/GDP ratio is around 118 %, the credits/GDP ratio is around 65%, and the deposits/GDP ratio is around 70%. There was a credits/GDP ratio of approximately 68% in the year 2020, which had the highest credits/GDP ratio during this period.

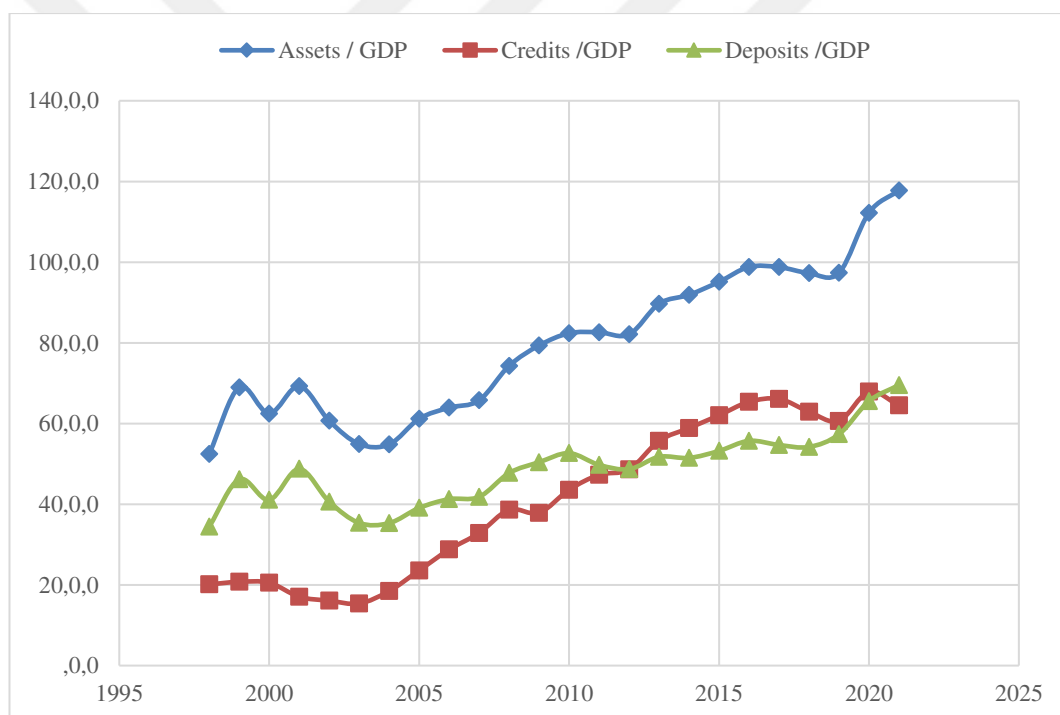


Figure 3.18 Balance sheet sizes of the banking sector in Turkiye: 1998-2021 (WB, 2023)

During the 2008 global crisis, unprecedented expansionary monetary policies were implemented by the United States, which was at the center of the crisis, as well as the European central banks, which affected the economy the most. Large amounts of foreign capital started to enter developing countries such as Turkiye at a relatively low cost. Through banks, Turkish residents were given credits in Turkish Lira to take advantage of the foreign resources, which became abundant in Turkiye. As a result of

the increase, the banks were able to extend more credits, increasing their assets and, therefore, their balance sheets (Eroğlu, Söylemez, and Alıç, 2016).

After the first Covid-19 case was reported in Türkiye in March 2020, the pandemic quickly spread across the country, resulting in devastating economic and social consequences. Turkish authorities used the banking and finance sector as an effective tool to combat the pandemic's negative consequences. A variety of policies are being implemented by the Turkish government to aid households and enterprises, including unrequited transfers and government-backed credits. Through state banks, it has offered financial products that offer advantages such as low-interest rates and grace periods. Most of the credits provided to households and enterprises during the pandemic were made by state banks (Bayar and Varışlı, 2020).

Total assets of the banking sector reached 14.347 billion Turkish Liras by the end of December 2022, an increase of 56% from the end of 2021. Approximately 86% of the total assets of the Turkish banking sector, as determined by the functional group classification, are owned by deposit banks as of December 2022. A total of 7.581 billion Turkish Liras was accumulated in credits as of December 2022, an increase of 2.680 billion Turkish Liras compared to the end of 2021. The credit component of the total assets accounted for 53% of the total assets (Banking Regulation and Supervision Agency (BRSA) Report, 2022).

A closer look at the composition of credits can be conducted after examining the total credit and deposit rates in Türkiye. Credits to the private sector⁹ are classified as follows by the CBRT: Non-financial enterprises, individual businesses, HCs, consumer credits, mortgage credits, auto credits, personal finance credits, personal credit cards, credits provided to personnel, credits provided to agriculture sales co-operatives, agriculture credit co-operatives and non-profit organizations serving households.

⁹ The most widely used measure of FD is the level of bank credit to the private sector as a percentage of GDP. For this reason, this study focuses on private sector credits.

Figure 3.19¹⁰ depicts the credit composition in Türkiye for the period of 2002-2022. EC and corporate credits, small business credits, and consumer credits have all an increasing trend over time. The amount of EC and corporate credit is always higher than the amount of consumer credit and small business credit in Türkiye. By 2018, EC and corporate credit increased more rapidly than the other two credits. In 2022, EC and corporate credit exceeds 3.5 billion Turkish Liras. Consumer credits are more than 1 billion Turkish Liras, and small business credits are around 750 million Turkish Liras.

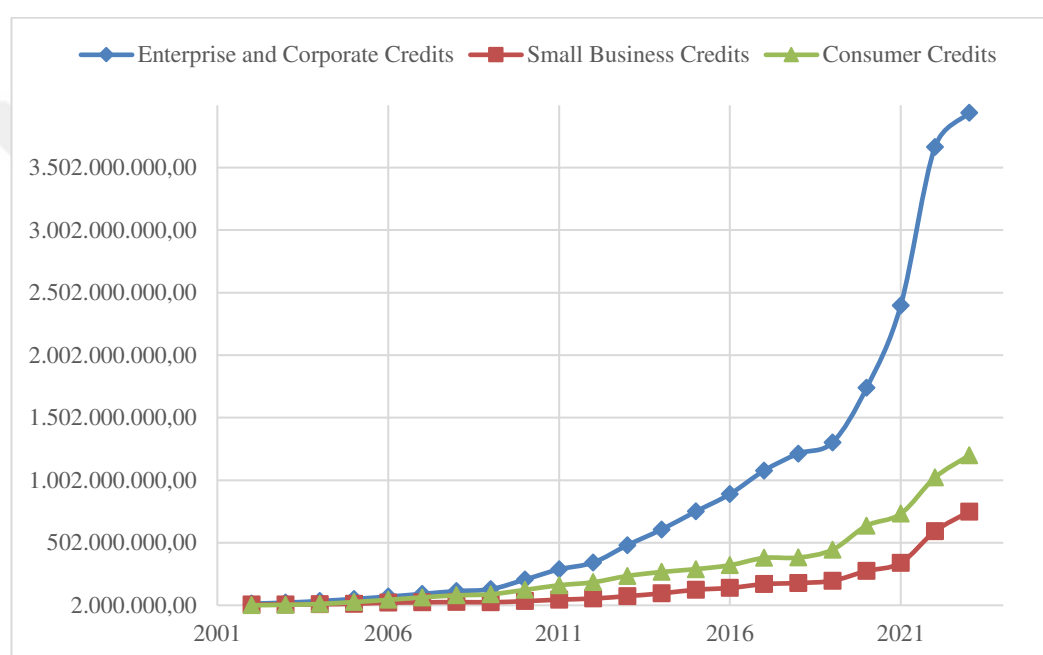


Figure 3.19 Credit composition in Türkiye: 2002-2022 (CBRT, 2023)

The latest credit composition can be evaluated with a pie chart since we expressed the status of the credit composition by years. By December 2022, as shown in Figure 3.20, 53% of the credit amount in the Turkish banking sector is accounted for by EC and corporate credits, while 20% is accounted for by consumer credits and credit cards. Small business credits are around 27 %. The total credit amount is composed of 67% Turkish Liras and 37% foreign currency (BRSA Report, 2022).

¹⁰ The data is obtained from Central Bank of Republic of Türkiye from Money and Bank Statistics Database.

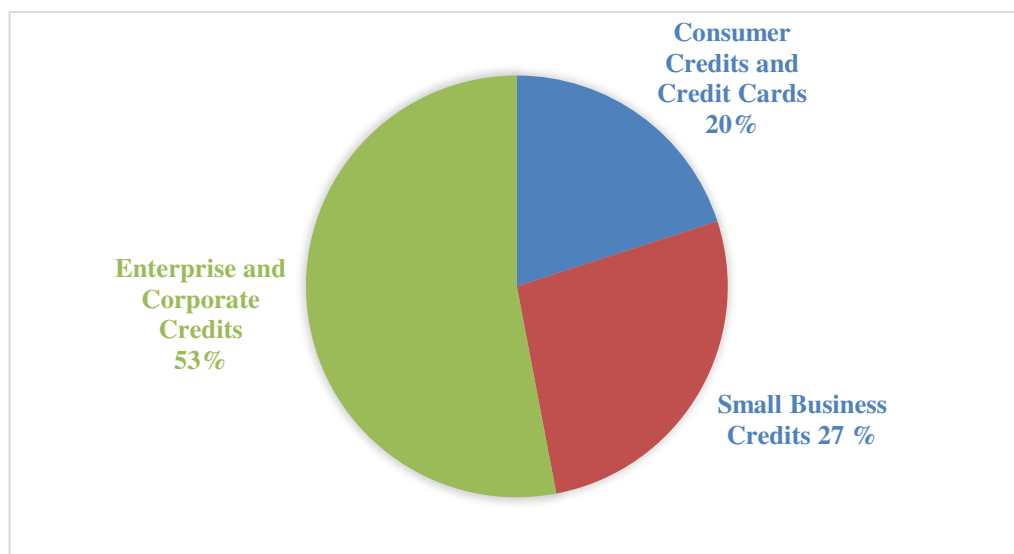


Figure 3.20 Credit composition in Türkiye: 2022 (BRSA Report, 2022)

Consumer credit is defined in Türkiye as the sum of mortgages, auto credits, personal finance credits, other consumer credit, and individual credit cards. For the purpose of purchasing a residence, mortgage credit is used, while auto credit is used for the acquisition of a personal vehicle. A personal finance credit category includes consumer credits, which are used to finance durable consumer goods, semi-durable consumer goods, and needs such as marriage, education, and health care (Demirezen, 2015).

Figure 3.21 provides information regarding the distribution of consumer credits in Türkiye for the period of 2005-2022. Personal finance credit is the highest among all consumer credit types during the period, followed by personal credit cards and mortgage credit. Following the year 2020, there has been a rapid increase in personal finance credit as well as personal credit cards. There has always been a low volume of auto credits in Türkiye over the years.

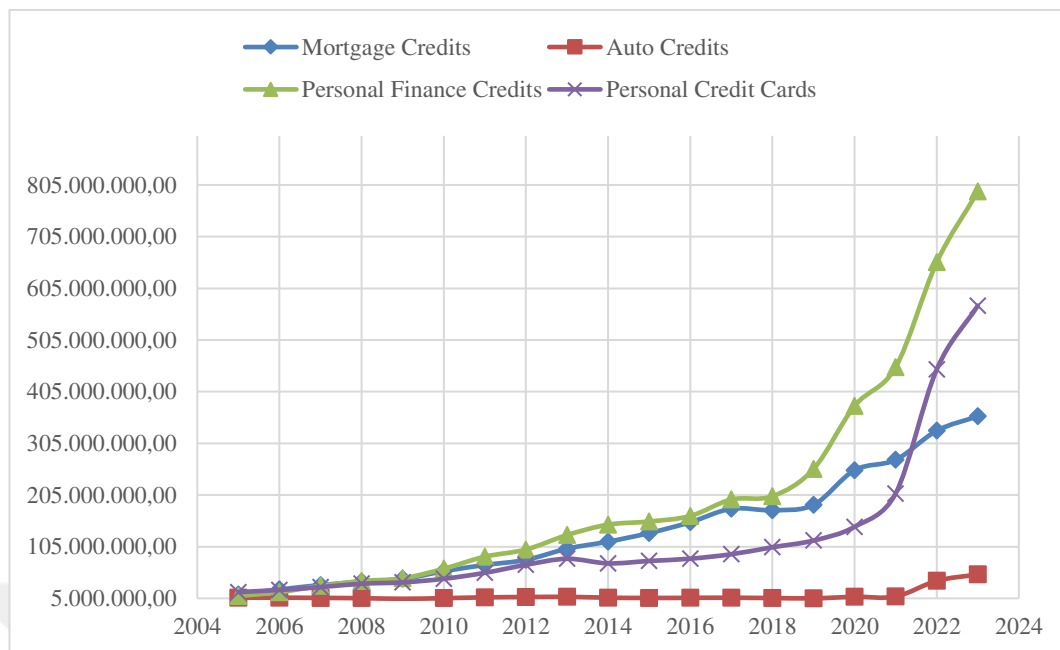


Figure 3.21 Distribution of consumer credits in Turkiye: 2005-2022 (CBRT, 2023)

As we expressed the status of the consumer credit by year, we can evaluate the latest distribution of consumer credit with a pie chart. Figure 3.22 shows the distribution of consumer credit in Turkiye for 2022. Personal finance credits are the highest at 44 %; personal credit cards follow it by 30 %; mortgage credits at around 23 %, and auto credits at 3 %.

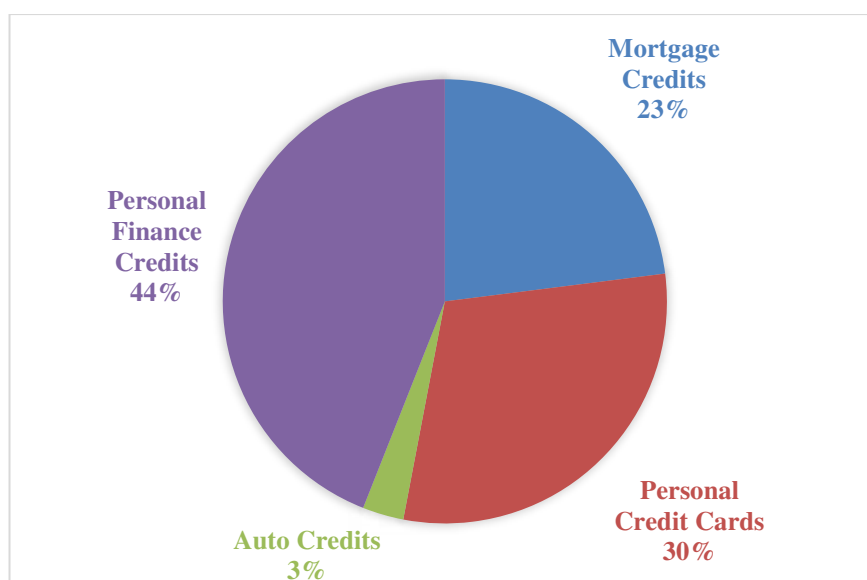


Figure 3.22 Distribution of consumer credits in Turkiye:2022 (BRSA Report, 2022)

The following is a chart (Figure 3.23) illustrating the performance of EC¹¹ and HC over the 1986-2021 period in Türkiye, which is the subject of our study. From 2005 onwards, both credits began to increase gradually after following a more stagnant course until 2005. In 2010, ECs began to increase faster than HC. The EC market is expected to reach 4 billion Turkish liras by 2023, while HC is expected to reach 2 billion Turkish liras by 2023.

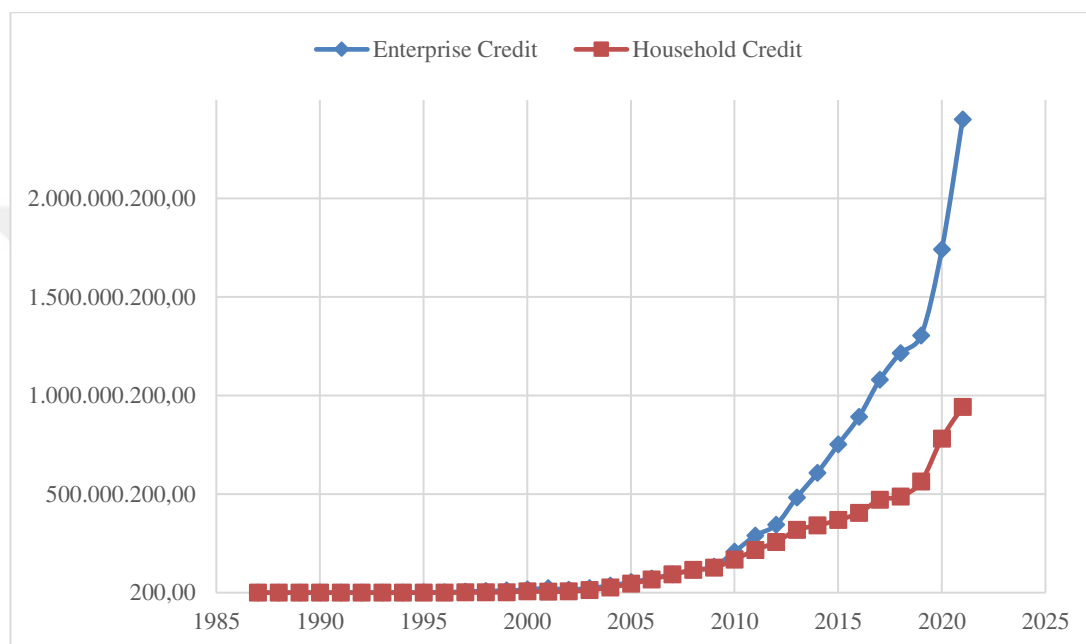


Figure 3.23 Enterprise and household credits in Türkiye: 1986-2022 (CBRT, 2023)

There has been a significant escalation in private sector credit throughout the period 1986-2021, summarized in Table 3.12, as well as its relative magnitude for enterprises and households. Furthermore, the table also shows the relative shares that households and enterprises have in terms of credit as a whole.¹²

¹¹ ECs are represented by credits given to non-financial enterprises by deposit money banks.

¹² See Table 5.1 for the explanations of abbreviations in Table 3.12.

Table 3.12 Credit composition indicators in Türkiye: 1986-2021

Years	BC	EC1	HC1	EC2	HC2
1986	17.8	18.1	0.4	0.700	0.030
1987	19.2	19.4	0.5	0.688	0.039
1988	17.4	18	0.1	0.620	0.008
1989	15.5	16	0.1	0.719	0.010
1990	16.5	17	0.1	0.723	0.011
1991	17.3	17.8	0.1	0.791	0.010
1992	17.7	18.2	0.2	0.723	0.013
1993	19.1	17.9	1.8	0.767	0.149
1994	19	18.9	0.7	0.729	0.072
1995	19.3	19	0.9	0.703	0.074
1996	23.7	23.2	1.3	0.737	0.086
1997	28.5	27.4	2	0.717	0.111
1998	25.8	24.4	2.1	0.809	0.137
1999	25.6	24.3	2.1	0.678	0.144
2000	25.8	22.3	4	0.604	0.268
2001	27.6	26.4	2	0.734	0.160
2002	21.9	20.7	1.8	0.699	0.207
2003	20	17.6	2.8	0.659	0.265
2004	22.1	17.7	4.7	0.594	0.345
2005	29.1	22.3	7.1	0.564	0.382
2006	35.8	27.2	9	0.562	0.401
2007	40.6	29.5	11.2	0.556	0.433
2008	47.3	35.3	12.3	0.551	0.439
2009	49	35	13.9	0.549	0.442
2010	55.9	39.8	16	0.587	0.406
2011	61.1	44.1	17	0.604	0.389
2012	62.6	44.5	18.1	0.605	0.388
2013	71.5	52	19.5	0.634	0.361
2014	74.5	56	18.6	0.672	0.325
2015	79.5	61.7	17.8	0.702	0.294
2016	84.6	67.1	17.5	0.715	0.280
2017	84.1	67.1	16.9	0.723	0.272
2018	82.7	68.1	14.6	0.738	0.257
2019	79.8	65.2	14.7	0.723	0.271
2020	89.4	71.9	17.5	0.717	0.278
2021	89.6	74.9	14.7	0.740	0.254

Source: CBRT, 2023

4. LITERATURE REVIEW

This section offers a condensation of the literature regarding FD and EG, as well as the literature on credit composition and EG. As it constitutes the sample of the study, a literature review was also conducted for Türkiye. Many papers have been carried out to analyze the tie connecting FD and EG; however, the number of studies examining the link connecting credit composition and EG is relatively small, and the field has only recently begun to evolve.

4.1 Financial Development and Economic Growth

The nexus connecting FD and EG was extensively studied in the literature. It is Schumpeter's work that provides the theoretical foundation for this link. He argued in 1911 that technology innovation and EG depend on FIs for mobilization of savings, evaluation of projects, management of risk and facilitation of transactions. (King and Levine, 1993). As key agents in facilitating financial intermediation activities, banks have a significant role in building up ED. Entrepreneurs, he argues, require credit to invest in new production technologies, and a well-developed FS can ensure that resources are put to their best use (Ang, 2008a).

Among the earliest works on FD and EG on Schumpeterian lines are Gurley and Shaw, and Goldsmith. In Gurley and Shaw (1955), FIs are emphasized as a major factor in EG. They argue that the evolution of financial institutions, including nonbank intermediaries, determines the process of growth. In response to the accumulation of assets and the secular rise in incomes, spending units demand a wider variety of financial services. Not just liquidity but also financial services, in general, appear to have a high-income elasticity of demand.

According to Goldsmith (1959), a country's financial organization affects the level of savings ratio and even the distribution of savings. A financial organization's ability to provide intangible assets that meet the needs of a variety of saver groups, and its ability to operate financially with public confidence, are important characteristics that have a crucial role in specifying the saving ratio and the distribution of savings. When self-

financing by small economic units is no longer the dominant mode of securing funding, there is a relation between the level and distribution of capital formation as well as the amount and character of funds available to finance it. It is also through the amount of savings made available to prospective borrowers and the form in which funds are supplied that financial organizations influence EG. In another seminal work by Goldsmith (1969), the value of FI assets divided by Gross National Product (GNP) is used to gauge the expansion of the financial sector. When periods of several decades are taken into account, Goldsmith observes a rough similarity between EG and FD based on data from 35 countries from 1860 to 1963 (Levine, 1997).

The first serious consideration of a causal link between FD and EG was made by Patrick (1966). His analysis shows that a two-way association between FD and EG can exist. In the first hypothesis, EG is associated with FD due to the demand-following hypothesis. The concept of demand-following refers to the fact in which untraditional financial institutions, their financial assets and liabilities, and associated financial services are formed to meet the needs of investors and savers. Financial evolution is a direct result of the widespread, sweeping process of ED in this case. The greater the growth rate of real national income, the greater the demand for external funds and, thus, the need for financial intermediation. Second, a supply-leading hypothesis describes how FD influences economic ED. The phenomenon of 'supply-leading' can be understood as the formation of financial institutions and the provision of their financial assets, liabilities, and regarding financial services before the need for them, particularly that of entrepreneurs in contemporary, growth-producing industries. Supply leading has two purposes: Transferring resources from traditional to untraditional sectors and promoting and vitalizing entrepreneurial activity in modern sectors. In consequence of financial intermediation, resources are transferred from traditional sectors, whether by collecting their savings and wealth in return for deposits and other financial liabilities or by creating credit and forcing them to save. This approach is similar to Schumpeterian innovation financing.

As part of the prominent works of the 1970s, McKinnon (1973) and Shaw (1973) extended Gurley, Shaw, and Goldsmith's earlier hypothesis by arguing that financial deepening includes higher capital productivity, as well as higher saving rates and,

therefore, higher investment volumes. When compared to Goldsmith (1969), who considered growth and financial intermediation endogenous, McKinnon (1973) and Shaw (1973) focused on the influences of policy on savings and investment. A key argument of McKinnon (1973) and Shaw (1973) is that policies that cause financial repression reduce saving incentives, such as controls that end up negative real interest rates. A lower savings rate leads to lower investment and slower growth rates. Therefore, they figure out that households are more likely to save when interest rates are higher as a result of financial liberalization (De Gregorio and Guidotti, 1995). By removing undue reserve requirements, interest ceilings, and mandated credit allocations for comparable bank deposits and loans, they propose keeping positive and uniformly high real rates within proportional categories of bank deposits and loans. By reducing the price level through relevant macroeconomic measures, they suggest stabilizing it. Investing in distinct sectors of the economy would therefore be more profitable because savers and investors can see the accurate scarcity price of capital (McKinnon, 1989).

Policy implications of the McKinnon-Shaw hypothesis are that government restrictions on the banking system impede FD and ultimately reduce EG (Khan and Senhadji, 2003). In the literature, this concept is also referred to as 'financial liberalization', implying that financial distortions can be removed or significantly reduced. It is unnecessary and unwise to induce distortions such as credits with low-interest rates, credit programs, and requirements for high reserve. As a result, savings can be reduced, capital accumulation can be slowed, and efficient resource allocation can be hindered. Entrepreneurs are more probable to invest in projects with high return if interest rates are authorized to change without restriction based on market mechanisms. The economy is therefore anticipated to grow faster (Ang, 2008b).

Since the enormous influence their indicators had on the subsequent literature, many empirical studies followed King and Levine (1993) in their study (Arestis, Chortareas, and Magnokis, 2015). King and Levine (1993) formed four indicators of FD to gauge the services provided by FIs. Among the indicators, liquid liabilities are measured in relation to GDP (traditionally accepting as a proxy of financial depth), deposit money bank domestic assets divided by deposit money bank domestic assets plus central bank

domestic assets (the method by which financial institutions conduct intermediation), the proportion of non-financial private sector claims over domestic credit and the proportion of non-financial private sector claims over GDP. Using data averaged over the 1960-1989 period; they carry out both a cross-country analysis for 80 countries and a time-series analysis for 80 countries over the 1960s, 1970s, and 1980s. A key conclusion of their study is that indicators of FD are strongly correlated with EG, physical capital accumulation, and capital allocation efficiency and that the elements of these FD indicators are significantly predictive of subsequent growth indicators as well.

There are a number of limitations to King and Levine's (1993) findings relating to the cross-sectional method used and to the causal interpretation. Based on the former, the assumption is that every economy has a steady growth path. The latter refers to causality theory since it is only possible through time series data. However, King-Levine findings are challenging to interpret causally for two plainly stated reasons. First of all, the indicators of FD are correlated across time in a given country. It is, therefore, an accurate proxy for the contemporary value of any given indicator if its initial value is omitted from the equation.

Consequently, King-Levine's results cannot be used to deduce anything other than a connection between growth and FD. A second limitation of the cross-sectional method is that different countries cannot demonstrate different causal patterns based on the method. Nevertheless, finance is the leading sector in some countries, while in others, it lags behind. In other words, the causality result only holds on average (Demetriades and Hussein, 1996).

Observing the empirical studies examining the link between FD and EG in general, we see that in some studies, variables represent the banking sector; in others, variables represent the stock market; and in some studies, both variables are considered. Many studies have focused on the subject at the macro level, but some have attempted to examine it at the micro level by utilizing firm and industry information (Maksimovic and Demirgüç-Kunt (1996); Rajan and Zingales (1996); Wurgler (2000); Beck, Demirgüç-Kunt, and Maksimovic (2005)). According to the nature of the data, all

work on this topic can be broadly categorized as time series and panel studies. A summary of the most prominent and most cited studies in these two groups can be found in the tables below.¹³

Table 4.1 Summary of time series studies

AUTHOR(S)	COUNTRY	YEAR	METHOD	RESULT
Jung (1986)	56 countries (19 are developed)	1950-1981	Vector Autoregression (VAR) and Granger Causality	In less developed nations, FD leads to ED, whereas in developed nations, the opposite is true.
Demetriades and Hussein (1996)	16 developing countries	27 annual observations	Engle-Granger and Johansen with Error Correction Model (ECM)	The study doesn't offer much evidence to back up the idea that finance is a major driver of growth. In a few countries, EG causes FD.
Choe and Moosa (1999)	Korea	1970-1992	VAR and Granger Causality	Empirical findings suggest that FD leads to real growth in Korea, and FIs are more significant than capital markets.

¹³ It is intended to present a narrow selection of literature in this section since summarizing it would take a great deal of time and effort. There are detailed summaries of the literature available that can be consulted for additional information (Levine (2005), Ang (2008a), Hassan, Sanchez, and Yu (2011), Samargandi et al. (2014), Bijlsma and Dubovik (2014)).

Table 4.1 continued

Xu (2000)	41 developing countries	1960-1993	Multivariate VAR analysis	Evidence suggests that FD affects GDP growth, and that domestic investment has a crucial role in this process.
Arestis, Demetriades and Luintel (2001)	5 developed countries (United States, United Kingdom, France, Germany, and Japan),	1968Q2- 1998Q1	Johansen cointegration with the Vector Autoregression Model (VECM)	Stock markets and banks have contributed significantly to EG in France, Germany, and Japan. A statistical analysis of FD and growth in the UK and the USA reveals weak findings.
Caporale, Howells and Soliman (2005)	Chile, Malaysia, Korea, and the Philippines	1979Q1- 1998Q4	VAR and Toda- Yamamoto Approach	Stock market development enables EG by enhancing investment productivity over time.
Ang and McKibbin (2008).	Malaysia	1960-2001	Johansen cointegration and Granger causality	There is support for the demand- following hypothesis that EG leads to high FD, but not the opposite.

Table 4.1 continued

Jalil and Ma (2008)	China and Pakistan	1960-2005	Autoregressive Distributed Lag Model (ARDL)	A positive and significant link exists between FD and EG in Pakistan but not in China, according to the study.
Johannes, Njong and Cletus (2011)	Cameroon	1970-2005	Johansen cointegration and Granger causality	EG and FD have no causal tie in the ST, but they do have a positive link over the LT.
Bojanic (2012)	Bolivia	1940-2010	Johansen cointegration and Granger causality	The findings show that EG, FD, and trade openness indicators are in equilibrium over the LT.
Tabash and Dhankar (2014)	United Arab Emirates	1990-2010	Johansen cointegration and Granger causality	A LT stable link exists regarding Islamic banks' financing and EG in the United Arab Emirates. FD and EG move together in the LT.

Table 4.2 Summary of panel studies

AUTHOR(S)	COUNTRY	YEAR	METHOD	RESULT
De Gregorio and Guidotti (1995)	12 Latin American countries	1950-1985	Random Effects	It has been shown empirically that improved growth performance is associated with FD. There is, however, a wide variation in this influence between countries and over time.
Rajan and Zingales (1996)	43 countries	1980-1990	Fixed Effects	A theoretical channel through which finance influences growth is found by the authors. A country's FD is directly affected by the growth of its firms, as well as the cost of internal and external financing. A more financially developed country would not need cash generated internally by industries if internal and external financing were equally expensive.
Beck, Levine, and Loayza (2000)	63 countries	1960-1995	Dynamic Generalized Method of Moments (GMM)	FD is causally related to real per capita income growth and productivity per capita. Study findings support that better-functioning banks increase resource allocation as well as total factor productivity growth, which are both favorable for EG over time.
Beck and Levine (2002)	42 countries	1980-1989	Two-stage Least Squares	The study's findings indicate that the overall level of FD and its legal determinants have an essential play in the growth and startup of industries that depend on the outside world. The type of FS, whether it's bank-based or market-based, doesn't seem to affect growth.

Table 4.2 continued

Calderon and Liu (2003)	109 developing countries	1960-1994	Geweke decomposition test and Granger causality	In developing countries, more financial deepening contributes to EG than in industrial economies, indicating that FD is generally linked to EG.
Khan and Senhadji (2003)	159 developing countries	1960-1999	Two-stage Least Squares	Despite the strong positive and statistically significant association between FD and EG in the cross-sectional analysis, the findings are generally weaker when panel data is included.
Rioja and Valev (2004)	74 countries	1960-1995	Dynamic GMM	Finance does not always positively impact growth; even when it does, its size varies. Once FD has reached a certain size threshold, it brings a strong positive effect on EG.
Loayza and Ranciere (2006)	82 countries	1960-2000	Dynamic GMM	Over the LT, the growth of the financial sector supports and promotes the growth of the economy. A maturing economy can suffer financial fragility, which can adversely affect EG.
Samargandi, Fidrmuc and Ghosh (2015)	52 middle-income countries	1980-2008	Dynamic GMM	Finance and growth have a LT U-shaped link. In the ST, the link is insignificant. It has been concluded that middle-income countries may experience negative growth effects.
Swamy and Dharani (2019)	24 advanced economies	1983-2013	Dynamic GMM	In the LT, finance and growth exhibit a U-shaped link. A threshold effect of 142 % of GDP is associated with the finance-growth link. A country's growth would be harmed instead of boosted by exceeding the threshold for too much finance.

Below is an outline of prominent papers that examine the tie connecting FD and EG in the Turkish economy.

Table 4.3 Summary of the studies for the Turkish Economy

AUTHOR(S)	YEAR	METHOD	RESULT
Kar and Pentecost (2000)	1963-1995	Johansen cointegration and VECM models	In Türkiye, the way of causality between FD and EG is determined by the proxy used to measure FD.
Aslan and Korap (2006)	1987Q1-2004Q4	Johansen cointegration and Granger causality	The findings show that there is a LT link regarding FD and EG. Credits from the private sector to EG can be shown to be causally related.
Aslan and Küçükaksoy (2006)	1970-2004	VAR and Granger causality	In Türkiye, test results support the supply-leading hypothesis by showing a correlation between FD and EG.
Kandır, İskenderoğlu and Önal (2007)	1988Q1-2004Q4	Johansen cointegration, ECM and Granger causality	EG and FD appear to be linked by a demand-following association. Financial growth seems to be influenced by EG. In addition, the Turkish financial market does not seem to support EG.
Altunç (2008)	1970-2006	Johansen cointegration and Granger causality	A supply-leading hypothesis is valid for the period 1970-2006 in Türkiye if the M2 money supply is taken into account as an indicator of FD. The findings hold up the supply-leading and demand-following hypotheses if the ratio of loans to the private sector and total financial assets to GDP is considered as an indicator of FD.
Öztürk, Barışık and Darıcı (2010)	1992-2007	Fixed effects	By utilizing funds more efficiently in the financial sector, the findings support the hypothesis that financial deepening promotes EG.

Table 4.3 continued

Özcan and Ari (2011)	1998- 2009	VAR and Granger causality	A unidirectional link exists between Turkish FD and EG. It is from EG to FD that this tie is oriented. Thus, the demand-following hypothesis has been confirmed.
Hayaloğlu (2015)	1990- 2012	Dynamic GMM	The finding of the study, which used a wide range of variables to represent FD, shows that there is a positive correlation between the development of the FS and the growth of the economy.
Çeştepe and Yıldırım (2016)	1986QI- 2015Q4	Johansen cointegration, ECM, and Toda- Yamamoto approach	There is a two-way causal link between FD and GDP in the short and LT, as indicated by the findings of this study. A base for the Patrick's hypothesis can be found in these findings.

4.2 Credit Composition and Economic Growth

An infinite number of empirical research has been performed regarding the tie between bank credit and EG; however, a small number of studies have analysed the influence of the composition of the credit on EG in relation to the source of credit. In their study, Beck et al. (2012) disentangled the influence of HC and EC on growth systematically for the first time, making it one of the most comprehensive studies of its kind. They used data from 45 developed and developing countries from 1994 to 2005. It has been found in the study that EC stimulates EG, whereas HC does not. The findings of the study by Sassi and Gasmi (2014), which investigated 27 countries using dynamic GMM, are also in line with the findings of the study by Beck et al. (2012). The study by Arcand, Berkes, and Panizza (2015) differs from other studies because they calculate a threshold effect, which depends on the non-monotonic tie between credit composition and EG. The findings suggest that growth is maximized when HC reaches 50% of GDP and firm credit to 80 % of GDP.

Bezemer, Grydaki, and Zhang (2016) distinguished HCs as consumer and mortgage credits. They found that EC is not statistically significant, and the coefficient of mortgage credit is negative. Leon (2016) used an extensive data set to estimate 143 countries using dynamic GMM. He asserts a negative tie connecting HC and growth, while no effect is found for EC. A study conducted by Angjelkovska, Hani, and Eliskovski (2016) found a positive correlation between HC, EC and EG in 8 Southeastern European countries. Benczúr, Karagiannis, and Kvedaras (2018) employ an analysis of 23 countries from the Organization for Economic Cooperation and Development (OECD) countries and the European Union (EU) countries. They find that credit to households is negatively correlated with growth, while credit to non-financial corporations is positively correlated.

Majeed et al. (2019) conducted a time series analysis for Pakistan using the ARDL model. The findings confirm a positive and vital influence of EC on Pakistan's EG, while HC does not enhance EG. Another time series study is conducted by Škare, Sinkovic, and Rochon (2019) for Poland using Johansen cointegration. They find that HC and EC have an important role in EG in the ST and LT. Irandoust (2021) employs a panel Granger causality test for six OECD countries and finds that HC has a more prominent influence on growth than EC.

An overview of the data set, method, and findings of the studies on the tie between credit composition and EG is provided in Table 4.4.

Table 4.4 Summary of the studies for credit composition

AUTHOR(S)	COUNTRY	YEAR	METHOD	RESULT
Beck, Büyükkarabacak, Rioja and Valev (2012)	45 developed and developing countries	1994-2005	Ordinary Least Squares (OLS)	A positive contribution to the growth of the economy is made by credit provided to enterprises but not by credit provided to households.
Sassi and Gasmi (2014)	27 European countries	1995-2012	Dynamic GMM	Results of the estimations suggest that EC boosts EG while HC dampens it.

Table 4.4 continued

Arcand, Berkes and Panizza (2015)	42 countries	1960-2010	Dynamic GMM	The link between HC and GDP is non-monotonic at 50% of GDP, indicating that when HC reaches 50% of GDP, growth is maximized. Our analysis suggests that growth reaches its maximum when firm credit is 80 % of GDP, despite the non-monotonic link found for firm credit.
Bezemer, Grydaki and Zhang (2016)	46 developed and developing countries	1990-2011	Fixed Effects and Dynamic GMM	The distinction between consumer and mortgage credits was made in HCs. FD was not good for EG in the sample due to the negative growth coefficient of mortgage credit and bank credit to asset markets in general. EC is not statistically significant.
Leon (2016)	143 countries (20 low-income, 67 middle-income, 56 high-income)	1995-2014	Dynamic GMM	According to the results, A negative connection exists regarding HC and growth. There is no evidence that HC is effective at spurring growth; in fact, it may be detrimental to it. Credit for enterprises also doesn't have a positive influence.
Angjelkovska, Hani and Eliskovski (2016)	8 Southeastern European countries	1995-2014	Fixed Effects and Dynamic GMM	Estimates suggest that HC and EC are positively correlated with EG and contribute to the appreciation of a real exchange rate.
Benczúr, Karagiannis and Kvedaras (2018)	23 countries from OECD and EU	1990-2014	Dynamic GMM	Even when non-linearities are taken into account, credit to households is negatively correlated with EG, while credit to non-financial corporations is positively correlated with growth.

Table 4.4 continued

Majeed, Iftikhar and Atiq (2019)	Pakistan	1982-2017	ARDL Model	The results confirm a positive and vital impact of EC on Pakistan's EG. Alternatively, HC, a component of PC, does not enhance EG.
Škare, Sinkovic and Rochon (2019)	Poland	1990-2018	Johansen cointegration and VECM	HC and EC have a crucial role in EG in the ST and LT, but the impact of EC is greater than that of HC.
Irاندoust (2021)	6 OECD countries (Germany, France, United Kingdom, Italy, Spain, and Japan)	1995-2015	Panel Granger causality test	According to the results, credit drives EG in the household sector, and EG drives credit in the enterprise sector in the majority of countries. Moreover, according to the results, HC has a greater impact on growth than EC.

As far as our knowledge allow us, no study investigates the tie connecting HC and EC with EG for Turkey.

5. ECONOMETRIC APPLICATION

An econometric study for Türkiye using time series analysis is presented in this part of the study to shed light on how credit composition and EG are related. Five models are estimated to determine the link, and the ARDL bounds test is conducted to analyze the data. First, the findings derived from the empirical literature on credit composition and EG will be discussed. In the following sections, the data set and variables, the methodology applied, and the study's hypotheses will be described in detail. Finally, the estimation results will be presented and interpreted.

5.1 Findings in Empirical Literature

In most empirical research, it appears that researchers focus primarily on aggregate credit measures, also known as PC, which includes both household and corporate credit. A small number of research have been done on the type of credit and how it affects EG. In most studies conducted so far, there is strong evidence that EC contributes to EG. This result can be explained by the theory that the growth of the economy should be boosted by increased EC if it generates new investment opportunities. Through the provision of more financing to firms, their financing constraints are eased, and thereby EG is stimulated by financial development. According to the findings of the papers by Beck et al. (2012), Sassi and Gasmi (2014), Arcand et al. (2015), Angjelkovska et al. (2016), Benczúr et al. (2018), Majeed et al. (2019) and Škare et al. (2019), EC has a positive influence on EG. Only two studies, Leon (2016) and Bezemer et al. (2016), found that EC has a statistically insignificant impact on EG.

While EC has been generally accepted as contributing positively to EG in the literature, HC has not been shown to do so. There is some ambiguity in the empirical literature regarding the link between HC development and EG. Arcand et al. (2015), Angjelkovska et al. (2016), Škare et al. (2019), and Irandoust (2021) show that credit to households has a positive influence on EG. The findings of these studies hold up the argument that increasing HC leads to an increase in EG, which indicates a strong correlation between the consumption market and EG. Sassi and Gasmi (2014),

Bezemer et al. (2016), Benczúr et al. (2018), and Leon (2016) provide a negative influence of HCs on EG. These studies' results confirm that HCs reduce savings rates and impede EG. Furthermore, in developing countries, HCs are becoming more prevalent, and this may lead to a decline in investment, which will have a detrimental influence on productivity and output (Sassi and Gasmi, 2014). Unlike other studies, Beck et al. (2012) find that HCs have a very negligible influence on EG.

5.2 Data Description and Variables

Turkiye is the subject of this study for the aim of examining the influence of credit composition on EG. A time series econometric analysis is applied using annual data from 1986 to 2021. The data were attained from the databases of the CBRT and the WB. All of the variables used in the model are converted into natural logarithms. Using logarithmic models, the coefficients give elasticity, and the models are resistant to heteroskedasticity. Since the aim of the study is to identify the role of HC and EC in estimating the model of EG in the country, this can be accomplished empirically by modeling EG as a dependent variable (DV) and HC and EC as independent variables (IV) along with other control variables. The credit variables are developed likewise with the study of Beck et al. (2012). Control variables are determined by following the finance-growth literature. The descriptive statistics of all variables are provided in Appendix A.

The real GDP (RGDP), which is calculated in constant local currency, is used as the DV for the representation of EG. Since GDP level was utilized as a DV in the studies applied with time series analysis, the same approach is applied in this study (Škare et al., 2019; Majeed et al., 2019). Five different variables are used to represent credits as IVs. EC to GDP is the total claims of deposit money banks on non-financial enterprises as a ratio to GDP. EC to total credit is the relative share of ECs in total credits. HC to GDP is the total claims of deposit money banks on households as a ratio to GDP. HC to total credit is the relative share of HCs in total credits. Bank credit to GDP is the share of total credit to the private sector as a ratio to GDP. This study was analyzed to detect the influence of each credit variable on GDP by including each credit variable in a model together with other control variables in an effort to estimate their impact.

The effect of EC on EG is anticipated to be positive, while the effect of HC on EG is uncertain since it depends on the type of spending it is used.

Three control variables are used in the study. General government final consumption expenditures as a share of GDP represent all purchases of goods and services by the government. This variable is added to the model for measuring the role of fiscal policy, and the expected sign is to be positive if it is used for investment and infrastructure (Benczur et al. (2018), Bezemer et al. (2016)). Other types of government expenditures may decrease EG. The gross school enrollment ratio is the ratio of the total enrollment of secondary education, regardless of age, to the population of the age group. This variable is used in the model to capture the role of human capital accumulation, and the expected sign of the variable is positive (Majeed et al. (2019), Beck et al. (2012)). Exports and imports of goods and services as a percentage of GDP are the measure of trade openness and it is supposed to foster EG; therefore, the expected sign is positive (Sassi and Gasmi (2014), Arcand et al. (2015)). There is a list of all variables in Table 5.1.

Table 5.1 Definitions of variables used in the estimation

Abbreviation	Variable	Definition
RGDP	GDP (constant LCU)	Real Gross Domestic Product
EC1	EC to GDP	EC share in GDP (%)
HC1	HC to GDP	HC share in GDP (%)
EC2	EC to Total Credit	EC share in total credits (%)
HC2	HC to Total Credit	HC share in total credits (%)
BC	Bank Credit to GDP	Share of total credit to the private sector in GDP (%)
GOV	Government Expenditures	General government final consumption expenditure (% of GDP)
EDU	School Enrollment	School enrollment, secondary (% gross)
OPEN	Trade Openness	The sum of exports and imports as a share of GDP (%)

Note: RGDP, GOV, EDU and OPEN variables are acquired from World Bank, World Development Indicators Database while EC1, HC1, EC2, HC2 and BC variables are taken from Central Bank of Turkey, comparative country statistics.

5.3 Econometric Methodology

An overview of the econometric methods and models used in our study will be presented in this section.

5.3.1 The Models and Hypotheses

This study took on the ARDL bounds test of cointegration to analyze the effect of EC and HC on the EG performance of Turkiye in the LT. As Beck et al. (2012) described, this study distinguished the independent role of credit types on EG. An empirical model uses HC and EC as IVs and government consumption, trade, and schooling as controls. The specification of the models with intercept and trend is as follows:

Model 1

$$\ln EG_{1,t} = \beta_{1,0} + \beta_{1,1}t + \beta_{1,2}\ln EC1_t + \beta_{1,3}\ln gov_t + \beta_{1,4}\ln open_t + \beta_{1,5}\ln edu_t + \varepsilon_{1,t} \quad (1)$$

Model 2

$$EG_{2,t} = \beta_{2,0} + \beta_{2,1}t + \beta_{2,2}\ln EC2_t + \beta_{2,3}\ln gov_t + \beta_{2,4}\ln open_t + \beta_{2,5}\ln edu_t + \varepsilon_{2,t} \quad (2)$$

Model 3

$$\ln EG_{3,t} = \beta_{3,0} + \beta_{3,1}t + \beta_{3,2}\ln HC1_t + \beta_{3,3}\ln gov_t + \beta_{3,4}\ln open_t + \beta_{3,5}\ln edu_t + \varepsilon_{3,t} \quad (3)$$

Model 4

$$\ln EG_{4,t} = \beta_{4,0} + \beta_{4,1}t + \beta_{4,2}\ln HC2_t + \beta_{4,3}\ln gov_t + \beta_{4,4}\ln open_t + \beta_{4,5}\ln edu_t + \varepsilon_{4,t} \quad (4)$$

Model 5

$$\ln EG_{5,t} = \beta_{5,0} + \beta_{5,1}t + \beta_{5,2}\ln BC_t + \beta_{5,3}\ln gov_t + \beta_{5,4}\ln open_t + \beta_{5,5}\ln edu_t + \varepsilon_{5,t} \quad (5)$$

Hypotheses tested in this study are as follows:

Hypothesis 1: EC is associated with an increase in EG. In other words, it is positively related to EG.

Hypothesis 2: The influence of HC on EG mainly depends on the use of credit.

Hypothesis 3: An increase in FD positively affects EG.

5.3.2 Test of Order of Integration

A major factor making for the evolution of time series econometrics is the non-stationarity of many time series and the presence of spurious regressions. The literature generally seems to agree that non-stationary series cause spurious regression. As a result, researchers have often developed and used unit root tests and cointegration methods (Ghouse, Khan, Rehman, and Bhatti, 2021).

Non-stationarity is most commonly decided through the use of statistical tests to identify unit roots. Once the series has been determined to be non-stationary, the first difference can be used to find out whether the series is stationary in the first difference. The series denoted $I(0)$ represents a stationary time series, while the series denoted $I(1)$ refers to a first-order integrated series or a series that is stationary by taking the

difference. In some cases, series can be integrated in the second order by taking the difference two times (Sevüktekin and Nargeleçekenler, 2010).

Before conducting ARDL bound test, the order of integration of the series has to be determined since the test results are invalid if any of the time series are integrated of order 2. For this aim, The Augmented Dickey Fuller (ADF) unit root test and Phillips-Perron (PP) unit root test, which are traditional unit root tests, were conducted to determine whether the variables are stationary or not, and if they are not, at what level they are stationary. As the null hypothesis in unit root tests indicates, the series has a unit root ($H_0: \delta=0$), while the alternative hypothesis suggests that it does not ($H_1: \delta<0$). The null hypothesis is rejected when the calculated test statistic (t_δ) is less than the relevant critical value.

A standard Dickey Fuller (DF) test employs the AR (1) process, but if there is a higher-order correlation in the series, ε_t will lose its feature of being clean series. ADF test solves this problem by adding p-lagged difference terms to the equation via AR(p) rather than AR (1). Following are the ADF equations without a trend and an intercept (none), with an intercept, and with an intercept and a trend (Mert and Çağlar, 2019):

$$\Delta y_t = \delta y_{t-1} + \sum_{i=1}^p \beta_i \Delta y_{t-i} + \varepsilon_t$$

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^p \beta_i \Delta y_{t-i} + \varepsilon_t$$

$$\Delta y_t = \mu + \beta_t + \delta y_{t-1} + \sum_{i=1}^p \beta_i \Delta y_{t-i} + \varepsilon_t$$

PP (1988) developed an alternative, non-parametric procedure to control serial correlation in tests of unit root hypotheses. PP estimates standard DF equations and modifies the t_δ test statistic to prevent serial correlation from affecting the asymptotic distribution. A statistic of the PP test is shown below (Mert and Çağlar, 2019):

$$\tilde{t}_\delta = t_\delta \left(\frac{\gamma_0}{f_0}\right)^{1/2} - \frac{T(f_0 - \gamma_0)S_{\hat{\delta}}}{2f_0^{1/2}s}$$

$\tilde{t}_\delta$ is estimator and t_δ is standard DF test statistics. $S_{\hat{\delta}}$ represents a standard error and s is the standard error of test regression. While γ_0 is a consistent estimator of error variance, f_0 is the estimator of the residual spectrum at frequency zero. In the PP test, as in the ADF test, the null hypothesis in unit root tests indicates, the series has a unit root ($H_0: \delta=0$), while the alternative hypothesis suggests that it does not ($H_1: \delta<0$).

5.3.3 ARDL Bound Test Approach

Several econometrics methods were introduced in the last three decades to reveal the LT ties among time series. Earlier procedures shown by Engle and Granger (1987), Phillips and Hansen (1990), Johansen and Juselius (1990), and Johansen (1992) have some limitations. Although Engle and Granger's cointegration method is one of the most applied empirical approaches, it is inefficient for multivariate cases. Johansen and Juselius (1990) and Johansen (1992) methods are other commonly used, more efficient procedures in multivariate systems. However, to implement both methods, all variables must be non-stationary and integrated in the same order, $I(0)$ or $I(1)$. The ARDL strategy has several benefits over these other strategies. First, regardless of whether the underlying regressors are purely $I(0)$, purely $I(1)$, or mutually cointegrated, this method tests for the existence of a relationship between variables in levels (Pesaran, Shin, and Smith, 2001). Second, it avoids serial correlation and endogeneity problems (Ghatak and Siddiki, 2001). Third, in the model under consideration, the LT and ST parameters are simultaneously estimated (Halicioglu, 2008). Finally, estimates are more efficient and consistent with small sample sizes (Narayan, 2004).

Eqs. (1) – (5) can be rewritten as an ARDL formula as the model with intercept and trend in Eqs. (6) – (10) as follows, respectively:

$$\begin{aligned}
\Delta \ln EG_{1,t} = & \beta_{1,0} + \beta_{1,1}t + \sum_{i=1}^l \beta_{1,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{1,3i} \Delta \ln EC1_{t-i} \\
& + \sum_{i=0}^l \beta_{1,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{1,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{1,6i} \Delta \ln edu_{t-i} \\
& + \beta_{1,7} \ln EG_{t-1} + \beta_{1,8} \ln EC1_{t-1} + \beta_{1,9} \ln gov_{t-1} + \beta_{1,10} \ln open_{t-1} \\
& + \beta_{1,11} \ln edu_{t-1} + v_{1,t}
\end{aligned}$$

6

$$\begin{aligned}
\Delta \ln EG_{2,t} = & \beta_{2,0} + \beta_{2,1}t + \sum_{i=1}^l \beta_{2,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{2,3i} \Delta \ln EC2_{t-i} \\
& + \sum_{i=0}^l \beta_{2,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{2,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{2,6i} \Delta \ln edu_{t-i} \\
& + \beta_{2,7} \ln EG_{t-1} + \beta_{2,8} \ln EC2_{t-1} + \beta_{2,9} \ln gov_{t-1} + \beta_{2,10} \ln open_{t-1} \\
& + \beta_{2,11} \ln edu_{t-1} + v_{2,t}
\end{aligned}$$

7

$$\begin{aligned}
\Delta \ln EG_{3,t} = & \beta_{3,0} + \beta_{3,1}t + \sum_{i=1}^l \beta_{3,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{3,3i} \Delta \ln HC1_{t-i} \\
& + \sum_{i=0}^l \beta_{3,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{3,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{3,6i} \Delta \ln edu_{t-i} \\
& + \beta_{3,7} \ln EG_{t-1} + \beta_{3,8} \ln HC1_{t-1} + \beta_{3,9} \ln gov_{t-1} + \beta_{3,10} \ln open_{t-1} \\
& + \beta_{3,11} \ln edu_{t-1} + v_{3,t}
\end{aligned}$$

8

$$\begin{aligned}
\Delta \ln EG_{4,t} = & \beta_{4,0} + \beta_{4,1}t + \sum_{i=1}^l \beta_{4,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{4,3i} \Delta \ln HC2_{t-i} \\
& + \sum_{i=0}^l \beta_{4,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{4,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{4,6i} \Delta \ln edu_{t-i} \\
& + \beta_{4,7} \ln EG_{t-1} + \beta_{4,8} \ln HC2_{t-1} + \beta_{4,9} \ln gov_{t-1} + \beta_{4,10} \ln open_{t-1} \\
& + \beta_{4,11} \ln edu_{t-1} + v_{4,t}
\end{aligned}$$

9

$$\begin{aligned}
\Delta \ln EG_{5,t} = & \beta_{5,0} + \beta_{5,1}t + \sum_{i=1}^l \beta_{5,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{5,3i} \Delta \ln BC_{t-i} \\
& + \sum_{i=0}^l \beta_{5,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{5,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{5,6i} \Delta \ln edu_{t-i} \\
& + \beta_{5,7} \ln EG_{t-1} + \beta_{5,8} \ln BC_{t-1} + \beta_{5,9} \ln gov_{t-1} + \beta_{5,10} \ln open_{t-1} \\
& + \beta_{5,11} \ln edu_{t-1} + v_{5,t}
\end{aligned}$$

10

The ARDL approach follows several steps. First, equations (6)-(10) estimate with ordinary least squares to show An LT link among variables. The parameters β_2 - β_6 are the ST coefficients and β_7 - β_{11} are the corresponding LT coefficients. Joint significance of the coefficients lagged levels of variables (β_7 - β_{11}) show whether cointegration exists. According to test, null hypothesis is $H_0: \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = 0$ against the alternative hypothesis $H_1: \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq \beta_{11} \neq 0$. The F test is used for the decision rule. Pesaran et al. (2001) calculated two sets of critical values (CV) for a given significance level. In one set, all variables are assumed to be $I(0)$ (*lower bound*), while in the other, all variables are assumed to be $I(1)$ (*upper bound*). However, Narayan (2004) and Narayan (2005) discussed that CVs obtained by Pesaran et al. (2001) are incompatible with small sample sizes. Thus, he calculated new CVs for sample sizes ranging from 30-80 observations. Considering 36 observations, it is taken into account Narayan's CVs in the present study.

There are three cases. First, if the estimated F statistic exceeds the upper bound critical value $I(1)$, the null hypothesis will be rejected. It implies that there is a cointegration relationship among variables. Second, if the estimated F statistic is less than the lower bound critical value $I(0)$, the null hypothesis will not be excluded. It implies that there is no co-integration link among variables. Third, if the computed F statistic falls into the bounds, then the test becomes inconclusive. Optimal lag l in Eqs. 6-10 are chosen based on model selection criteria such as Akaike (AIC) or Schwarz (SIC). The minimum information criteria imply optimal l .

If there is a cointegration, the second step is to estimate the coefficient of the LT relationship determined in the first step. LT selected ARDL (h, z, r, k, m) models 11-15 as follows:

$$\begin{aligned} \ln EG_{1,t} = & \beta_{1,0} + \beta_{1,1}t + \sum_{i=1}^h \beta_{1,2i} \ln EG_{t-i} + \sum_{i=0}^z \beta_{1,3i} \ln EC1_{t-i} \\ & + \sum_{i=0}^r \beta_{1,4i} \ln gov_{t-i} + \sum_{i=0}^k \beta_{1,5i} \ln open_{t-i} + \sum_{i=0}^m \beta_{1,6i} \ln edu_{t-i} + v_{1,t} \end{aligned}$$

11

$$\begin{aligned} \ln EG_{2,t} = & \beta_{2,0} + \beta_{2,1}t + \sum_{i=1}^h \beta_{2,2i} \ln EG_{t-i} + \sum_{i=0}^z \beta_{2,3i} \ln EC2_{t-i} \\ & + \sum_{i=0}^r \beta_{2,4i} \ln gov_{t-i} + \sum_{i=0}^k \beta_{2,5i} \ln open_{t-i} + \sum_{i=0}^m \beta_{2,6i} \ln edu_{t-i} + v_{2,t} \end{aligned}$$

12

$$\begin{aligned} \ln EG_{3,t} = & \beta_{3,0} + \beta_{3,1}t + \sum_{i=1}^h \beta_{3,2i} \ln EG_{t-i} + \sum_{i=0}^z \beta_{3,3i} \ln HC1_{t-i} \\ & + \sum_{i=0}^r \beta_{3,4i} \ln gov_{t-i} + \sum_{i=0}^k \beta_{3,5i} \ln open_{t-i} + \sum_{i=0}^m \beta_{3,6i} \ln edu_{t-i} + v_{3,t} \end{aligned}$$

13

$$\begin{aligned} \ln EG_{4,t} = & \beta_{4,0} + \beta_{4,1}t + \sum_{i=1}^h \beta_{4,2i} \ln EG_{t-i} + \sum_{i=0}^z \beta_{4,3i} \ln HC2_{t-i} \\ & + \sum_{i=0}^r \beta_{4,4i} \ln gov_{t-i} + \sum_{i=0}^k \beta_{4,5i} \ln open_{t-i} + \sum_{i=0}^m \beta_{4,6i} \ln edu_{t-i} + v_{4,t} \end{aligned}$$

14

$$\begin{aligned} \ln EG_{5,t} = & \beta_{5,0} + \beta_{5,1}t + \sum_{i=1}^h \beta_{5,2i} \ln EG_{t-i} + \sum_{i=0}^z \beta_{5,3i} \ln BC_{t-i} \\ & + \sum_{i=0}^r \beta_{5,4i} \ln gov_{t-i} + \sum_{i=0}^k \beta_{5,5i} \ln open_{t-i} + \sum_{i=0}^m \beta_{5,6i} \ln edu_{t-i} + v_{5,t} \end{aligned}$$

15

To select lag values h , z , r , k , and m in Eqs. 11-15, model selection criteria such as AIC or SIC, as done in the first step, are used.

Finally, ECM is estimated to provide for ST coefficients of the ARDL model. Equations 16-20 are below:

$$\begin{aligned}
\Delta \ln EG_{1,t} = & \beta_{1,0} + \beta_{1,1}t + \sum_{i=1}^l \beta_{1,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{1,3i} \Delta \ln EC1_{t-i} \\
& + \sum_{i=0}^l \beta_{1,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{1,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{1,6i} \Delta \ln edu_{t-i} \\
& + \lambda ECM_{1,t-1} + v_{1,t}
\end{aligned}$$

16

$$\begin{aligned}
\Delta \ln EG_{2,t} = & \beta_{2,0} + \beta_{2,1}t + \sum_{i=1}^l \beta_{2,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{2,3i} \Delta \ln EC2_{t-i} \\
& + \sum_{i=0}^l \beta_{2,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{2,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{2,6i} \Delta \ln edu_{t-i} \\
& + \lambda ECM_{2,t-1} + v_{2,t}
\end{aligned}$$

17

$$\begin{aligned}
\Delta \ln EG_{3,t} = & \beta_{3,0} + \beta_{3,1}t + \sum_{i=1}^l \beta_{3,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{3,3i} \Delta \ln HC1_{t-i} \\
& + \sum_{i=0}^l \beta_{3,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{3,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{3,6i} \Delta \ln edu_{t-i} \\
& + \lambda ECM_{3,t-1} + v_{3,t}
\end{aligned}$$

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$$\begin{aligned}
\Delta \ln EG_{4,t} = & \beta_{4,0} + \beta_{4,1}t + \sum_{i=1}^l \beta_{4,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{4,3i} \Delta \ln HC2_{t-i} \\
& + \sum_{i=0}^l \beta_{4,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{4,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{4,6i} \Delta \ln edu_{t-i} \\
& + \lambda ECM_{4,t-1} + v_{4,t}
\end{aligned}$$

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$$\begin{aligned}
\Delta \ln EG_{5,t} = & \beta_{5,0} + \beta_{5,1}t + \sum_{i=1}^l \beta_{5,2i} \Delta \ln EG_{t-i} + \sum_{i=0}^l \beta_{5,3i} \Delta \ln BC_{t-i} \\
& + \sum_{i=0}^l \beta_{5,4i} \Delta \ln gov_{t-i} + \sum_{i=0}^l \beta_{5,5i} \Delta \ln open_{t-i} + \sum_{i=0}^l \beta_{5,6i} \Delta \ln edu_{t-i} \\
& + \lambda ECM_{5,t-1} + v_{5,t}
\end{aligned}$$

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where λ is the speed of adjustment coefficient, and ECM is the residuals provided from estimated cointegration models of Eqs. 6-10.

5.4 Model Estimation Results

This part of the study displays the findings from ARDL bound tests and unit root testing.

5.4.1 Unit Root Test Results

Results of the ADF and PP unit root tests for the intercept and trend model are shown in Table 5.2. The results point out that all variables are non-stationary at 1% significance level, but stationary at first difference. So, they are determined to be I (1)¹⁴.

Table 5.2 Results of ADF and PP tests

Variables	ADF Test		PP Test	
	Level	First Diff.	Level	First Diff.
RGDP	-2.446 (0.351)	-6.259 (0.000) ***	-2.446 (0.351)	-8.353 (0.000) ***
EC1	-1.890 (0.638)	-4.993 (0.001) ***	-1.991 (0.585)	-4.952 (0.001) ***
HC1	1.838 (1.000)	-2.728 (0.233)	-2.296 (0.424)	-6.134 (0.000) ***

¹⁴ OPEN variable is I (0) at 5 % level of significance according to ADF test results. When selecting the ARDL model for estimation, this situation was also taken into account.

Table 5.2 continued

EC2	-1.867 (0.649)	-7.078 (0.000)***	-1.758 (0.702)	-7.289 (0.000)***
HC2	-1.337 (0.856)	-2.050 (0.548)	-1.779 (0.693)	-6.991 (0.000)***
BC	-3.007 (0.144)	-4.045 (0.016)***	-2.081 (0.537)	-3.958 (0.020)**
GOV	-2.616 (0.275)	-5.712 (0.000)***	-2.276 (0.435)	-5.710 (0.000)***
EDU	-1.542 (0.795)	-5.672 (0.000)***	1.588 (0.773)	-5.672 (0.000)***
OPEN	-3.593 (0.045)**	-5.291 (0.000)***	-2.801 (0.206)	-5.862 (0.000)***

Note: 1%, 5%, and 10% levels of significance are indicated by the symbols ***, **, and *, respectively. Probability values are given within the parentheses. ADF unit root test uses Schwarz information criteria while PP test uses Barlett Kernell estimation method. Results of ADF and PP unit root tests for intercept model are shown in Appendix B. Graphs of the series show that each variable has trend. Furthermore, it is also estimated simple linear regression on the trend variable of each variable and found that trend variable is statistically significant. Therefore, trend variables are considered in the models.

5.4.2 Cointegration Results

ARDL cointegration approach suggests five different models defined according to their deterministic features. These five models are the model with no intercept and no trend (case I), the model with the restricted intercept and no trend (case II), the model with unrestricted intercept and no trend (case III), the model with unrestricted intercept and restricted trend (case IV), and the model with unrestricted intercept and unrestricted trend (case V). (Pesaran et al., 2001). As it is mostly used and in line with the literature, case V is selected to estimate our models.

Five models with five different credit indicators are estimated to assess the effect of credit types on EG. This approach was chosen to control the influence of each credit variable separately on EG.

Model 1 is estimated to determine the effect of EC1 on EG (RGDP). The ARDL (4,0,4,2,4) model was derived by selecting the best model from a set of 2500 possible models in accordance with the AIC information criteria. Table 5.3 displays the findings of the bound test conducted to determine whether the variables are cointegrated. The calculated F statistical value (7.239) exceeds the upper critical values ($F > I(1)$), thus rejecting the null hypothesis that cointegration does not exist. It appears that the series

are cointegrated based on the bounds test with F statistics, but it is imperative to check the results of the t-bound test in order to ensure that this cointegration is valid. The calculated t statistic ($|-4.963|$) is greater than the upper critical value for all levels of significance, confirming the validity of the cointegration link between the variables (t statistics and critical values are evaluated in absolute values).

Table 5.3 Bound test results for model 1

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	7.239	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-4.963	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Table 5.4 presents the ARDL model's LT estimation results. A diagnostic analysis of this model has determined that normality is confirmed, and the model displays no autocorrelation, heteroskedasticity, and model specification issues (normality assumption occurs at 10 % significance level in this model). EC to GDP and government expenditures are statistically significant at a 1 % level. The school enrollment variable is statistically significant at a 5 % level, while trade openness is not statistically significant. A 1 % increase in EC to GDP will increase EG by 0.21 %. This result shows that EC has a positive impact on EG in the LT. A 1 % increase in government expenditures will decrease EG by 0.48 %, while a 1 % increase in school enrollment will increase EG by 0.003 %. We expected the GOV variable to have a positive sign but concluded that it had a negative sign during the study period. It is possible for government expenditures to negatively affect the growth of the economy if they force the private entrepreneur out of the market, cause economic rent, and create distortions in the market. Increasing spending in public sector but channeling these spendings to less productive areas can also result in negative effect.

Table 5.4 ARDL model LT estimation results for model 1

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
EC1	0.2184***	0.035	6.14	0.0001
GOV	-0.4874***	0.096	-5.06	0.0003
OPEN	0.0039	0.099	0.03	0.9689
EDU	0.2873**	0.124	2.31	0.0392
$\bar{R}^2 = 0.99$, F=415.143 (P=0.000)				
Diagnostic Tests Results				
Serial Correlation (Breusch-Godfrey): F=2.985 (P=0.1045)				
Model Specification (Ramsey-Reset): F=0.474 (P=0.5050)				
Normality (Jarque-Bera): JB=5.014 (P=0.081)				
Heteroskedasticity (Breusch-Pagan-Godfrey): F=0.759 (P=0.7136)				

Table 5.5 presents the ST regression findings of the ECM, and the error correction coefficient EC_{t-1} is calculated as -1.316. This coefficient must be negative and statistically significant in order for the error correction mechanism to function. Based on these findings, the error correction coefficient is negative and statistically significant. It is anticipated that the deviations from the ST equilibrium will improve after a $1/|-1.316|=0.76$ period of time, meaning in 8 months, and reaching the LT equilibrium.

Table 5.5 ARDL model ST estimation results for model 1

DV: Δ RGDP	Coef.	St. Er.	t-st.	Pr.
Δ RGDP _{t-1}	0.981***	0.162	6.02	0.0001
Δ RGDP _{t-2}	0.261	0.147	1.76	0.1029
Δ RGDP _{t-3}	0.732***	0.159	4.59	0.0006
Δ GOV	-0.255***	0.075	-3.36	0.0056
Δ GOV _{t-1}	0.313***	0.074	4.18	0.0013
Δ GOV _{t-2}	0.274**	0.095	2.89	0.0136
Δ GOV _{t-3}	0.775***	0.114	6.79	0.0000
Δ OPEN	0.186***	0.060	3.08	0.0094
Δ OPEN _{t-1}	0.286***	0.069	4.13	0.0014
Δ OPEN _{t-2}	-0.030	0.053	-0.57	0.5771
Δ OPEN _{t-3}	0.434***	0.075	5.75	0.0001
Δ EDU	0.547***	0.136	4.01	0.0017
Δ EDU _{t-1}	-0.583***	0.115	-5.06	0.0003
Constant	34.307***	4.934	6.95	0.0000
Trend	0.042***	0.006	7.05	0.0000
EC _{t-1}	-1.316***	0.189	-6.94	0.0000
$\bar{R}^2 = 0.73$, F=6.725 (P=0.000)				

For the stability analysis of the model, the Cusum test is conducted. The Cusum and Cusum of square (Cusumsq) graphs indicate whether the estimated parameters are stable. It can be seen that the parameter estimators comply with the stability condition since the dashed lines in both graphs remain within the 95% confidence limit.

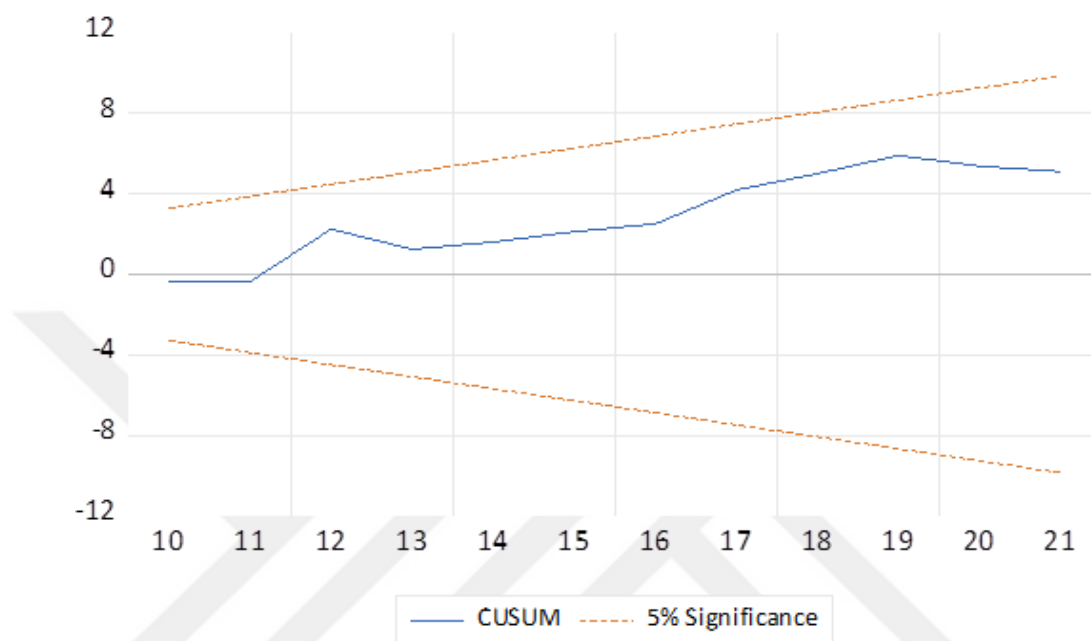


Figure 5.1 CUSUM graph of ARDL (4,0,4,2,4) model

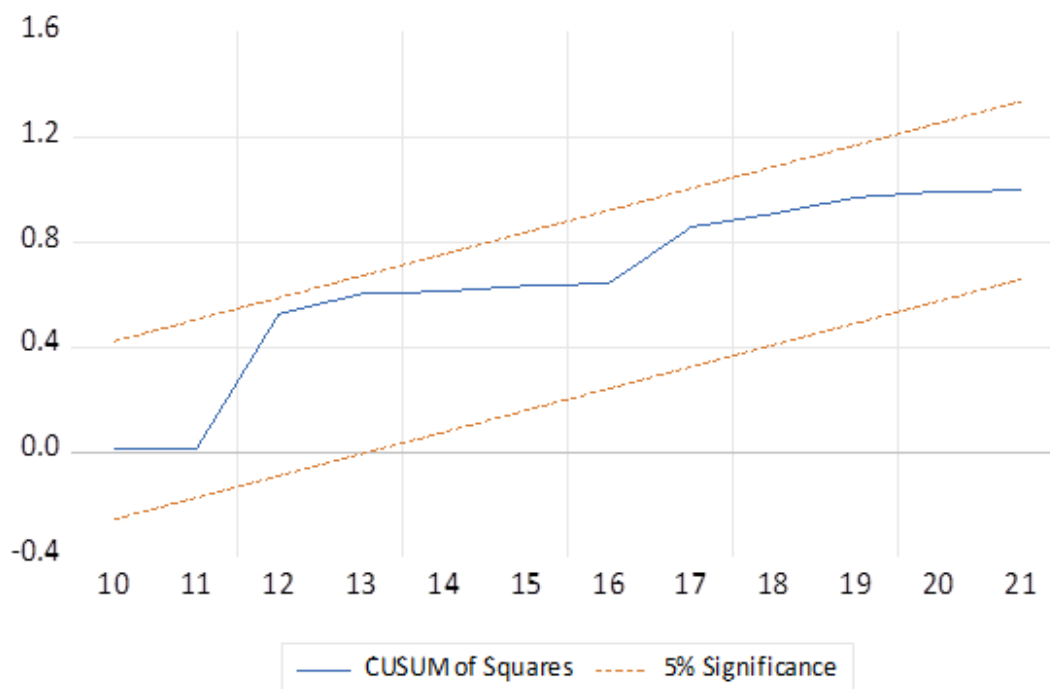


Figure 5.2 CUSUMSQ graph of ARDL (4,0,4,2,4) model

Model 2 is estimated to specify the effect of HC to GDP (HC1) on EG by the ARDL (4,3,2,3,4) model. Table 5.6 displays the results of the bound test conducted to determine whether the variables are cointegrated. The calculated F statistical value (5.235) does not exceed the upper critical values ($F < I(1)$) at 5 % and 1% significance levels, thus accepting the null hypothesis that cointegration does not exist. It appears that the series are cointegrated at a 10 % significance level, but it is necessary to check the results of the t-bound test to ensure that this cointegration is valid. The calculated t statistic ($|-1.979|$) is smaller than the upper critical value for all levels of significance, confirming that cointegration does not exist between variables. For the period of 1986-2021, HC to GDP does not have any effect on EG in the LT.

Table 5.6 Bound test results for model 2

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	5.235	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-1.979	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Model 3 is estimated to find out the effect of EC2 on EG. The ARDL (4,0,2,0,1) model was derived with the AIC information criteria. Table 5.7 exhibits the results of the bound test conducted to determine whether the variables are cointegrated. The calculated F statistical value (7.071) exceeds the upper critical values ($F > I(1)$) at a 5 % level of significance, thus rejecting the null hypothesis that cointegration does not exist. It appears that the series are cointegrated based on the bounds test with F statistics, but it is essential to check the results of the t-bound test in order to confirm that this cointegration is valid. The calculated t statistic ($|-4.921|$) is greater than the upper critical value for all levels of significance, confirming the validity of the cointegration tie between the variables.

Table 5.7 Bound test results for model 3

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	7.071	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-4.921	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Table 5.8 shows the ARDL model's LT estimation results. It has been determined through diagnostic analysis that normality exists, and the model exhibits no autocorrelation, heteroskedasticity, or specification issues. EC to total credit and school enrollment are statistically significant at a 1 % level. The government expenditure variable is statistically significant at a 10 % level, while trade openness is not statistically significant. A 1 % increase in EC to total credit will increase EG by 0.18 %. This result shows that EC has a positive influence on EG in the LT. A 1 % increase in government expenditures will diminish EG by 0.17 %, while a 1 % increase in school enrollment will diminish EG by 0.244 %.

Table 5.8 ARDL model LT estimation results for model 3

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
EC2	0.1847***	0.033	5.56	0.0000
GOV	-0.1788*	0.087	-2.03	0.0561
OPEN	-0.0444	0.043	-1.03	0.3147
EDU	-0.2444***	0.044	-5.43	0.0000
$\bar{R}^2 = 0.99$, F= 499.420(P=0.000)				
Diagnostic Tests Results				
Serial Correlation (Breusch-Godfrey): F=1.969 (P=0.1511)				
Model Specification (Ramsey-Reset): F=0.192 (P=0.6659)				
Normality (Jarque-Bera): JB=0.744 (P=0.6890)				
Heteroskedasticity (Breusch-Pagan-Godfrey): F=1.648 (P=0.1599)				

Table 5.9 presents the ST regression results of the ECM, and the error correction coefficient EC_{t-1} is calculated as -1.740. Based on this result, the error correction coefficient is negative and statistically significant as expected. The shocks in the ST equilibrium will improve after a $1/|-1.740|=0.57$ period of time, meaning in 6 months, and reaching the LT equilibrium.

Table 5.9 ARDL model ST estimation results for model 3

DV: Δ RGDP	Coef.	St.Er.	t-st.	Pr.
Δ RGDP _{t-1}	0.868***	0.183	4.74	0.0001
Δ RGDP _{t-2}	1.022***	0.204	4.98	0.0001
Δ RGDP _{t-3}	0.753***	0.179	4.18	0.0005
Δ GOV	-0.176**	0.067	-2.62	0.0168
Δ GOV _{t-1}	0.203***	0.069	2.91	0.0090
Δ OPEN	0.189***	0.063	2.97	0.0079
Constant	49.167***	7.508	6.54	0.0000
Trend	0.092***	0.014	6.56	0.0000
EC _{t-1}	-1.740***	0.266	-6.54	0.0000
$\bar{R}^2 = 0.61$, $F=7.219$ ($P=0.000$)				

The model's Cusum and Cusumsq graphs (Figures 5.3 and 5.4) indicate that statistics are within the critical range. Therefore, parameter estimators comply with the stability condition since the dashed lines in both graphs remain within the 95% confidence limit. EG and its determinants are stable in the LT.

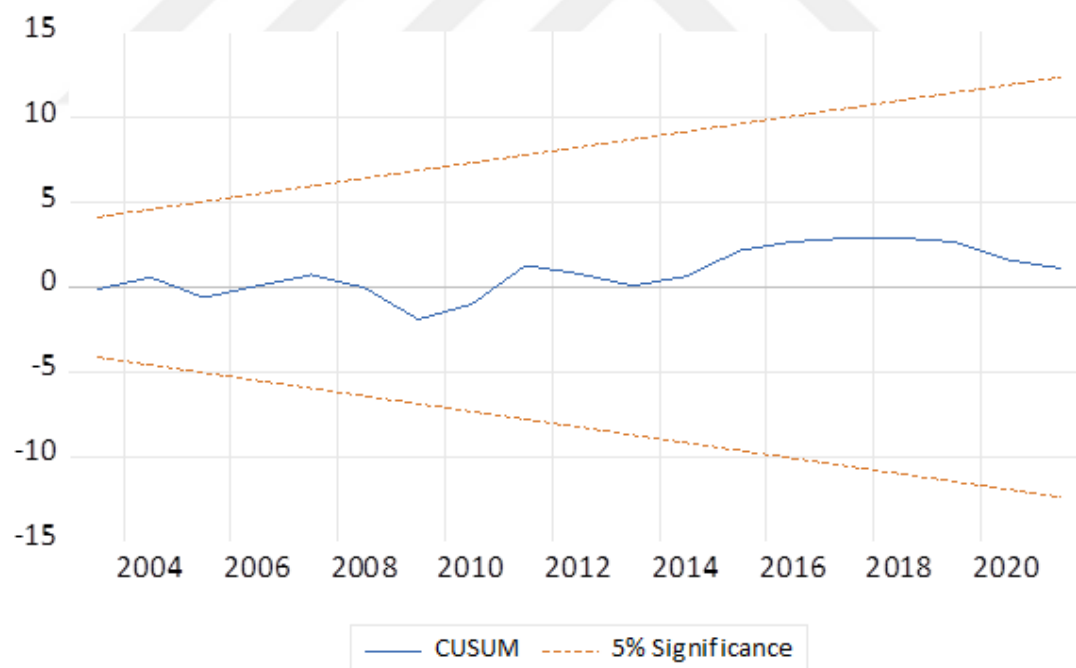


Figure 5.3 CUSUM graph of ARDL (4,0,2,0,1) model

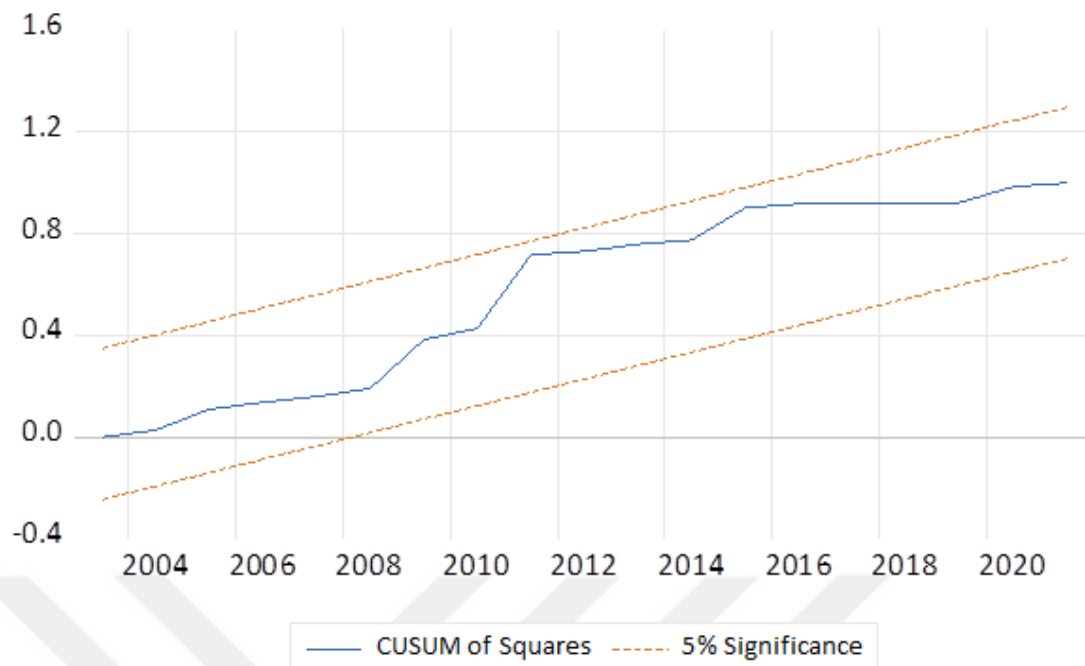


Figure 5.4 CUSUMSQ graph of ARDL (4,0,2,0,1) model

Model 4 is estimated to figure out the effect of HC to total credit (HC2) on EG by the ARDL (4,4,3,4,1) model. Table 5.10 shows the results of the bound test conducted to determine whether the variables are cointegrated. The calculated F statistical value (8.220) exceeds the upper critical values ($F > I(1)$) for all significance levels, thus rejecting the null hypothesis that cointegration does not exist. It is also necessary to check the results of the t-bounds test in order to ensure that this cointegration is valid. The calculated t statistic ($|-2.951|$) is smaller than the upper critical value for all levels of significance, showing that cointegration does not exist between variables. For the period of 1986-2021, HC to total credit does not have any effect on EG.

Table 5.10 Bound test results for model 4

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	8.220	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-2.951	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Model 5 is estimated to determine the effect of bank credit to GDP (BC) on EG by the ARDL (4,1,4,2,4) model. Table 5.11 presents the results of the bound test conducted to determine whether the variables are cointegrated. The calculated F statistical value (3.264) does not exceed the upper critical values ($F < I(1)$) at all levels of significance, thus accepting the null hypothesis that cointegration does not exist. The calculated t statistic (-1.814) is also smaller than the upper critical value for all levels of significance, confirming that cointegration does not exist between variables. For the period of 1986-2021, bank credit to GDP does not have any effect on EG.

Table 5.11 Bound test results for model 5

H ₀ : No cointegration		α	I(0)	I(1)
F statistics	3.264	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistics	-1.814	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

The results of all model estimations indicate that EC is positively correlated with EG whereas HC seems not to be correlated with EG. Our findings are compatible with those obtained by Beck et al. (2012). The results of the study show a different dimension to the finance-growth link, demonstrating there is a tie connecting EC and EG. Using PC share in GDP values, study findings on the link between FD and EG tend to be noteworthy. Bank credits have no effect on EG in Türkiye in the LT.

5.4.3 Causality Results

There may be a causality relationship between two-time series if part of the information contained within one is derived from another. The concept of causality must be examined from two different perspectives in order to explain this issue. The first method of obtaining causality is through the use of VAR models. The second one is causality derived through cointegration equations. LT and ST causality can be determined using the error correction mechanism obtained from cointegration

equations (Mert and Çağlar, 2019). Cointegration equations will be used in our study to derive causality.

LT Causality

If the variables are cointegrated, a causality analysis obtained from cointegration can be conducted. It is not possible to perform a causality analysis if a cointegration relationship does not exist. In our models estimated in the previous section, a cointegration exists between EC variables (EC1, EC2) and RGDP. Therefore, LT causality will be tested for these variables. In model 1, which is presented in the previous section, RDGP is a DV, and EC1 is an IV. Bound test findings specify that there is a cointegration relationship; LT estimation results suggest that EC1 is statistically significant. ST estimation findings also exhibit that the error correction term is negative and statistically significant. To determine if there is a two-way causal link, we will solve a model with EC1 as the DV and RGDP as the IV. For this purpose, ARDL (2,4,4,4,2) model is estimated. Table 5.12 exhibits the findings of the bound test conducted to determine whether the variables are cointegrated. The results affirm the validity of the co-integration relationship.

Table 5.12 Bound test results for EC1

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	7.778	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-4.657	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Table 5.13 shows the ARDL model's LT estimation results. It has been determined through diagnostic analysis that normality exists, and the model exhibits no

autocorrelation, heteroskedasticity, or specification issues. RGDP is statistically significant at the 5 % level.¹⁵

Table 5.13 ARDL model LT estimation results for EC1

DV: EC1	Coef.	St. Er.	t-st.	Pr.
RDGP	2.2575**	0.926	2.43	0.0261
GOV	1.2418	1.003	1.23	0.2329
OPEN	0.0983	0.828	0.11	0.9069
EDU	-2.2961***	0.640	-3.58	0.0023
$\bar{R}^2 = 0.98$, F=96.970 (P=0.000)				
Diagnostic Tests Results				
Serial Correlation (Breusch-Godfrey): F=0.4003 (P=0.6770)				
Model Specification (Ramsey-Reset): F=2.4520 (P=0.1369)				
Normality (Jarque-Bera): JB=0.6138 (P=0.7357)				
Heteroskedasticity (Breusch-Pagan-Godfrey): F=0.4828 (P=0.9125)				

Table 5.14 displays the ST regression findings of the ECM, and the error correction coefficient EC_{t-1} is calculated as -0.353. It is necessary for this coefficient to be negative and statistically significant in order for the error correction mechanism to function. Based on these results, the error correction coefficient is negative and statistically significant.

Table 5.14 ARDL model ST estimation results for EC1

DV: $\Delta EC1$	Coef.	St. Er.	t-st.	Pr.
ΔGOV	0.343**	0.150	2.28	0.0353
ΔGOV_{t-1}	-0.291*	0.150	-1.94	0.0688
ΔGOV_{t-2}	-0.361**	0.149	-2.42	0.0269
ΔGOV_{t-3}	-0.871***	0.142	-6.11	0.0000
$\Delta OPEN$	0.206*	0.115	1.78	0.0920
$\Delta OPEN_{t-1}$	-0.310**	0.124	-2.50	0.0229
$\Delta OPEN_{t-2}$	0.022	0.120	0.18	0.8563
$\Delta OPEN_{t-3}$	-0.505***	0.129	-3.91	0.0011
Constant	-18.29***	2.649	-6.90	0.0000
Trend	-0.005***	0.001	-3.85	0.0013
EC_{t-1}	-0.353***	0.050	-6.93	0.0000
$\bar{R}^2 = 0.71$, F=8.653 (P=0.000)				

¹⁵ Our study focuses primarily on EC and EG; therefore, causality between these two variables was analyzed, whereas causality between EC and the control variables was not considered.

The Cusum and Cusum Square graphs of the model (Figures 5.5 and 5.6) indicate that statistics are within the critical range; therefore, parameter estimators comply with the stability condition since the dashed lines in both graphs remain within the 95% confidence limit. EC1 and its determinants are stable in the LT.

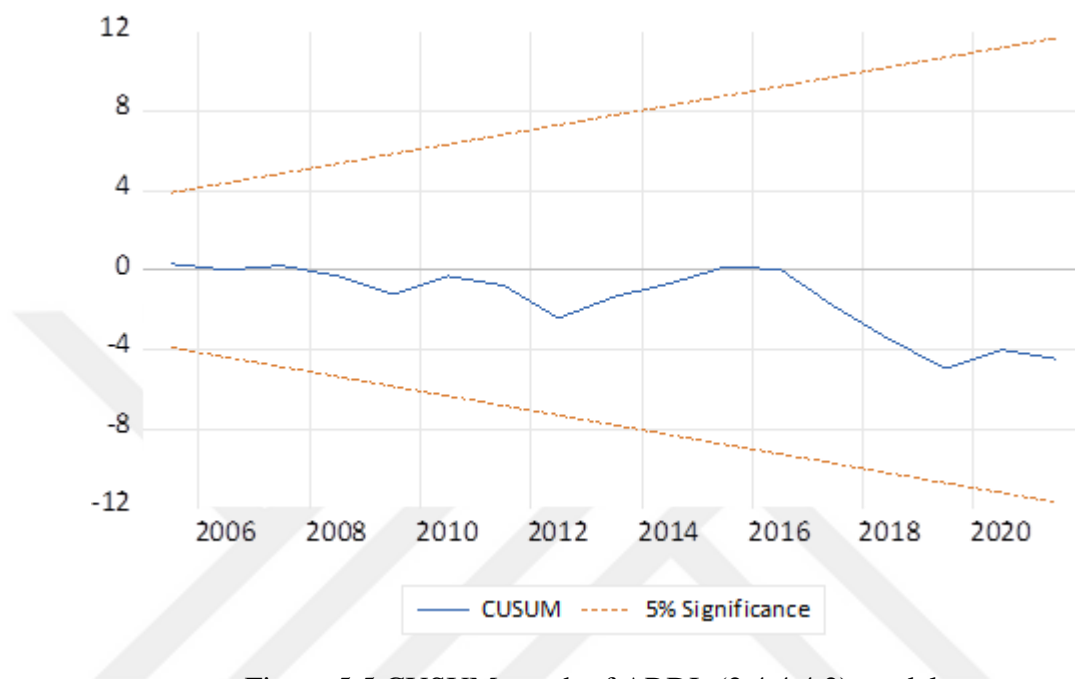


Figure 5.5 CUSUM graph of ARDL (2,4,4,4,2) model

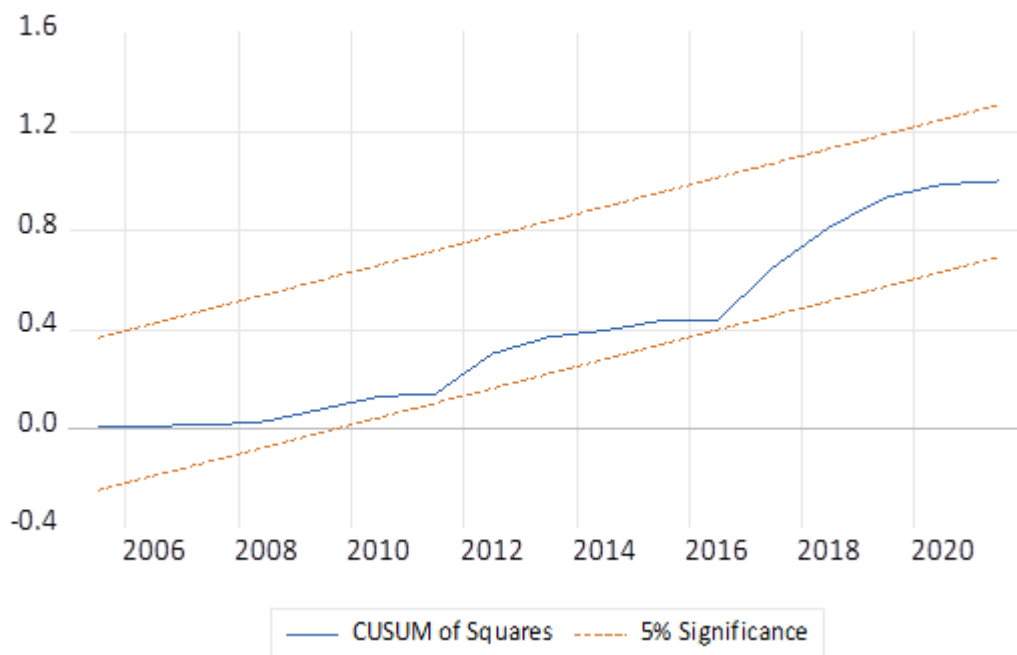


Figure 5.6 CUSUMSQ graph of ARDL (2,4,4,4,2) model

When RGDP is a DV, and EC1 is an IV, EC1 is statistically significant, and ECM functions properly since the error correction term is negative and statistically significant. When EC1 is a DV and RGDP is an IV, RGDP is statistically significant, and the error correction term fulfills the requirement as it is negative and statistically significant. It brings a conclusion that two-way causality exists between RGDP and EC1.

It will be tested whether a two-way causal relationship exists for RDGP and EC2 by solving another model. In this case, EC2 will be the DV, while RGDP will be the IV. For this purpose, ARDL (1,4,0,2,4) model is estimated. Table 5.15 exhibits the findings of the bound test conducted to determine whether the variables are cointegrated. The results corroborate the validity of the cointegration relationship.

Table 5.15 Bound test results for EC2

H ₀ : No cointegration		α	I(0)	I(1)
F statistic	9.176	% 10	3.374	4.512
		% 5	4.036	5.304
		% 1	5.604	7.172
t statistic	-5.819	α	I(0)	I(1)
		% 10	-3.13	-4.04
		% 5	-3.41	-4.36
		% 1	-3.96	-4.96

Table 5.16 displays the ARDL model's LT estimation results. It has been determined through diagnostic analysis that normality exists, and the model exhibits no autocorrelation, heteroskedasticity, or specification issues. RGDP is statistically significant at a 1 % level.

Table 5.16 ARDL model LT estimation results for EC2

DV: EC2	Coef.	St. Er.	t-st.	Pr.
RDGP	2.9588***	0.493	5.99	0.0000
GOV	-0.1538	0.221	-0.69	0.4971
OPEN	-0.0147	0.163	-0.09	0.9289
EDU	0.0308	0.288	0.10	0.9163
$\bar{R}^2 = 0.89, F=11.898 (P=0.000)$				
Diagnostic Tests Results				
Serial Correlation (Breusch-Godfrey): $F=2.2004 (P=0.1503)$				
Model Specification (Ramsey-Reset): $F=1.8682 (P=0.1888)$				
Normality (Jarque-Bera): $JB=0.7983 (P=0.6708)$				
Heteroskedasticity (Breusch-Pagan-Godfrey): $F=1.5442 (P=0.2031)$				

Table 5.17 presents the ST regression results of the ECM, and the error correction coefficient EC_{t-1} is calculated as -0.570. It is necessary for this coefficient to be negative and statistically significant in order for the error correction mechanism to function. Based on these results, the error correction coefficient is negative and statistically significant.

Table 5.17 ARDL model ST estimation results for EC2

DV: $\Delta EC2$	Coef.	St. Er.	t-st.	Pr.
$\Delta RGDP$	0.358**	0.135	2.64	0.0184
$\Delta RGDP_{t-1}$	-0.575***	0.180	-3.19	0.0061
$\Delta RGDP_{t-2}$	-1.457***	0.163	-8.88	0.0000
$\Delta RGDP_{t-3}$	-0.878***	0.193	-4.52	0.0004
$\Delta OPEN$	-0.280***	0.061	-4.60	0.0003
$\Delta OPEN_{t-1}$	0.236***	0.054	4.33	0.0006
ΔEDU	0.762***	0.111	6.85	0.0000
ΔEDU_{t-1}	0.055	0.120	0.45	0.6541
ΔEDU_{t-2}	0.184	0.112	1.64	0.1218
ΔEDU_{t-3}	0.344***	0.115	2.97	0.0094
Constant	-45.04***	5.905	-7.62	0.0000
Trend	-0.073***	0.009	-7.46	0.0000
EC_{t-1}	-0.570***	0.074	-7.62	0.0000
$\bar{R}^2 = 0.84, F=15.106 (P=0.000)$				

The Cusum and Cusum Square graphs of the model (Figures 5.7 and 5.8) indicate that statistics are within the critical range; therefore, parameter estimators comply with the stability condition since the dashed lines in both graphs remain within the 95% confidence limit. EC2 and its determinants are stable in the LT.

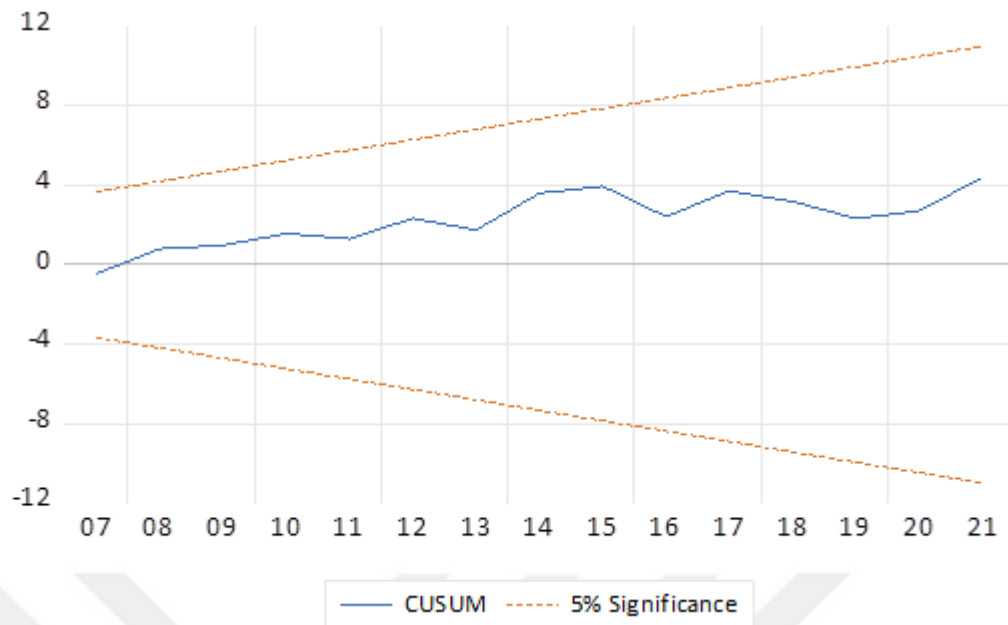


Figure 5.7 CUSUM graph of ARDL (1,4,0,2,4) model

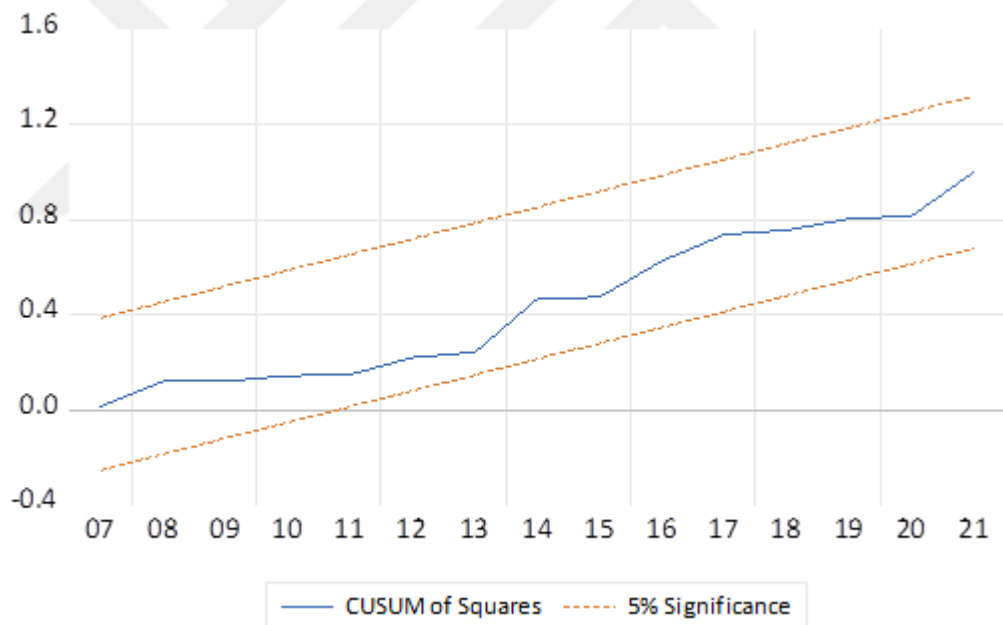


Figure 5.8 CUSUMSQ graph of ARDL (1,4,0,2,4) model

When RGDP is a DV and EC2 is an IV, EC2 is statistically significant, and ECM functions properly since the error correction term is negative and statistically significant. When EC2 is a DV, and RGDP is an IV, RGDP is statistically significant, and the error correction term fulfills the requirement as it is negative and statistically significant. Two-way causality exists between RGDP and EC2.

LT causality results can be summarized in Table 5.18. Two-way causality is observed between RGDP and EC1 as well as between RDGP and EC2.

Table 5.18 LT causality results

DV	IV	t-st.
RDGP	EC1	0.2184*** (0.0001)
EC1	RGDP	2.2575** (0.0261)
RGDP	EC2	0.1847*** (0.0000)
EC2	RGDP	2.9588*** (0.0000)

ST Causality

Table 5.19 shows the ST causality results. Wald test statistics indicate the existence of ST causality between the variables. It is possible to establish ST causality from RGDP to EC1 as well as from EC1 to RGDP. Moreover, there is a ST causal relationship for RGDP and EC2 as well as between EC2 and RGDP.

Table 5.19 ST causality results

DV	IV	Wald Test
RGDP	EC1	13.033*** (0.0036)
EC1	RGDP	6.197** (0.0234)
RDGP	EC2	9.948*** (0.0052)
EC2	RGDP	19.168*** (0.0005)

6. CONCLUSION

The Turkish economy has grown rapidly, and the amount of credit has expanded over the past twenty years, which has paved the way for this study. For the period of 1986-2021, the findings acquired in the present study, which evaluates the effects of credit composition on EG in Türkiye, differ considerably depending on exactly what type of credit is being examined. Utilizing the credits given to enterprises and households, a time series analysis is performed, and the outcomes of the models are presented.

Empirical results indicate a positive link between EC and EG, while HC does not contribute to real EG in the LT. Furthermore, while there is a two-way causality for EC and EG in the ST and LT, there has been no causality link between HC and EG in the ST or the LT. The results obtained for Türkiye are similar to many studies in literature, such as Beck et al. (2012), Sassi and Gasmi (2014), Benczúr et al. (2018), Majeed et al. (2019), Škare, Sinkovic, and Rochon (2019). Therefore, credit market development should be directed primarily to productive investments and innovations instead of HC to achieve a positive effect on EG. Regarding the context of reforms that fosters the Turkish financial sector and EG, this study's findings point out that it is in the interest of the country to develop financial policies concerning credit distribution. The government should support increasing the share of EC in this regard. The influences of HC are currently not evident in Türkiye, but it should be noted that increases in HC may negatively affect EG. It is imperative that monetary and fiscal authorities strictly control the proportion of credit going to the household sector.

Moreover, the findings of the study show that the lending structure affects the extent and persistence of FD on EG. In other words, the lending structure is responsible for determining how much FD impacts EG. For the period of 1986-2021 in Türkiye, the total amount of banking credit given to the private sector has been presented to have no effect on EG, while ECs have a positive effect. Therefore, it can be concluded that it is not relevant how much money financial institutions lend, but to whom and for what purposes it is lent is quite significant.

There are several research areas that can be explored in the future based on the results of this study. It is possible to extend and improve this study to review the link between bank credit activities and other macroeconomic variables in Türkiye. Furthermore, there are limitations to this study due to the lack of time series data on ECs and the inability to determine the sectors in which ECs are spent. This analysis will need to be revisited once the required data are obtained regarding sectors ECs are provided as well as the types of HCs, such as mortgage credits, auto credits, and consumer credits have long nature of data. Additionally, since traditional time series methods are employed within this study, it is possible to analyze and improve the study using more modern time series techniques.



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APPENDICES

Appendix A: Time Series Graphs and Descriptive Statistics

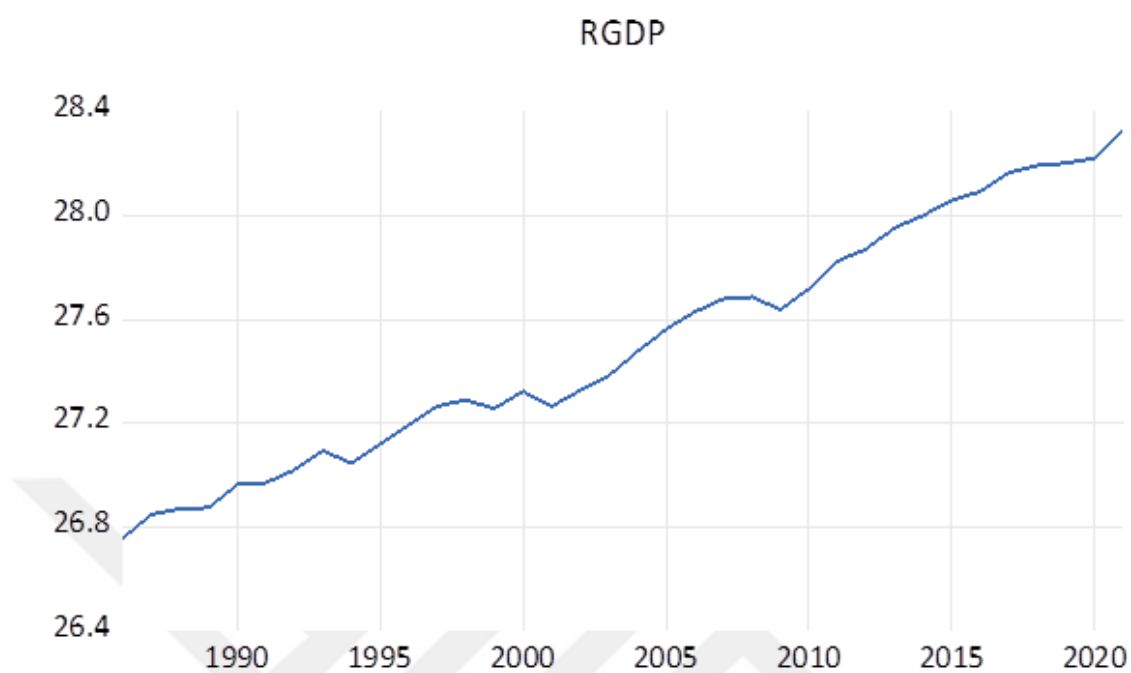


Figure A.1 Time series graph of real GDP

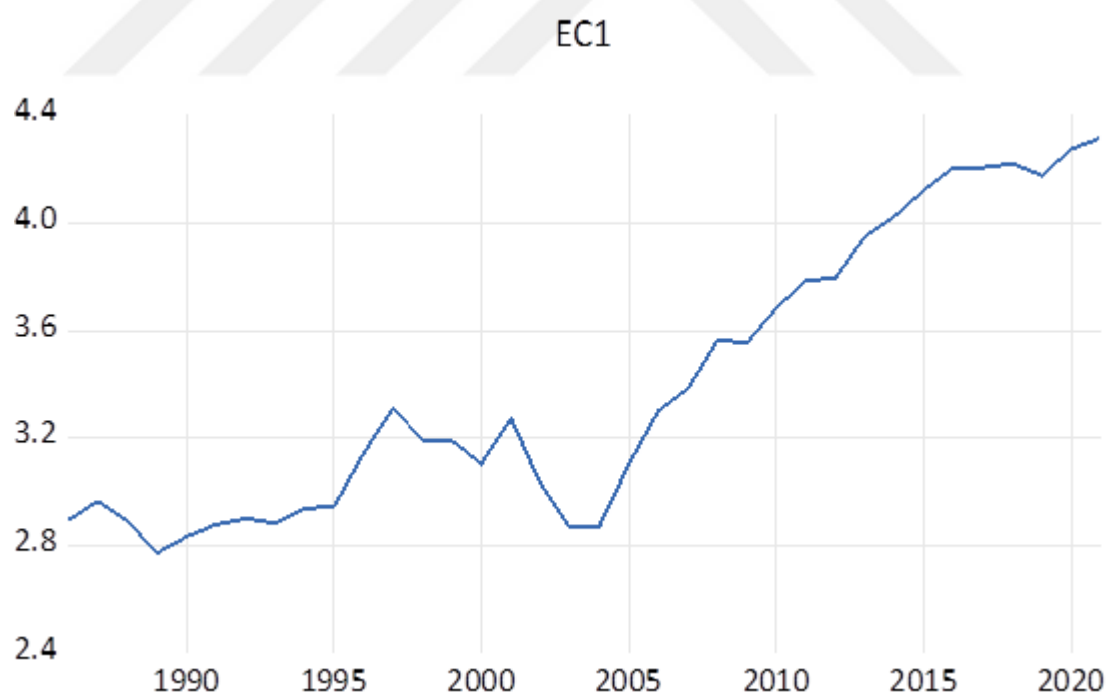


Figure A.2 Time series graph of EC to GDP

Appendix A continued

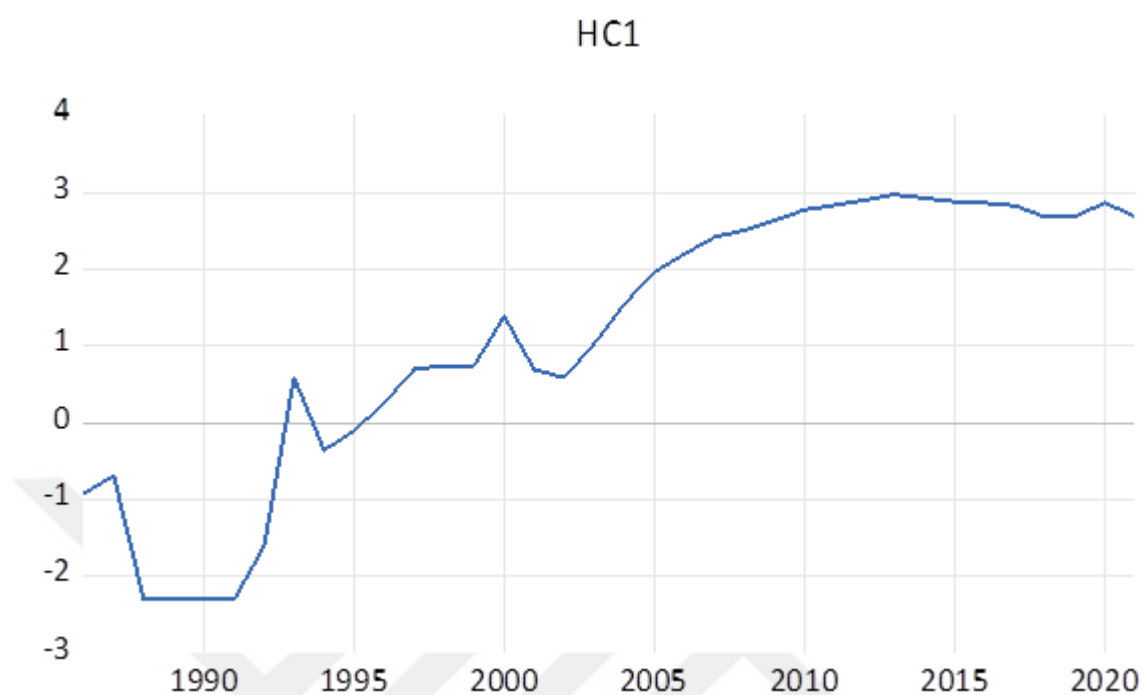


Figure A.3 Time series graph of HC to GDP

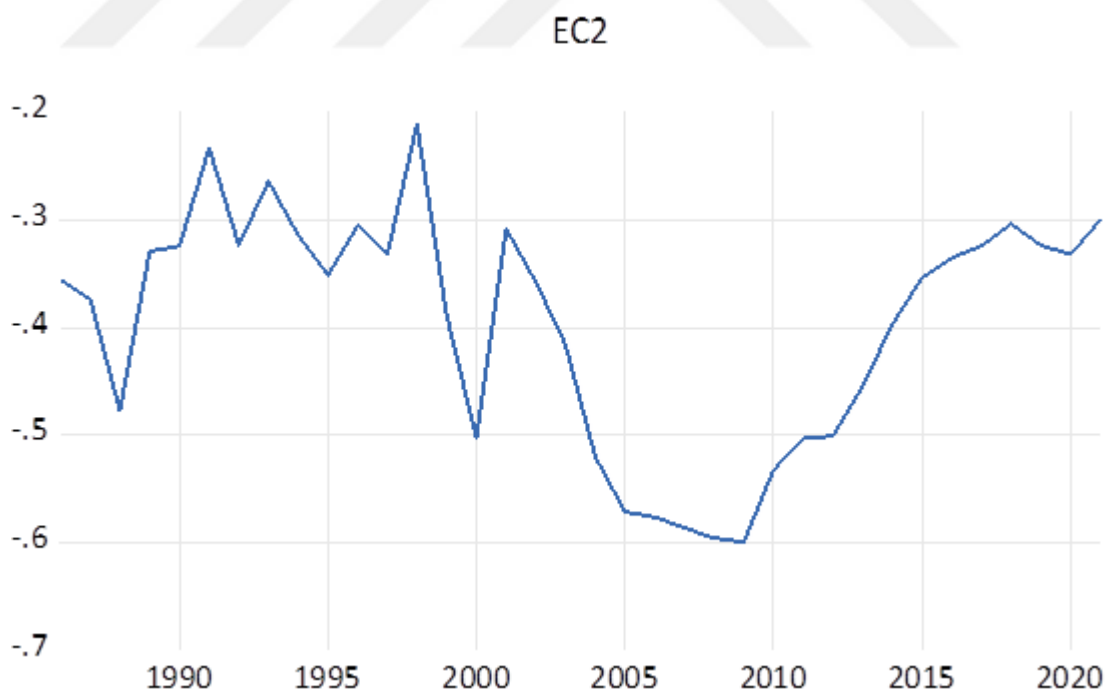


Figure A.4 Time series graph of EC to total credits

Appendix A continued

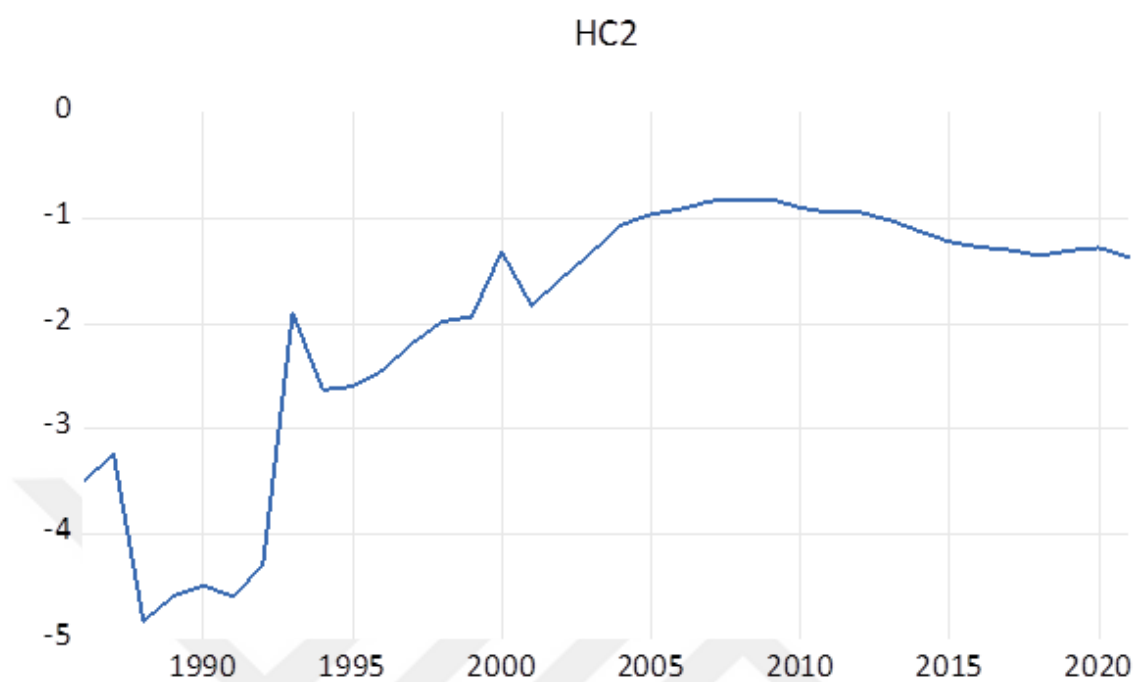


Figure A.5 Time series graph of HC to total credits

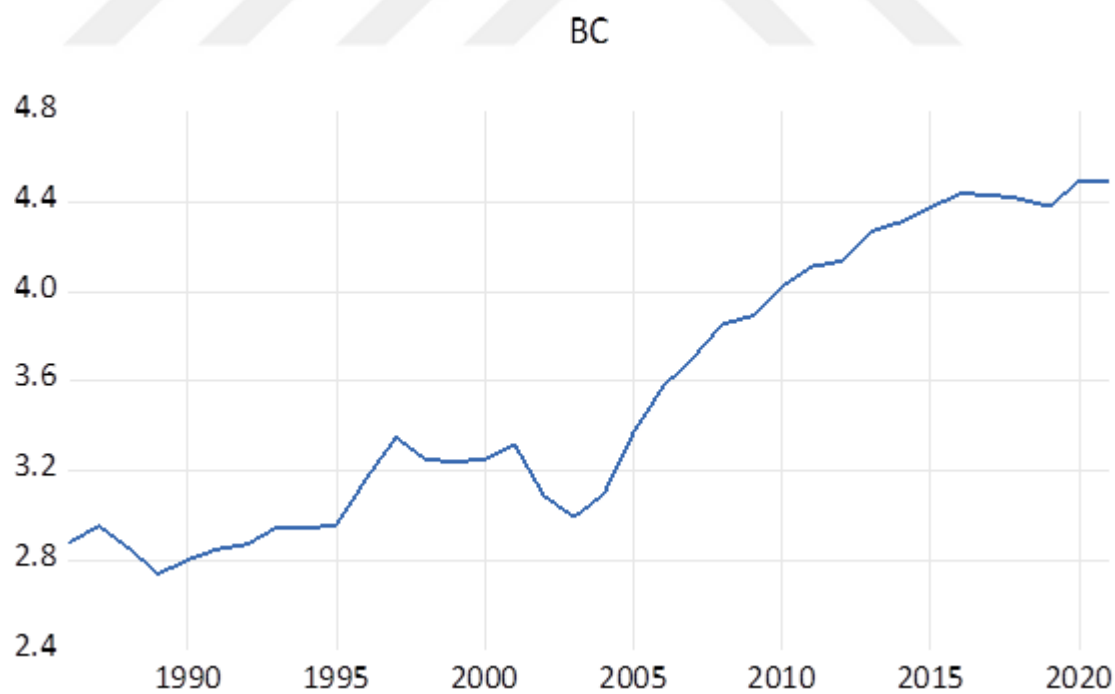


Figure A.6 Time series graph of bank credits to GDP

Appendix A continued

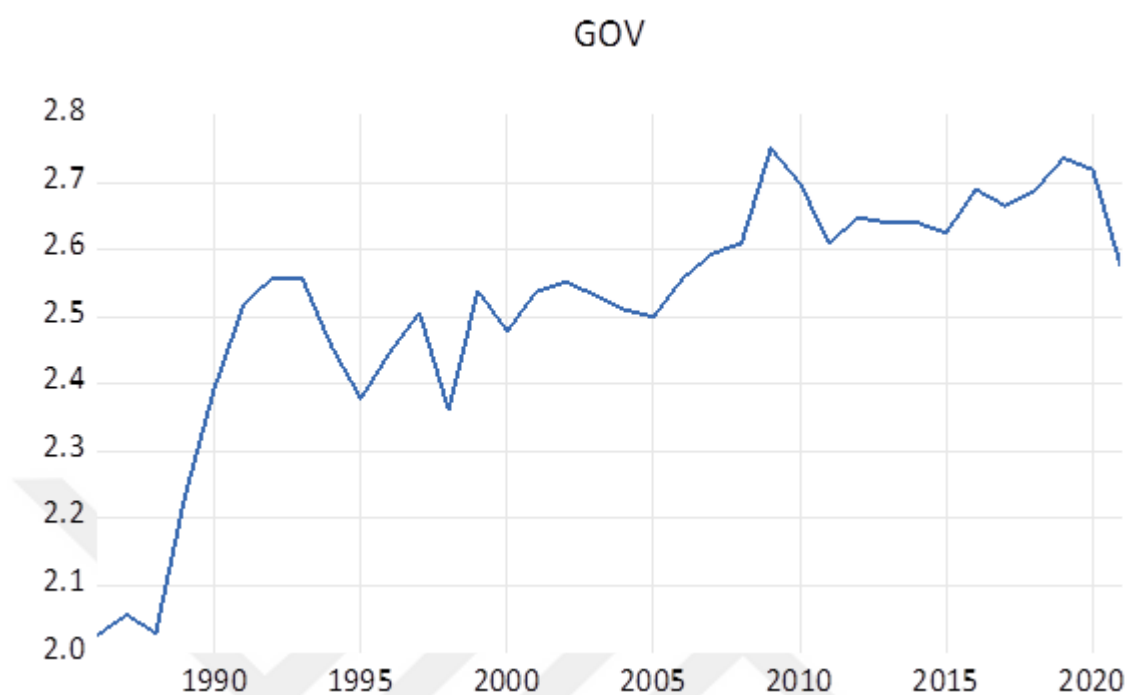


Figure A.7 Time series graph of government expenditures

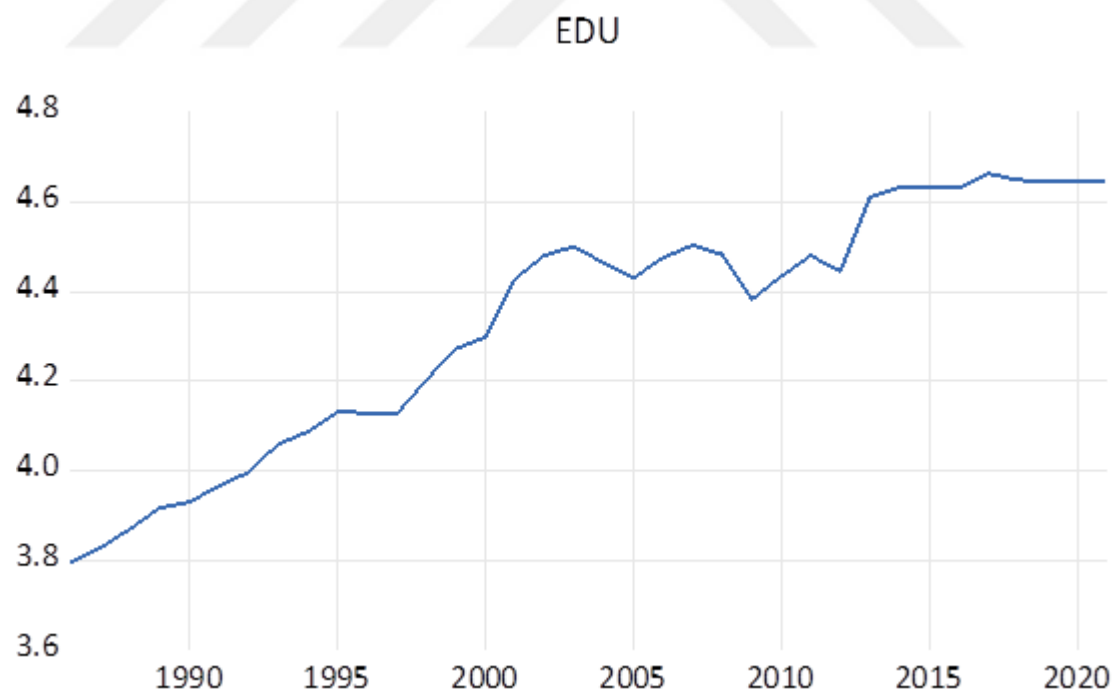


Figure A.8 Time series graph of school enrollment

Appendix A continued

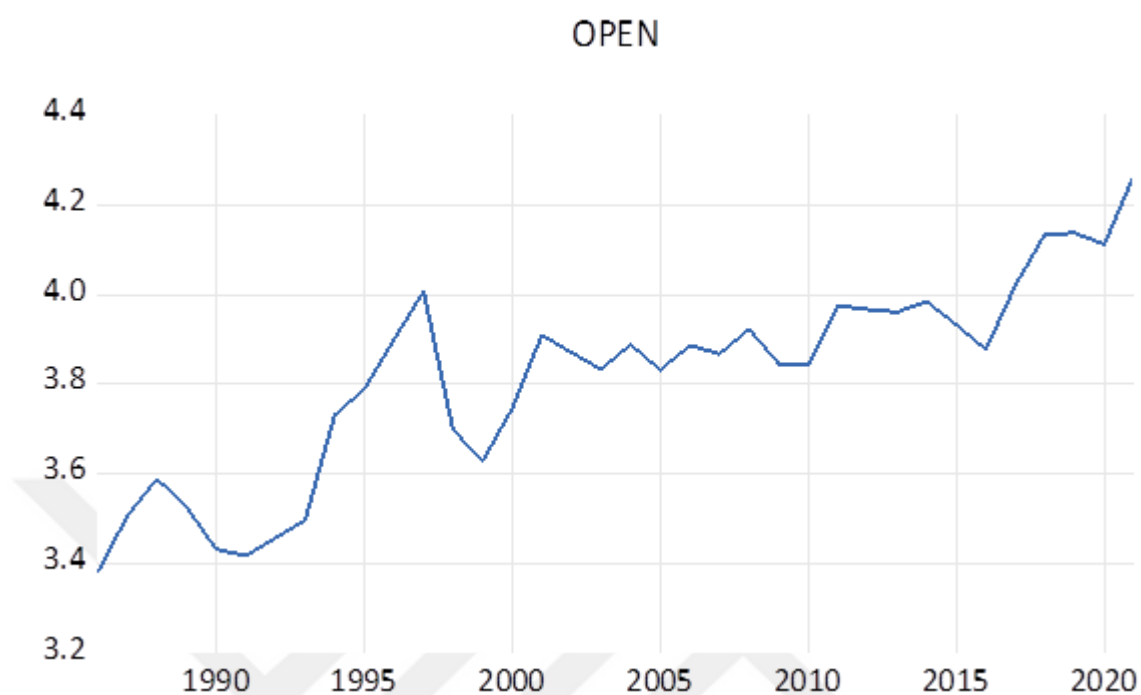


Figure A.9 Time series graph of trade openness

Table A.1 Descriptive statistics

	Mean	Median	Max	Min	St. Dv.	Ob.
RGDP	27.504	27.429	28.328	26.758	0.465	36
EC1	3.404	3.233	4.316	2.772	0.521	36
HC1	1.138	1.466	2.970	-2.302	1.775	36
EC2	-0.396	-0.354	-0.211	-0.599	0.109	36
HC2	-1.963	-1.340	-0.815	-4.827	1.249	36
BC	3.551	3.333	4.495	2.740	0.621	36
GOV	2.517	2.554	2.750	2.026	0.184	36
EDU	4.330	4.432	4.663	3.796	0.276	36
OPEN	3.816	3.869	4.265	3.381	0.223	36

Appendix B: Unit Root Test Results for Intercept Model

Table B.1 Results of ADF and PP tests for intercept model

Variables	ADF Test		PP Test	
	Level	First Difference	Level	First Difference
RGDP	0.251 (0.972)	-6.265 (0.000)***	0.840 (0.993)	-6.665 (0.000)***
EC1	0.295 (0.974)	-4.862 (0.000)***	0.214 (0.969)	-4.828 (0.000)***
HC1	-1.821 (0.362)	-1.379 (0.577)	-1.053 (0.722)	-6.224 (0.000)***
EC2	-1.981 (0.293)	-7.125 (0.000)***	-1.888 (0.333)	-7.320 (0.000)***
HC2	-1.313 (0.608)	-1.977 (0.294)	-1.541 (0.501)	-7.041 (0.000)***
BC	0.129 (0.963)	-4.034 (0.003)***	-0.025 (0.948)	-3.946 (0.004)***
GOV	-2.932 (0.051)*	-5.351 (0.000)***	-3.099 (0.035)**	-5.351 (0.000)***
EDU	-1.811 (0.369)	-5.434 (0.000)***	-1.811 (0.369)	-5.434 (0.000)***
OPEN	-1.331 (0.604)	-5.377 (0.000)***	-0.934 (0.765)	-6.154 (0.000)***

Appendix C: ARDL Model Estimation Results

Table C.1 ARDL (4,0,4,2,4) model estimation results for model 1

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
RGDP _{t-1}	0.665***	0.205	3.24	0.0071
RGDP _{t-2}	-0.720**	0.250	-2.87	0.0139
RGDP _{t-3}	0.470*	0.239	1.96	0.0731
RGDP _{t-4}	-0.732***	0.226	-3.22	0.0072
EC1	0.287***	0.079	3.61	0.0036
GOV	-0.255**	0.107	-2.37	0.0349
GOV _{t-1}	-0.072	0.129	-0.55	0.5877
GOV _{t-2}	-0.038	0.112	-0.34	0.7348
GOV _{t-3}	0.501***	0.157	3.17	0.0080
GOV _{t-4}	-0.775***	0.203	-3.82	0.0024
EDU	0.547**	0.224	2.44	0.0311
EDU _{t-1}	-0.752**	0.268	-2.80	0.0159
EDU _{t-2}	0.583***	0.189	3.07	0.0097
OPEN	0.186*	0.103	1.80	0.0959
OPEN _{t-1}	0.105	0.102	1.03	0.3231
OPEN _{t-2}	-0.317**	0.118	-2.67	0.0203
OPEN _{t-3}	0.464***	0.144	3.21	0.0074
OPEN _{t-4}	-0.434***	0.106	-4.07	0.0015
Constant	34.307***	6.951	4.93	0.0003
Trend	0.042***	0.011	3.66	0.0032

Appendix C continued

Table C.2 ARDL (4,3,2,3,4) model estimation results for model 2

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
RGDP _{t-1}	0.910***	0.161	5.63	0.0002
RGDP _{t-2}	-0.068	0.204	-0.33	0.7425
RGDP _{t-3}	-0.411**	0.149	-2.74	0.0208
RGDP _{t-4}	0.178	0.187	0.95	0.3629
HC1	0.052***	0.014	3.55	0.0052
HC1 _{t-1}	-0.075	0.014	-5.34	0.0003
HC1 _{t-2}	0.023	0.017	1.32	0.2162
HC1 _{t-3}	0.016	0.017	0.90	0.3848
GOV	-0.524***	0.096	-5.46	0.0003
GOV _{t-1}	0.143	0.123	1.16	0.2716
GOV _{t-2}	-0.189	0.116	-1.62	0.1343
EDU	-0.017	0.128	-0.13	0.8954
EDU _{t-1}	-0.145	0.156	-0.92	0.3764
EDU _{t-2}	-0.088	0.127	-0.69	0.5023
EDU _{t-3}	0.153	0.099	1.54	0.1539
OPEN	0.048	0.072	0.67	0.5169
OPEN _{t-1}	-0.212**	0.084	-2.51	0.0305
OPEN _{t-2}	0.022	0.105	0.21	0.8334
OPEN _{t-3}	-0.074	0.105	-0.71	0.4939
OPEN _{t-4}	-0.085	0.073	-1.16	0.2712
Constant	13.282**	5.387	2.46	0.0334
Trend	0.028**	0.011	2.47	0.0327

Table C.3 ARDL (4,0,2,0,1) model estimation results for model 3

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
RGDP _{t-1}	0.127	0.210	0.60	0.5513
RGDP _{t-2}	0.153	0.188	0.81	0.4265
LRGDP _{t-3}	-0.268	0.178	-1.50	0.1487
RGDP _{t-4}	-0.753***	0.244	-3.08	0.0061
EC2	0.321***	0.101	3.15	0.0052
GOV	-0.176	0.118	-1.49	0.1524
GOV _{t-1}	0.068	0.118	0.57	0.5695
GOV _{t-2}	-0.203**	0.082	-2.45	0.0238
EDU	-0.425***	0.106	-3.98	0.0008
OPEN	0.189**	0.088	2.14	0.0450
OPEN _{t-1}	-0.266***	0.084	-3.16	0.0051
Constant	49.167***	9.721	5.05	0.0001
Trend	0.092***	0.017	5.22	0.0000

Appendix C continued

Table C.4 ARDL (4,4,3,4,1) model estimation results for model 4

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
RGDP _{t-1}	0.719***	0.121	5.89	0.0002
RGDP _{t-2}	0.100	0.164	0.61	0.5538
RGDP _{t-3}	0.169	0.159	1.05	0.3148
RGDP _{t-4}	-0.453**	0.148	-3.05	0.0121
HC2	-0.029*	0.014	-2.00	0.0722
HC2 _{t-1}	-0.096***	0.010	-9.51	0.0000
HC2 _{t-2}	0.004	0.011	0.36	0.7207
HC2 _{t-3}	0.022*	0.010	2.11	0.0603
HC2 _{t-4}	0.052***	0.016	3.29	0.0081
GOV	-0.483***	0.066	-7.30	0.0000
GOV _{t-1}	0.204**	0.068	2.97	0.0140
GOV _{t-2}	0.050	0.100	0.50	0.6238
GOV _{t-3}	0.394***	0.098	4.02	0.0024
EDU	-0.007	0.079	-0.09	0.9270
EDU _{t-1}	-0.070	0.084	-0.82	0.4267
EDU _{t-2}	0.046	0.084	0.54	0.5946
EDU _{t-3}	0.175*	0.082	2.12	0.0595
EDU _{t-4}	0.103	0.081	1.26	0.2337
OPEN	0.144**	0.051	2.78	0.0192
OPEN _{t-1}	-0.198***	0.041	-4.75	0.0008
Constant	11.219**	4.605	2.43	0.0351
Trend	0.012	0.010	1.22	0.2485

Appendix C continued

Table C.5 ARDL (4,1,4,2,4) model estimation results for model 5

DV: RGDP	Coef.	St. Er.	t-st.	Pr.
RGDP _{t-1}	0.866***	0.230	3.75	0.0032
RGDP _{t-2}	-0.623*	0.295	-2.10	0.0588
RGDP _{t-3}	0.450	0.291	1.54	0.1501
RGDP _{t-4}	-0.249	0.290	-0.85	0.4097
BC	0.299**	0.123	2.43	0.0330
BC _{t-1}	-0.113	0.125	-0.91	0.3819
GOV	-0.338**	0.130	-2.59	0.0250
GOV _{t-1}	-0.076	0.159	-0.47	0.6425
GOV _{t-2}	-0.064	0.132	-0.48	0.6381
GOV _{t-3}	0.499**	0.186	2.68	0.0214
GOV _{t-4}	-0.736**	0.248	-2.96	0.0129
EDU	0.730**	0.291	2.50	0.0294
EDU _{t-1}	-0.766**	0.330	-2.31	0.0406
EDU _{t-2}	0.419	0.261	1.60	0.1364
OPEN	0.093	0.146	0.63	0.5370
OPEN _{t-1}	0.184	0.137	1.34	0.2056
OPEN _{t-2}	-0.296*	0.137	-2.16	0.0535
OPEN _{t-3}	0.411**	0.167	2.45	0.0318
OPEN _{t-4}	-0.428***	0.129	-3.30	0.0070
Constant	14.608	8.512	1.71	0.1141
Trend	0.014	0.017	0.83	0.4203

Appendix C continued

Table C.6 ARDL (2,4,4,4,2) model estimation results for EC1

DV: EC1	Coef.	St. Er.	t-st.	Pr.
EC1 _{t-1}	0.4246	0.250	1.69	0.1213
EC1 _{t-2}	-0.1603	0.161	-0.99	0.3441
RGDP	1.3550**	0.552	2.45	0.0340
RGDP _{t-1}	-0.8144	0.642	-1.26	0.2336
RGDP _{t-2}	1.3339*	0.653	2.04	0.0685
RGDP _{t-3}	-0.9988	0.580	-1.71	0.1163
RGDP _{t-4}	1.3408	0.892	1.50	0.1639
GOV	0.3243	0.296	1.09	0.2991
GOV _{t-1}	0.0115	0.324	0.03	0.9722
GOV _{t-2}	-0.0898	0.280	-0.31	0.7557
GOV _{t-3}	-1.1109**	0.394	-2.81	0.0183
GOV _{t-4}	1.8013***	0.483	3.72	0.0039
OPEN	-0.2780	0.379	-0.73	0.4800
OPEN _{t-1}	-0.5433*	0.296	-1.83	0.0966
OPEN _{t-2}	0.7132**	0.300	2.37	0.0392
OPEN _{t-3}	-1.0573**	0.354	-2.98	0.0137
OPEN _{t-4}	0.8744**	0.285	3.06	0.0119
EDU	-1.3054**	0.559	-2.33	0.0419
EDU _{t-1}	1.1532	0.740	1.55	0.1503
EDU _{t-2}	-1.0990*	0.563	-1.95	0.0797
Constant	-53.358	35.049	-1.52	0.1589
Trend	-0.0396	0.0504	-0.78	0.4503

Appendix C continued

Table C.7 ARDL (1,4,0,2,4) model estimation results for EC2

DV: EC2	Coef.	St.Er.	t-st.	Pr.
EC2 _{t-1}	0.2486	0.277	0.89	0.4048
EC2 _{t-2}	-0.0107	0.218	-0.04	0.9622
EC2 _{t-3}	0.1393	0.206	0.67	0.5252
EC2 _{t-4}	0.1536	0.156	0.98	0.3637
RGDP	0.6399*	0.302	2.11	0.0791
RGDP _{t-1}	0.3307	0.438	0.75	0.4794
RGDP _{t-2}	-0.5094	0.397	-1.28	0.2476
RGDP _{t-3}	0.0577	0.446	0.12	0.9014
RGDP _{t-4}	1.1139*	0.492	2.26	0.0645
GOV	-0.0755	0.178	-0.42	0.6865
GOV _{t-1}	0.2176	0.194	1.11	0.3064
GOV _{t-2}	0.1021	0.173	0.58	0.5773
GOV _{t-3}	-0.3555	0.288	-1.23	0.2640
GOV _{t-4}	0.3032	0.352	0.86	0.4224
OPEN	-0.4269	0.240	-1.77	0.1259
OPEN _{t-1}	0.3314*	0.165	1.99	0.0925
OPEN _{t-2}	0.0973	0.207	0.46	0.6562
OPEN _{t-3}	-0.3302	0.248	-1.32	0.2325
OPEN _{t-4}	0.1310	0.188	0.69	0.5136
EDU	0.3245	0.399	0.81	0.4480
EDU _{t-1}	-0.0249	0.486	-0.05	0.9607
EDU _{t-2}	-0.1362	0.367	-0.37	0.7238
EDU _{t-3}	-0.0125	0.284	-0.04	0.9662
EDU _{t-4}	-0.3219	0.263	-1.22	0.2678
Constant	-42.798**	17.671	-2.42	0.0517
Trend	-0.0653*	0.033	-1.96	0.0966