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MASTER THESIS

**THE RELATIONSHIP BETWEEN BIST100 AND
FOREIGN EXCHANGE RATES: GRANGER
CAUSALITY TEST**

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ABSTRACT

THE RELATIONSHIP BETWEEN BIST100 AND FOREIGN EXCHANGE RATES: GRANGER CAUSALITY TEST

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The foreign exchange market and stock market are two crucial financial markets affecting international capital and commodity movements. Financial literature emphasizes two theoretical approaches to explain this interaction flow-oriented approach and stock-oriented approach. In this study, the relationship between the BIST 100 index and exchange rates have examined. According to the literature, there is a significant relationship between the exchange market and the stock market. However, in the empirical literature, the direction and the causal interaction between the stock market and the foreign exchange market have mixed results.

The aim of this study is to examine the relationship between exchange rates and BIST 100 index stock prices for the period from 2009:01 to 2018:06 by performing the Granger causality test. The results of this study suggest that the causal direction runs from the stock market to the exchange market, which supports the stock-oriented approach. According to the stock-oriented approach, the variations that occur in the exchange rate will cause a variation in stock prices. Thus, policymakers should focus on the stock market to eliminate the spread effect and reduce financial market volatility.

Keywords: BIST 100, stock exchange market, foreign exchange market, Granger causality.

ÖZ

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Yüksek Lisans Tezi, İşletme Tezli İngilizce Yüksek Lisans Programı

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08 2020

Döviz piyasası ve hisse senedi piyasası, uluslararası sermaye ve mal hareketlerini etkileyen iki önemli finans piyasasıdır. Finansal literatürde bu etkileşimi açıklamak için akış odaklı yaklaşım ve stok odaklı yaklaşım olarak iki teorik yaklaşım vurgulamaktadır. Bu çalışmada BIST 100 endeksi ile döviz kurları arasındaki ilişki incelenmiştir. Literatüre göre borsa ve borsa arasında anlamlı bir ilişki vardır. Bunun yanında, ampirik literatürde borsa ve döviz piyasası arasındaki nedensellik ilişkisi farklı sonuçlar ortaya koymaktadır.

Bu çalışmanın amacı 2009:01 – 2018:06 dönemi için döviz kurlarının Borsa İstanbul 100 endeksleri ve hisse senedi fiyatları üzerindeki etkilerini ve hisse senedi fiyatları ile bazı makroekonomik değişkenler arasında nedensellik ilişkisi Granger Causality Test ile incelemektir. Bu çalışmanın sonuçları, nedensel yönün hisse senedi odaklı yaklaşımı destekleyen hisse senedi piyasasından Döviz piyasasına doğru ilerlediğini göstermektedir. Bu nedenle, politikayı belirleyenler yayılma etkisini ortadan kaldırmak ve finansal piyasalardaki oynaklığı azaltmak için borsaya odaklanmalıdır.

Anahtar Sözcükler: döviz kuru, hisse senedi fiyatı, BIST 100, hisse senedi piyasası, döviz piyasası.

TEXT OF OATH

I declare and honestly confirm that my study, titled “THE RELATIONSHIP BETWEEN BIST100 AND FOREIGN EXCHANGE RATES: GRANGER CAUSALITY TEST” and presented as a Master’s Thesis, has been written without applying to any assistance inconsistent with scientific ethics and traditions. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are indicated in the text and listed in the list of references.

Begüm Bozdemir

24.08.2020

TABLE OF CONTENT

ABSTRACT.....	ii
ÖZ	iii
TEXT OF OATH	iv
TABLE OF CONTENT	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS.....	ix
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 FINANCIAL MARKETS: AN OVERVIEW	3
2.1. Divisions of Financial Markets.....	4
2.1.1. Money Market.....	4
2.1.2. Capital Market	4
2.2. Processing Types of Financial Markets.....	4
2.2.1. Primary Markets	5
2.2.2. Secondary Markets	5
2.3. Organization Types of Financial Markets	7
2.3.1. Organized Financial Markets.....	7
2.3.2. Unorganized Financial Markets.....	8
CHAPTER 3 FOREIGN EXCHANGE MARKET AND EXCHANGE RATE	9
3.1. The Term Exchange Rate	9
3.2. Exchange Rate Regimes	11
3.2.1. Fixed Exchange Rate Regime.....	13
3.2.2. Floating Exchange Rate Regime.....	15
2.2.2.1. Managed Floating Exchange Rate Regime.....	17
2.2.2.2. Free Floating Exchange Rate Regime.....	18
3.2.3. Intermediate Exchange Rate Regimes	19
2.2.3.1. Crawling Band Exchange Rate Regime.....	19
2.2.3.2. Crawling Peg Exchange Rate Regime	20
2.2.3.3. Pegged in a Horizontal Band Exchange Rate Regime.....	20
3.3. Foreign Exchange Rate Market in Turkey	22
2.3.1. Pre-1980s Exchange Rate Regime.....	23
2.3.2. Post-1980s Exchange Rate Regime	25

CHAPTER 4 STOCK MARKET	27
4.1. An Overview of Stock Market.....	27
4.2. The Role of The Stock Market in Financial Markets	28
4.3. A Brief History of the Stock Market in Turkey.....	28
4.3.1. Stock Exchange in Ottoman Era.....	30
4.3.2. The Pre IMKB Period (1923-1985).....	31
4.3.3. ISE: Istanbul Stock Exchange.....	32
4.3.4. BIST: Borsa Istanbul	33
4.4. Characteristics of BIST: Borsa Istanbul	35
4.5. Legal Framework and Property Structure of Borsa	37
CHAPTER 5 THE LINK BETWEEN BIST100 INDEX VALUE AND EXCHANGE RATES	
5.1. Theoretical Framework.....	39
5.4.1. Flow Oriented Approach	40
5.4.2. Stock Oriented Approach	42
5.2. Literature Review	45
5.3. Macroeconomic Factors that Affect The Stock Market and Foreign Exchange Market	51
5.3.1. The Relationship Between Interest Rates and Stock Price.....	53
5.3.2. The Relationship Between Exchange Rate and Stock Price	54
5.4. The Link Between BIST and Foreign Exchange Market	55
5.4.1. Data and The Methodology	55
5.4.2. Augmented Dickey Fuller-ADF Unit Root Test	55
5.4.3. Phillips-Perron Unit Root Test.....	56
5.4.4. Co-integration Test	61
5.4.5. Granger Causality (F-test)	63
5.4.6. Empirical Results	67
CONCLUSION	68
REFERENCES	69

LIST OF TABLES

TABLE 1. A Brief Overview of Financial Market	3
TABLE 2. The Independence Level of Exchange Rate Regimes	13
TABLE 3. The Main Characteristics of Exchange Rate Regimes	21
TABLE 4. The Explanations of BIST Indices	36
TABLE 5. The Shareholder Structure of BIST	38
TABLE 6. The Flow Oriented Model and The Stock Oriented Model	39
TABLE 7. The Effects Of Exchange Rate to Stock Price in Flow Oriented Model	41
TABLE 8. The Effects of Stock Prices to Exchange Rate in Flow Oriented Model	44
TABLE 9. ADF Unit Root Test	55
TABLE 10. Phillips-Perron Unit Root Test	56
TABLE 11. LNNER-Correlogram Level and First Difference in Stationary Analysis	57
TABLE 12. LNBIST-Correlogram Level and First Difference in Stationary Analysis	59
TABLE 13. Cointegration Test	61
TABLE 14. The Lag Order Selection	62
TABLE 15. Granger Causality (F-Test)	63
TABLE 16. LNNER	64
TABLE 17. 1 st Difference of LNNER (DLNNER)	64
TABLE 18. LNBIST	65
TABLE 19. 1 st Difference of LNBIST (DLNBIST)	66

LIST OF FIGURES

FIGURE 1. The Application of Exchange Rate Regimes	11
FIGURE 2. The Exchange Rate regimes	12
FIGURE 3. The Mechanism of Fixed Exchange Rate Regime	14
FIGURE 4. The Appreciation in The Floating Exchange Rate Regime	16
FIGURE 5. The Depreciation in Floating Exchange Rate Regime	16
FIGURE 6. The Representation of Managed Float Exchange Rate Regime	18
FIGURE 7. LNNER	64
FIGURE 8. DLNNER	65
FIGURE 9. LNBIST	65
FIGURE 10. DLNBIST	66
FIGURE 11. LNNER and LNBIST	67

LIST OF ABBREVIATIONS

- AC:** Auto Correlation Function
- ADF:** Augmented Dickey-Fuller Unit Root Tests
- AMEX:** The American Stock Exchange
- BIST:** Borsa Istanbul
- CMB:** Capital Markets Board
- CML:** The Capital Market Law
- ECB:** European Central Bank
- IAB:** Istanbul Gold Exchange
- IFC:** International Financial Center
- IMF:** International Monetary Fund
- IMKB:** Istanbul Menkul Kıymetler Borsası
- ISE:** Istanbul Stock Exchange
- MAIC:** Modified Akaike Information Criterion
- MSCI:** Emerging Markets Index
- NYSE:** The New York Stock Exchange
- OTC:** Over the Counter
- PAC:** Partial Auto Correlation Function
- PP:** Phillips-Perron Unit Root Tests
- TWF:** Turkey Wealth Fund
- USD:** USA Dollar
- VAR:** Vector Autoregressive
- VOB:** Futures and Options Exchange

CHAPTER 1

INTRODUCTION

As a fragile part of the economic system, both foreign exchange and stock markets are inevitably affected by policy changes and financial risks. In a relationship between these two markets, it is possible to use information belonging to one of the markets to predict the other market's future behavior. Therefore, determining the relationship between the foreign exchange market and the stock market, which has a vital role in the economy's stability, has great importance. Exchange rates and stock prices also play an essential role in increasing financial crises and financial volatility. Especially after the 1980s, emerging market economies have become in need of foreign debt due to financial crises. Because the risks arising in national and international markets cause fluctuations in the markets, affecting other markets by showing an infectious effect. Besides, emerging countries tend to volatility in stock markets and foreign exchange markets. Volatility is a significant risk factor in financial markets.

On the other hand, the spread in one market can increase volatility in another financial market. Therefore, the exchange rates' volatility may cause a continuous and excessive spread effect in the stock market returns so that a causal relationship can expect between the exchange rate and stock market that may help to reduce these risk factors. Although many studies have been conducted in the literature to investigate the relationship between exchange rates and stock prices and this relationship's direction, no theoretical and empirical consensus has reached.

Two theoretical approaches focus on the causal interaction between the foreign exchange market and stock market: “the flow-oriented approach” or “the traditional approach” and the “stock-oriented approach” or “portfolio balance approach” The traditional approach has developed by Dornbusch and Fischer (1980). According to this approach, any increase in the currency value makes a good market more competitive and increases the export volume of a country that may directly increase the company's profit level and income level due to stock value. This situation shows

positive and causal interaction between the exchange market and the stock market in the traditional approach. The stock oriented approach developed by Branson and Frankel (1984) analyzed the relationship between the two variables within the dynamics between exchange rates, current transactions, and relative prices.

According to this approach, an increase in national stock value will lead investors to demand more national assets and sell foreign assets. This circumstance will lead to an appreciation of the domestic currency. The rise in the national stock market will directly affect investors to more money demand and increase national interest rates. The increasing interest rates will cause capital inflows and a decrease in exchange rates. This situation indicates the existence of a negative causal interaction between stock markets and exchange markets in financial markets.

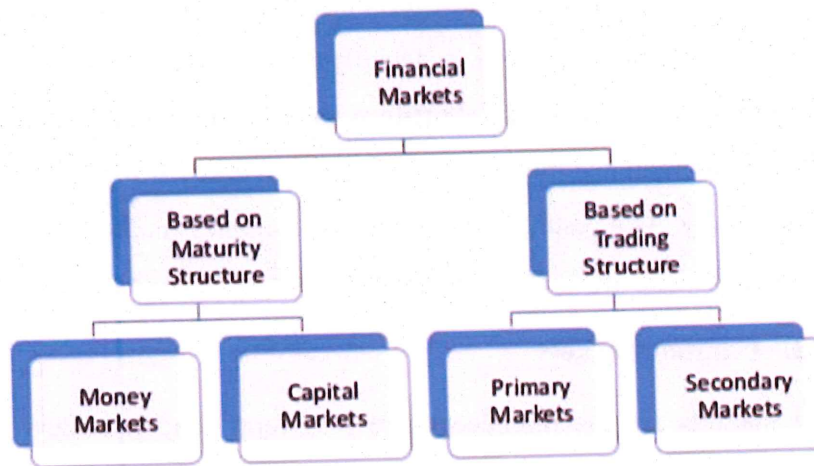
In this thesis study, the first part provides information about financial markets. In the second section, the foreign exchange market, exchange rate regimes, and the exchange market in Turkey have explained while the third chapter emphasizes the stock market characteristics. The following chapter includes the empirical study to determine the causal interaction between the stock market and the foreign exchange market by performing granger causality. Finally, the last chapter concludes the thesis.

CHAPTER 2

FINANCIAL MARKETS: AN OVERVIEW

In science economics, the market is divided mainly into the goods and services market and the financial market. In the goods and services market, the relation occurs between producers and consumers or buyers and sellers. On the other hand, in the financial market, interaction can be found between who has an excess of funds and a shortage of funds. Thus, while goods and services are the critical variables in the real market, the fund is in the financial market (Ertuna,1987).

Table 1. A Brief Overview of Financial Markets



Source: Koundinya (2017). A Brief Overview of Financial Markets. p.1

Table 1 shows that the financial markets are listed in many respects.

The most well-known way of categorization has based on maturity and trading. Financial Money markets where the financial assets are highly liquid and short term such as currencies where the Capital markets. Money markets, one of the financial markets in which financial instruments with the highly liquid and short term have traded, and Capital markets where the investors sell investment instruments like bonds, equities, and treasury bills. Primary markets are also known as new issue markets where the fund owners directly traded their funds when the secondary market refers to the equity market and debt market where securities have traded.

2.1. Divisions of Financial Markets

2.1.1. Money Markets

Short-term money markets and long-term capital markets have divided into two groups. Short-term transactions have been carrying out in Money Markets while long-term transactions have been carrying out in Capital Markets. Money markets are the markets where short-term fund providers and fund claimants interact and where credit transactions have been making in the short-term. The most prominent institutions organized in the Money Market are commercial banks and government institutions.

Businesses generally meet their capital requirements through short-term loans from banks. The government addresses their short-term needs through the funds have received and provided the issuance of short-term instruments such as treasury bills and government bonds. Commercial banks, especially in businesses, give loans for less than one year or discount bonds. Thus, short-term instruments occupy a great place in the market. The most organized monetary institution in Turkey is the Central Bank of the Republic of Turkey. As a result, the instruments of money markets are bonds and certificates issued by banks in less than one year (Keser, 2015).

2.1.2. Capital Markets

Capital markets are the markets where long-term fund providers and fund claimants interact, and credit transactions have been made long-term. In the capital market, funds generally trade in exchange for long-or unlimited-term financial assets (securities) such as bonds, income partnership Securities, and stocks. Enterprises generally apply to the money market to meet their capital needs while using the capital market to increase its investment projects' amount and capital. The capital market and the money market are similar. Many businesses, financial institutions may trade in both markets (Keser, 2015).

2.2. Processing Types of Financial Markets

Financial markets by processing types have been diving into two groups as the primary market and secondary market. The third and fourth markets can also be mention. Tertiary markets have been forming by trading financial assets registered on the stock exchange outside the stock market. The fourth market has been carrying out by changing financial assets without intermediaries (Boehme, 2011).

2.2.1. Primary Markets

In primary markets, financial assets are placed on the market for the first time and offered for the first time to circulation. The purpose of the seller (firms or individuals) in the primary market, meet urgent fund needs by selling their financial assets directly or indirectly to the buyers. There is no intermediary in financial assets put up for direct sale. The buyer (investor) faces the seller who needs funds. There is an intermediary in the indirect sale of financial assets, and this intermediary receives a commission. The seller, who is unwilling to give commissions, can provide their financial assets directly up for sale that provides a significant saving in cost but is risky. There is a possibility that the sale period extends or requests for emergency funds will not be met within the specified period, and the sale is likely to fail. There are two situations in financial assets put up for sale indirectly. Firstly, a commission payment is made to the financial intermediary and providing to reach more buyers, but there is no sales guarantee. The success rate is higher than those sellers who put their financial assets on direct sales due to more investors. The agent mediates in a specific time. If the agent cannot sell during this period, unsold financial assets returned to sellers. In the second case, the intermediary financial firm gives a guarantee. These intermediary firms buy the financial asset at a specific price and sell the financial asset at a price determined. The difference in price between the purchase price and its sale price is the intermediary firm's profit. In this situation, the financial intermediary is at risk. This risk is the risk of failing to sell financial assets at a price guaranteed and not making the desired profit (Berkly, 2003).

2.2.2. Secondary Markets

In primary markets, financial assets are sold on the market for the first time. In contrast, there is a resale of financial assets in secondary markets where have been put into circulation and sold and have still been circulated on the market. When the buyers want to convert their financial assets back into money, the buyers do not want to sell their financial assets to the seller from whom they purchased (e.g., face value) or do not want to sell before the financial assets due date (e.g., bond). In this case, secondary market forms. In secondary markets, existing financial assets are sold again and converted into money by the intermediary institution. In the secondary market, financial assets that had already have sold in the primary market are sold and changed by intermediary institutions (Morgül, 2013).

Secondary markets are divided into the organized securities exchanges and over the counter (OTC) markets. The expression organized markets are physical places where buyers and sellers come together under specific rules and where securities, foreign currency, or other goods are traded. Exchanges are markets with a legal and administrative structure. Over the counter markets (OTC) are markets where securities, foreign exchange, gold, or interbank funds are traded in an electronic environment that does not depend on a physical location. They are also known as non-stock markets (Teweles and Bradley, 1998).

While the income from the sale of financial assets made in the primary market and the company that put them on the market for the first time increase in income. In the secondary market, the income from financial assets that have changed hands has nothing to do with the company that launched them for the first time. Firms in the second market buy and sell financial assets among themselves. Thus, assets and money continuously change hands. Profit or loss occurs with the price differences formed in not funds bought and sold, which are papers, valuable assets (Keser, 2015).

Borsa Istanbul-BIST is the best-organized part of the secondary market. The secondary market increases the value of financial assets, provides a large source of resources to the primary market, and dramatically helps develop the primary market. The contribution of the secondary markets to the economy is relatively high. The secondary market provides a faster and easier sale of financial assets that need cash but cannot apply to the issuing company. In other words, by selling financial assets that meet the money needs more quickly. Higher liquidity of a financial asset (the ability to convert to cash in a short time with lower costs) increases interest and demand for that asset. The risk is less because converting the asset into money it takes less time. Therefore, the trading volume of these assets is increasing in the primary market. The firm traded in the secondary market also affects the price of the financial asset the firm has sold in the primary market. Investors in the primary market do not pay more than the asset's price in the secondary market. The higher the asset's price in the secondary market, the higher the price in the primary market. Thus, the company provides and increases liquidity more quickly (Morgül, 2013).

2.3. Organization Types of Financial Markets

2.3.1. Organized Financial Market

The Feature of organized markets is that they have managers, controllers, institutions, and places where a particular transaction performs. The organized markets have specific rules that are regulated by law. The organized markets are formal and monitored by audits. These markets can divide into two groups: organized money markets and organized capital markets. However, most capital markets are included in this market. Organized money markets are generally the system of commercial banks. Because economic agents typically provide their cash needs from commercial banks. Commercial banks usually discount their bonds or open loans to them for less than one year. Thus, commercial banks meet the firm's cash needs. In this respect, commercial banks are essential in this market (Çetkin, 2016).

Organized capital markets are markets that are a bridge between buyers and sellers together and have specific rules. Each country's capital market forms its operation and regulations, which are either legal or contractual. Transactions in Turkey's capital market carry out by The Capital Markets Board (CMB). The most important feature of organized capital markets is creating a market form that ensures continuity for trading financial assets. The most important organized institution to talk about the capital market in a country is the stock exchange. Securities traded in the capital market tie to the stock market. The stock exchange is the place where instruments, precious metals, and foreign currency trade come together. According to their subjects, stock exchanges divide into securities, commerce, foreign exchange, and gold exchange. Just securities registered on the stock exchange trades in organized markets (Morgül, 2013).

In the organized capital markets, intermediary institutions directly represent individuals and the company and carry out their transactions in the capital market on behalf of the person and company they represent. Financial intermediaries are private financial institutions established for the efficient allocation of funds to lenders or fund investors. Because there are conditions in the risky financial market that make it difficult for lenders or investors to deal directly with borrowers of funds, depository institutions, insurance companies, regulated investment companies, investment banks, pension funds are financial intermediaries. Financial intermediaries' role is to create

more favorable trading conditions as they can realize by lenders, investors, and borrowers directly involved in the financial market. Financial intermediaries receive funds from lenders or investors and work by lending or investing the funds they borrowed from those who need the funds. Funds purchased by a financial mediator become the financial mediator, depending on the financial demand. Funds borrowed or invested in by a financial instrument become the asset of the financial instrument. Financial intermediaries are interested in converting less desirable financial assets to other, more preferred financial assets for most of the investing population (Darškuvienė, 2010).

2.3.2. Unorganized Financial Markets

Unorganized financial markets divide into unorganized money markets and unorganized capital markets. In the unorganized money markets, transactions do not make within the commercial bank system. Unorganized financial markets where there are transactions other than commercial banks. Individuals and organizations other than commercial banks provide short-term funding to firms and meet firms' cash requirements. In the unorganized capital markets, the trading of securities is not made on the stock exchange. Unorganized financial markets are over the counter markets. Transactions carried out in these markets; occurs with bankers, brokers, or sellers who buy commissions. Unorganized financial markets do not have a specific place, even if there are rules in themselves. Unlike organized capital markets, there is no particular order, and there is no audit. The trading intermediaries do not have to be registered and listed on the stock exchange and become members. The prices are determined depending on the trading of intermediary firms (Çetkin, 2016).

According to Wai (1980), in developed countries, unorganized financial markets may create problems for central banks with reasons such as non-bank financial intermediaries' presence. The issue of coordination of monetary policy with commercial banks is raised. For developing countries, non-institutional lenders in unorganized financial markets have difficulty accepting deposits. Therefore there is virtually no transition of deposits from organized financial markets to unorganized ones. Financial markets are where central banks have tightened monetary policy, and commercial banks have put an interest ceiling on their deposit obligations.

CHAPTER 3

FOREIGN EXCHANGE MARKET AND EXCHANGE RATE

3.1. The Term Exchange Rate

The price of one currency in terms of another currency is called the exchange rate. The conversion of any country's money to another country's currency is called a foreign exchange transaction. Since the increasing trend of globalization in the world economy, countries linked to each other. With the acceleration of globalization in the world economy, international trade has increased rapidly. Other countries' prices must know the price of goods in each country because of such a trade relationship. This requirement spawned the concept of "exchange rate". The currency of a country is used not only in trading with another country (Barışık and Demircioğlu, 2016). For this reason, economic relations between countries require the use of foreign currency. Foreign exchange is bought and sold just like a commodity, and exchange rates are determined between domestic and foreign currencies. The foreign exchange rate refers to the foreign currency's equivalent in its own country. The market in which foreign exchange supply and demand is encountered, where foreign currencies are traded or where a national currency is converted into another country's currency, is called the foreign exchange market (Zengingönül, 2005).

Exchange rate types divide into four groups, but there are some alternative exchange rates;

- Real and Nominal exchange rates:

The real exchange rate refers to the adjusted overall price level change eliminated exchange rate. (Atılın,2011).

The real exchange rate is calculated by:

$$\text{Real Exchange Rate} = (\text{Nominal Exchange Rate} \times \text{Domestic Price}) / (\text{Foreign Price})$$

- **Forward and Future Exchange Rate:**

The forward exchange rate is generally a tool used by investors who expect the exchange rate. The exchange rate for a later date is determined and fixed from today. In the future exchange rate, the exchange rate for a later date does not determine from today (Iktisatbank, 2013).

- **Foreign Exchange Buying and Selling Rate:**

The price difference between the exchange rate price desired to buy, and the exchange rate price desired to sell constitutes the intermediaries' profit. In the exchange market, those who want to sell their foreign currency; use the buying rate of exchange and who want to buy foreign currency use the selling rate of exchange (Atilgan, 2011).

- **Cross Exchange Rate:**

Cross currency is the type of currency that compares foreign currencies with other foreign currencies and shows the relationship between them. The USD based on the USD's acceptance as the currency existing in the international system (Investaz, 2016).

- **Arbitrage:**

Arbitrage as a profit-making activity is buying a worthless asset or portfolio to make a risk-free profit from the price difference or sale of an overvalued but equivalent asset or portfolio to make a risk-free profit from the price difference. To profit from pricing anomalies, the person or organization that buys and sells financial assets evaluates the anomalies that occur when the same asset types have multiple or different price levels. As financial markets are well informed and highly competitive, this abnormal situation is often small and does not last long. Abnormalities are generally known, so no arbitrage risk makes it different from speculation (Darškuvienė, 2010)

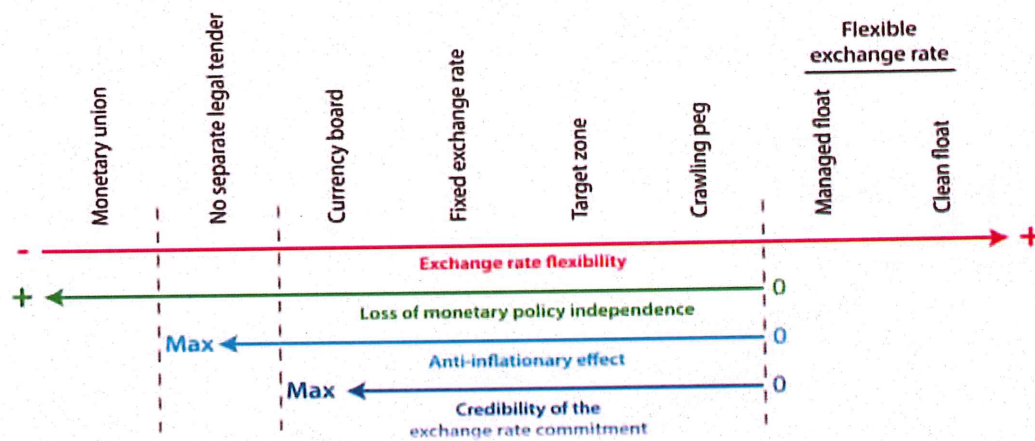
- **Spread:**

A spread is a difference between two similar measurements, such as the return on the percentage you stand to earn from investing in stock prices or interest rates. A Spread is a gap between two criteria; returns or prices. For instance, a stock's bid-ask spread is the difference between a stock's bid and ask price. A spread with bonds compares the yield between two similar bonds (Robinhood Financial LLC, 2020).

3.2. Exchange Rate Regimes

Exchange rate systems are policies that determine the foreign exchange value. This system is called the exchange rate regime. Exchange rate regimes are divided into fixed exchange rate regimes, floating exchange rate regimes, and intermediate exchange rate regimes containing both regimes.

Figure 1. The Application of Exchange Rate Regimes

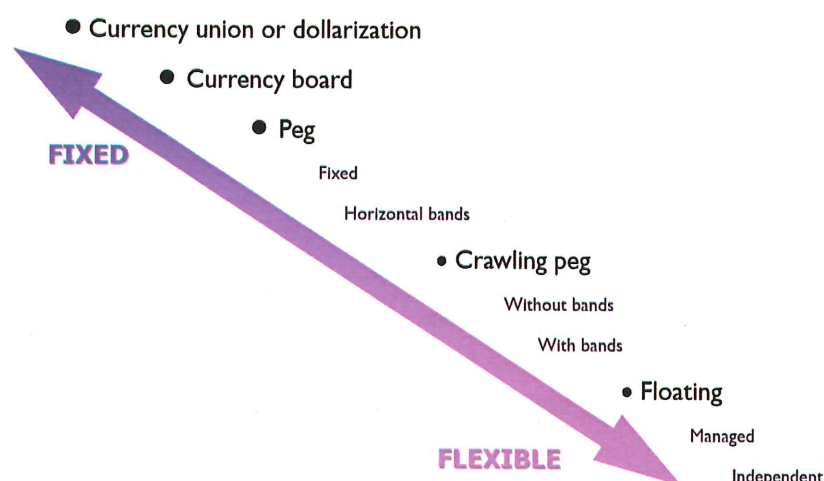


Source: Policonimics, (2017) Exchange rate regimes: Definition p.1

A country's economy is affected by the effect of the exchange rate regime. Exchange rate regimes can be examined in 4 different interactions, as shown in figure 1. These are the flexibility structure of the exchange rate in a country, the stability of that exchange rate, the country's monetary policy's sensitivity to independence, and its reaction to inflation. Figure 1 illustrates that Monetary Union that two or more nations use the same currency and monetary union countries does not need to be a common internal market and common interests determined by trade agreements. The dollar zone/eurozone monetary unions are some of those currency unions. No separate legal tender, where another country's currency is implemented as a sole legal tender (formal dollarization) or adopts a currency or currency union that shares with the same only legal tender by the union members. Currency Board, where the national currency's value is fixed against a foreign currency or a basket of foreign currencies. In terms of monetary policy implementation, the monetary board allows the monetary base to change only with transactions made against foreign currency. Target zone arrangement, where the nominal exchange rate is allowed to fluctuate freely within a band. The

exchange rate at the center of the band is a fixed currency exchange rate or basket of currencies. The width of the band may vary. Crawling Peg, where the value of the country's money is fixed. Fixed value can be adjusted depending on selected economic indicators of the country and, in particular, changes in the balance of payments. Managed float where is exchange rates are set freely in the market without a formal exchange rate target; however, authorities can intervene in exchange rates by selling or buying foreign exchange from the market. Clean float (free) where is exchange rates are set freely in the market without a formal exchange rate target, but authorities can intervene in exchange rates by selling or buying foreign exchange from the market.

Figure 2. The Exchange Rate regimes



Source: Gylfason, T. (2012) Balance of Payments and Exchange Rate Regimes.

The IMF's exchange rate regime classifies as firstly Hard Pegs that the countries have given up their sovereignty over a monetary policy like dollarization or currency boards. Secondly, Soft Pegs, also known as fixed exchange rate, and thirdly Floating Arrangement may be free-floating or floating with occasional government intervention.

Above mentioned figure, in point of currency union or dollarization, a country shares the same currency with other union members or uses another countries currency with no separate legal tender. In the currency board, legally commit to exchange domestic currency for specified and foreign currency at a fixed rate. In fixed peg, a fixed rate against a single currency or a currency basket and pegged with a horizontal band is like fixed peg regimes currency is maintained with a small margin (bands) around a fixed central rate. In point of a crawling peg, the domestic currency is pegged

to another currency or group of currencies. The exchange rate maintains within bands. The target rate is periodically adjusted, perhaps in response to changing economic indicators in managed floating when the Central Bank intervenes in the foreign exchange market without any target value. There is no pre-announced path for the exchange rate, although intervention is common. Moreover, in independent point, the exchange rate is determined by market forces, with intervention to minimize volatility.

The below-mentioned table explains the independence level of exchange rate regimes, which are shown in figure 2.

Table 2. The Independence Level of Exchange Rate Regimes

Exchange rate regimes	Definition
High independence	Flexible exchange rate
	Free (clean) floating where the value of a currency is determined in the market.
	Managed (dirty) float is a flexible regime but monetary authorities may intervene in the exchange rates.
Decreasing independence	Crawling peg regime which the value of the currency is adjusted periodically
	Target zone arrangement where the exchange rate is allowed to fluctuate within certain bands
	Fixed exchange rate
	Monetary authorities focus on a fixed exchange rate between two or more currencies
Low independence	Where the foreign currency is not legal tender but uses as a domestic currency for several reasons Dollarization / Demonetization
	A monetary union such as the Euro currency

Source: Policonimics, (2017) Exchange rate regimes: Definition p.1

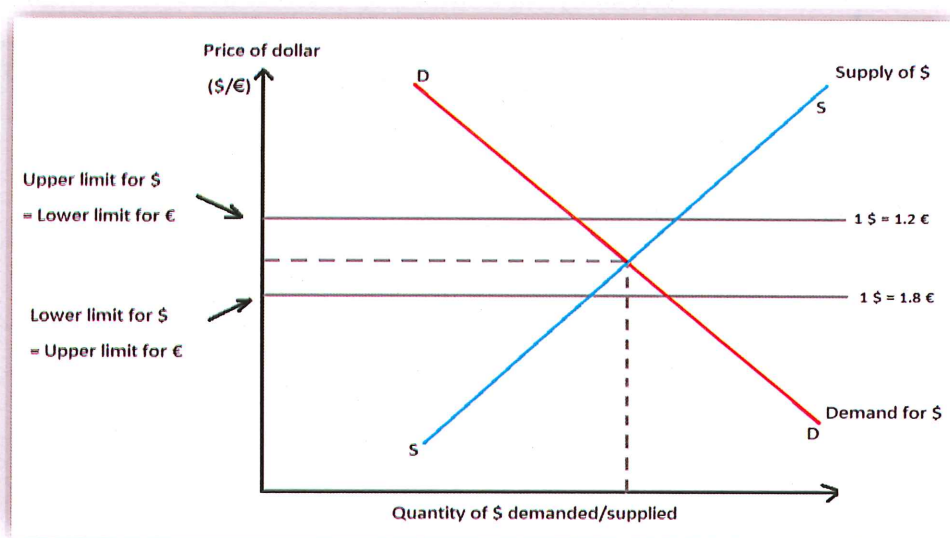
3.2.1. Fixed Exchange Rate Regime

A fixed exchange rate regime is the system of equalization of the domestic currency value to foreign currency with a certain amount by the Central Bank or Monetary Board. The country that makes foreign trade carries out its trade with other countries in this fixed exchange rate (Eğilmez, 2012). The Central Bank develops a fixed exchange rate regime for preventing volatility in the value of money markets. In this regime, the exchange rate keeps constant unless the Central Bank changes it. The

aim of the fixed exchange rate regime to provide price stability with this system (Gök, 2006).

The fixed exchange rate advantage is that the exchange rate value is fix and clear, and inflation can keep under control. However, the disadvantage is that the countries implementing the fixed exchange rate regime cannot follow an independent monetary policy and the system remains unprotected against external factors (Atılğan, 2011). A fixed exchange rate regime cannot implement in a system where capital movements are free. In order to change the fixed exchange rate regime, it is necessary to control capital input and output and, therefore, to give up convertibility. In this system, the state decides who gets how much foreign currency. Sending money abroad or bringing foreign currency from abroad depends on the permission of the country (Eğilmez, 2018).

Figure 3. The Mechanism of Fixed Exchange Rate Regime



Source: Sridevi Tolety (2011), Own Work (CC BY-SA 3.0) p.1

The government regulates its currency's foreign exchange value by not being allowed to fluctuate freely exchange rates or react to daily changes in supply and demand. For example, the European Central Bank (ECB) may fix its exchange rate at $\text{€}1 = \$1$ (assuming that the euro follows the fixed-exchange-rate), which refers to the central value or par value of the euro. Any different value of the domestic currency than the par rate in the exchange rate are not permitted. The "band" or "spread" in Figure $\text{€}0.6$ (from $\text{€}1.2$ to $\text{€}1.8$).

3.2.2. Floating Exchange Rate Regime

The exchange rate value is freely floating without government intervention, such as the Central bank or monetary board, ensuring its stability. In this way, the fluctuating exchange rate forms. The absence of the institution that provides stability does not mean that exchange rates will fluctuate precariously. Precarious fluctuations occur when the market condition becomes unstable. In a floating exchange rate regime, the exchange rate is determined by the international market, not by the Central Bank (Atılgan, 2011).

Since the introduction of the fluctuating exchange rate regime of developed countries in the 1970s, the interaction between stock prices and exchange rates had become more considered (Kurihara and Fukushima, 2014).

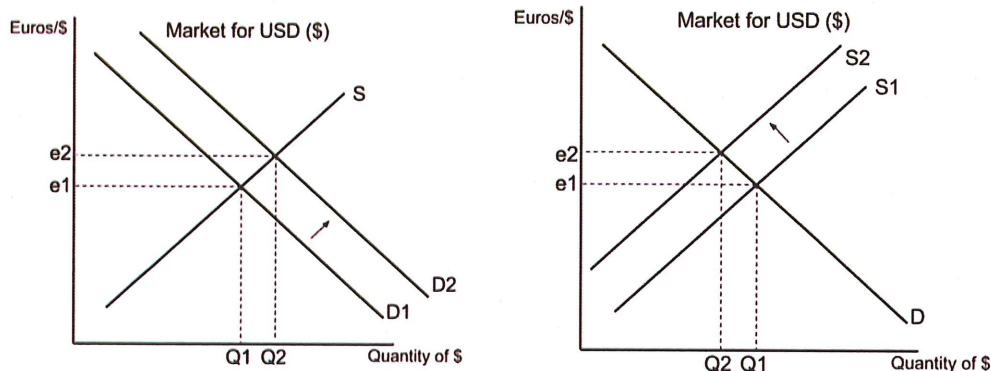
One of the essential advantages of the floating exchange rate regime is that the exchange rate responds immediately to the exchange rate's supply and demand conditions and eliminates the foreign currency shortage or excess. Besides, the free exchange rate application allows governments to pursue an independent monetary and fiscal policy. Also, floating exchange rate regimes have some disadvantages. The disadvantage is that the possibility of excessive volatility in the values of currencies due to uncontrolled market conditions scares investors. Trade dealers and those who want to invest can reduce the exchange rate risk by hedging in futures markets. However, hedging can be a costly solution. Besides, this system creates the problem of inflation tendency with its monetary and fiscal policy implementation feature (Atılgan, 2011).

Forex hedge transactions can define as such. To protect against financial risks that may occur in the future, we can express it as opening a transaction in the opposite direction of the financial product position (InvestAZ, 2016).

Figure 4 The appreciation in the floating exchange rates shows that the USD market. The y-axis shows the euro/USD parity while the x-axis shows the quantity of USD. In the beginning, the foreign exchange market is at equilibrium point "e1" where the euro/USD parity and the amount of USD are intersecting; thus, the USD market is

at equilibrium. At this point, the demand level D_1 increases from D_1 to D_2 , which increases the euro/USD parity while the quantity of USD or the Supply lives remains constant. The exchange rate of a currency is determined in the foreign exchange market.

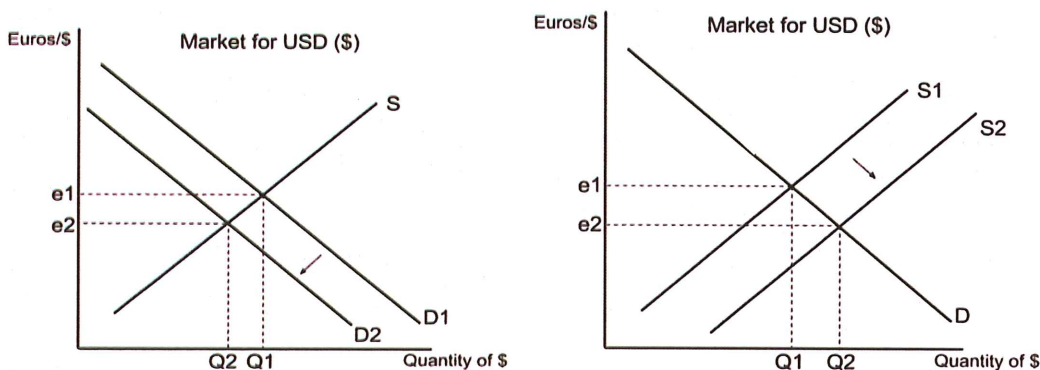
Figure 4. The Appreciation in The Floating Exchange Rate Regime



Source: The IB Economist (2020), Freely Floating Exchange Rates p.1

Figure 5 the depreciation in the floating exchange rates shows that the market for USD. The y-axis shows the euro/USD parity while the x-axis shows the quantity of USD. In the beginning, the foreign exchange market is at equilibrium point "e1" where the euro/USD parity and the quantity of USD are intersecting thus the USD market is at equilibrium. At this point, the demand level D_1 decreases from D_1 to D_2 which decreases the euro/USD parity while the quantity of USD or the Supply lives remains constant. When a currency loses its value in terms of another currency. The exchange rate of a currency is determined in the market.

Figure 5. The Depreciation in Floating Exchange Rate Regime



Source: The IB Economist (2020), Freely Floating Exchange Rates p.2

3.2.2.1. Managed Floating Exchange Rate Regime

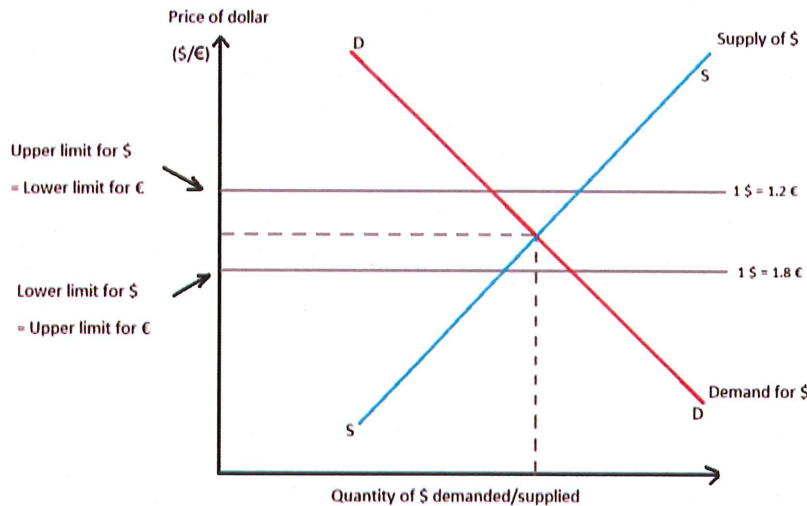
According to pre-determined rules, the Monetary Authority does not interfere with the exchange rates in the managed floating exchange rate regime. The Monetary Authority applies its decision-making mechanism according to the period's economic conditions in line with the economic indicators. With these interventions that do not make according to the previously announced rules, the field of activity of the country's economy expands. Some risks and uncertainties caused by the free-floating exchange rate system can reduce (Özdemir and Şahinbeyoğlu, 2000).

The market determines the value of the country's currency. The interventions made by the central bank on the foreign exchange market make to prevent unnecessary fluctuations in this market and to make changes more moderate rather than to ensure that exchange rates are established at the desired level. Monetary policy becomes more effective, and the number of international reserves the country must hold decreases. The negative effect of the free-floating exchange rate system is that it negatively affects the distribution of resources due to increasing uncertainties and risks in foreign economic relations.

There are some advantages of a managed float exchange rate. For instance, the managed float exchange rate regime is a mixed application that carries specific characteristics of both free-floating and fixed exchange rate systems. Taking advantage of both systems and avoiding the negative aspects is possible. The low economic instability requires less government intervention because they can pursue more independent policies to stabilize the state economy. As instability increases, central banks need to intervene more in the market, and become difficult to follow independent monetary policies because they need to use their foreign exchange supply to eliminate foreign exchange markets' problems.

Disadvantages of a managed float exchange rate are difficult to adjust the timing of instability, determine the magnitude, and determine the necessary intervention. Monetary authorities' actions may become even more unstable if central banks react very quickly or if the amount of intervention is unsuitable. An increase in instability tendency to dampen international flows and contract world trade. If policymakers extend the decision-making process, some countries may experience permanent damage to their trade and investment balances (Graham, 2014).

Figure 6. The Representation of Managed Float Exchange Rate Regime



Source: Graham, L. (2014). A Comparison of Exchange Rates and More p.28

The forces of demand and supply broadly manage the currency's value, but government intervention is needed to influence the exchange rate. For example, a country central bank fixes its exchange rate at level $\text{€}1=\text{\$}1$. The currency movement uses for upper and lower limits, and there is no permission for the mobility of the exchange rate beyond these limits. The "band" is € currency from $\text{€}1.2$ to $\text{€}1.8$

3.2.2.2. Free Floating Exchange Rate Regime

In the free-floating exchange rate regime, the value of the country's currency is determined by the market, meaning that the central bank or any other institution rarely intervenes with the currency's foreign value. Foreign exchange market interventions make to prevent unnecessary fluctuations in this market and make changes more moderate rather than to ensure that exchange rates are desired. The advantage of this regime is that monetary policy becomes more effective, and the number of international reserves the country must hold decreases. Another advantage is that external shocks contribute positively to stability within the country due to being absorbed by nominal exchange rates. The negative effect of the free-fluctuating exchange rate regime is that it negatively affects the distribution of resources due to

increasing uncertainties and risks in foreign economic relations. Besides, since losing the exchange rate can be a nominal anchor for monetary policy, the free-floating exchange rate regime can become a system conducive to inflation (Özdemir and Şahinbeyoğlu, 2000).

The free-floating exchange rate regime is a kind of implication of a laissez-faire economy. The free-floating exchange rate regime allows countries to determine the value of the domestic currency by market players. The free-floating exchange rate regime will enable policymakers to choose other components of the economy as a target. However, emerging external shocks as oil price rises or capital flights make it impossible to maintain a Free-floating exchange rate. Most countries intervene in foreign exchange markets to some extent, from time to time. These can consider managed floating regimes. The International Monetary System aims to stabilize the international monetary system and reduce the volatility, which may turn into systemic risk. For this aim, the IMF monitors the member countries (Policonimics, 2017).

3.2.3. Intermediate Exchange Rate Regimes

In such a regime, rates are allowed to fluctuate freely within a specified range. This exchange rate regime, which can perceive as a combination of a free-floating and fixed exchange rate regime, brings flexibility and stability. While the average value of the range determined as the central parity gives the exchange rate a specificity, the fact that the exchange rate fluctuates within this specified range reduces the effect of external shocks. Determining the range in this system is a problem. This very narrow specified range may bring instability and speculation. Furthermore, the sustainability of this range is essential for confidence in this system. They continuously adjusted the specified range can eliminate the expected benefits (Özdemir and Şahinbeyoğlu, 2000).

3.2.3.1. Crawling Band Exchange Rate Regime

A country currency's value fluctuates within certain limits around a previously announced fixed value in a crawling band exchange rate regime. However, the underlying fixed value can be adjusted based on selected economic indicators and developments in the balance of payments. The difference between a crawling band exchange rate regime and a fixed exchange rate regime is that when pressure on a fixed exchange rate occurs, the necessary adjustment is made periodically, not at a time, and

frequently. The band is also allowed to fluctuate between these adjustments within the identified limits. Speculative movements observed and anticipated from expectations can be prevented. The most significant disadvantage is the necessity of interest policy to support exchange rates. Therefore, interest rates cannot be used in line with the requirements of the economy. In practice, the crawling band regime has a more flexible structure than the crawling peg regime (Özdemir and Şahinbeyoğlu, 2000). The crawling band exchange rate regime is fixed but adjustable, and the countries which are used fixed exchange rate regimes. If they do not change their regime completely, they are periodically revised their regime (Frankel, 1999).

3.2.3.2. Crawling Peg Exchange Rate Regime

In this exchange rate regime, the value of the country's currency is fixed. However, this fixed value can be adjusted based on selected economic indicators of that country, especially on developments in the balance of payments like the crawling band regime. This system has a stricter structure compared to the crawling band exchange regime. Compared to conventional fixed exchange rate regimes, when pressure occurs on the fixed exchange rate, the necessary adjustment is made at specific periods and frequently. For this reason, the crawling peg exchange rate regime brings the advantages and disadvantages of the crawling band exchange rate regime. In addition to these, uncertainties minimize due to the lack of range. The necessary adjustment can fluctuate within limits determined. Through these adjustments, speculative movements observed in other fixed exchange rate regimes and expectations can prevent. The biggest problem is the necessity of interest rate policy to support exchange rates. Therefore, interest rates cannot be used as desired in line with the requirements of the economy (Edwards and Savastano, 1999).

3.2.3.3. Pegged in a Horizontal Band Exchange Rate Regime

In this case, the currency's value is allowed to fluctuate within margins of fluctuation around at least $\pm 1\%$ percent the fixed central rate, and the monetary authorities try to keep the value of domestic currency within this margin. There is a limited degree of monetary policy discretion, depending on the band width. (International Monetary Fund, 2004).

Table 3 briefly describes the main characteristics of each regime, summarizing their alleged values:

Table 3. Main Characteristics of Exchange Rate Regimes

Regime	Main Features	Main Benefits
1. Free Float	-Value of foreign exchange freely determined in the market. Actual and expected changes in demand/supply of assets and goods reflected in exchange rate changes.	-Changes in nominal exchange rate shoulder bulk of adjustment to foreign and domestic shocks. -High international reserves not required.
2. "Dirty" Float	-Sporadic central bank interventions in foreign exchange market. Modes and frequency of intervention vary, as do the objectives guiding the intervention. -Active intervention (sterilized and non-sterilized) results in changes in international reserves. Indirect intervention (through changes in interest rates, liquidity and other financial instruments) does not result in changes in reserves.	-Same as in a free float, except that higher international reserves may be needed. -Dampens "excessive" fluctuations of exchange rates.
3. Floating within a Band (Target zone)	-The nominal exchange rate is allowed to fluctuate (somewhat freely) within a band. The center of the band is a <i>fixed rate</i> , either in terms of one currency or of a basket of currencies. The width of the band varies (in the ERM it was originally = 2.25 percent). -Some band systems are the result of cooperative arrangements, others are unilateral.	-System combines the benefits of some flexibility with some credibility. -Key parameters (bands, mid-point) help guide the public's expectations. -Changes in the nominal rate within the bands help absorb shocks to fundamentals.
4. Sliding Band	-There is no commitment by the authorities to maintain the central parity "indefinitely". Instead, it is clear at the outset that the central parity will be adjusted periodically (e.g., due to competitiveness considerations). -The system is an adaptation of the band regime to the case of high-inflation economies.	-The system allows countries with an ongoing rate of inflation higher than world inflation to adopt a band without having to experience a severe real appreciation.
5. Crawling Band	-A band system whereby the central parity crawls over time. -Different rules can be used to determine the rate of crawl. The two most common are: backward-looking crawl (e.g., based on past inflation differentials), and forward-looking crawl (e.g., based on the expected, or target, rate of inflation).	-System allows high inflation countries to adopt a band system without having to undertake (large) stepwise adjustments of the central parity.

<p>6. Crawling peg</p>	<p>-The nominal exchange rate is adjusted periodically according to a set of indicators (usually lagged inflation differentials) and is not allowed to fluctuate beyond a narrow range (say, two percent). -One variant of the system consists of adjusting the nominal rate by a pre-announced rate set deliberately below ongoing inflation (variant known as a "tablita" regime).</p>	<p>-Allows high-inflation countries to avoid severe real exchange rate overvaluation. -The "tablita" variant helps to guide the public's expectations, and buys a limited amount of credibility.</p>
<p>7. Fixed-but-adjustable exchange rate</p>	<p>-The regime epitomized by the Bretton Woods system. The nominal exchange rate is fixed, but the central bank is not obliged to maintain the parity indefinitely. No tight constraints are imposed on the monetary and fiscal authorities, who can follow, if they so decide, policies that are inconsistent with preserving the parity. - Adjustments of the parity (devaluations) are a powerful policy instrument.</p>	<p>-Provides macroeconomic discipline by maintaining (tradable good prices) in line with foreign prices in a context of relatively low uncertainty -The built-in "escape clause" (which allows the authorities to devalue in case of need) provides the system with some flexibility.</p>
<p>8. Currency board</p>	<p>-Strict fixed exchange rate system, with institutional (legal, and even constitutional) constraints on monetary policy and no scope for altering the parity. - The monetary authority only can issue domestic money when it is fully backed by inflows of foreign exchange.</p>	<p>-The system maximizes credibility and reduces (eliminates) problems of "time inconsistency".</p>
<p>9. Full 'dollarization'</p>	<p>-Generic name given to an extreme form of a currency board system where the country gives up completely its monetary autonomy by adopting another country's currency.</p>	<p>-Credibility is maximized under this regime. Monetary authorities have, in theory, no scope for "surprising" the public.</p>

Source: Edwards & Savastano (1999). Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know? p.7228

3.3. Foreign Exchange Rate Market in Turkey

When the exchange rate regimes carried out from the early years of the republic to the present day are examined, the constant exchange rate regime is seen that persists for a long time. Turkey's exchange rate regimes are divided into two time periods: before 1980 and after 1980 (Gümüő, 2019).

The Turkish economy is a highly volatile structure regarding foreign exchange rates. Because Turkey's foreign debt has increased, and due to rising exchange rates, Turkey has had to purchase the money needs at a higher price. (Altın, 2014)

3.3.1. Pre-1980s Exchange Rate Regime

The fact that the capital of the Ottoman Bank belonged to foreigners caused reactions in time; this was the basis for establishing a national central bank. Efforts to establish a central bank based on the domestic capital result in the establishing the Ottoman Reputation National Bank on 11 March 1917. However, since the Ottoman Empire lost the First World War, this Bank could not achieve its goal of being a national bank to function as a central bank. After the First World War, it discussed establishing a central bank to strengthen the political independence gained by the Independence War in the Ottoman Empire with the effect of central banks' tendency to determine their monetary policies independently and with economic freedom.

At the Izmir Economics Congress of 1923, where this issue was first discussed, establishing a "National State Bank" was especially emphasized. In 1927, he adopted a draft law presented by Minister of Finance Abdulhalik Renda on establishing a central bank. In order to assist the central bank in its establishment, it is stated that the Turkish authorities have also requested opinions from the central banks of other countries. Following the developments, the Government took action to prepare the necessary legal framework to establish a central bank and Prof. Lausanne University. With the contributions of Leon Morf, the Central Bank draft law was prepared. On June 11, 1930, by the Grand National Assembly of Turkey, the bill was adopted and published in the Official Gazette on June 30, 1930, under the Central Bank Law of the Republic of Turkey No. 1715. The central bank started its activities on October 3, 1931, after the functions carried out by different institutions and organizations were collected in one hand. The bank has gained its legal presence in a joint-stock company, indicating its status as separate and independent from other public institutions (TCMB, 2020).

The most widely applied exchange rate regime in the period from the Republic of Turkey's establishment in 1923 until 1980 is the fixed exchange rate regime. The most important feature of this period is that Turkey does not have enough foreign currency and cannot make the necessary imports. As a result, it does not reach the desired level of development. Since 1923, the Republic of Turkey's establishment until 1929, gold, foreign currency, and stock exchange market, was widely and actively traded. During this period, the Turkish lira was fluctuating depending on the Sterling.

As a result of the Great Depression in 1929, the Sterling gained value against the Turkish lira and the Turkish lira depreciated. Therefore, the law on protecting the value of the Turkish lira was put into effect in 1930 to preserve the Turkish lira's value due to the 1929 depression and control the foreign exchange markets. In the 1930s, the Turkish lira's value was determined against the Franc and the Sterling, while after World War II, its value was determined by the USD (Gümüş, 2019).

In 1933, the Lending Money Law was enacted. The free interest application has been abolished, and the convertibility of the Turkish lira; the ability to freely convert it into foreign currency has been terminated. After this period, the fixed exchange rate regime was introduced in Turkey. The devaluation of exchange rates; the decrease of the value of money in exchange for foreign currency occurred in 1946 to adapt to the economy after World War II (Arat, 2003).

Turkey became a member of the International Monetary Fund (IMF) and the World Bank in 1947 and implemented an adjustable peg exchange rate policy. Increasing foreign exchange control (surveillance of foreign currency in the country) has not worked, smuggling has increased, and the inflation rate has risen. During this period, the Turkish lira was overvalued by Foreign exchange control. It also supported import substitution and protection policies (Arat, 2003).

A new exchange rate adjustment was made with the law on protecting the Turkish currency decision's value on August 10, 1970. 1 USD was determined as 15 Turkish liras. The purpose of this devaluation is to reduce imports and increase our exports. Thus, it has been stated that the competitive power of our goods in foreign markets will increase. After this adjustment, exchange rate adjustments are made more frequently. The introduction of a new application in the exchange rate regime in 1974 is the main reason for devaluation frequency. With this practice, measures according to the rules laid down to ensure necessary alignment between international exchange rates were implemented by the International Monetary Fund (IMF) in 1974. The most important rule is that there is no more than 2% difference between the exchange rates (Ulaş, 2010).

3.3.2. Post-1980s Exchange Rate Regime

On January 24, 1980, Turkey began to implement a managed floating exchange rate regime, and the exchange rate was determined daily. During this period, there has been a downward movement due to the easy borrowing from other countries and the sending of foreign currency to Turkey by Turkish workers who were working outside the country. Thus, the volume of exports was expected to increase (Gümüþ, 2019).

The exchange rate policy implemented in 1980-1983 aimed to increase foreign currency inflows, and therefore, foreign capital legislation has been amended. Thus, export incentives were raised, and export revenues increased. The aim of increasing foreign currency inflows was mostly achieved with the policies implemented, and foreign trade and balance sheet deficit decreased (Atılgan, 2011).

In 1985, the banks could freely determine the exchange rates for commercial transactions by the government. After that, in 1986, pressures increased, bank permits were restricted.

On August 11, 1989, to protect the value of Turkish currency, to the determination of the value of the Turkish currency against foreign currencies, foreign exchange saving and its administration, import and export of the Turkish lira and its representative, the regulatory and limiting principles of foreign exchange transactions relating to capital movements, was enacted called as the protection of the value of Turkish currency (Borsa İstanbul). In the same year 1989, With the decision to protect the value of the Turkish currency, capital mobility increased; in this way, the value of the Turkish lira against the currencies of other countries increased. With the Gulf War in 1991, short-term capital began to move out of the country, and therefore, the value of the Turkish lira against other national currencies decreased.

Later on, in 1994, the government announced a new stabilization program to reduce the Turkish lira's value, reduce demand in the domestic market, and increase exports. With this stabilization program in 1994, exchange rates started to be freely determined by banks and authorized institutions following market rules. However, it was envisaged that the exchange rate policy should be used as a nominal anchor to decrease inflation (Arat, 2003).

In 1995, a stand-by agreement was made with the International Monetary Fund (IMF). According to the agreement, the currency basket; was defined as the dollar and

the German mark, and it was decided to change the basket value as much as the changes in the inflation rates. This goal was achieved in September 1995. In the last three months of this year, the public's demand for foreign currency increased, and the Central Bank intervened in increasing exchange rates. As a result of this intervention, foreign exchange reserves decreased and traded above the Turkish Lira value. The high-interest rates in domestic transactions and the idea that the central bank's intervention in the exchange rate will continue increasing the upward trend in exchange rates. With the growth in 1995, the Turkish lira gained value and increased imports. In 1996, Turkey's external deficit increased, and exports did not meet imports has started. Then, the Central Bank established a new monetary policy and determined the exchange rate policy according to monetary policy. The aim was to minimize the volatility in real exchange rates, and this goal was mainly achieved (Gümüş, 2019).

From 1995 to 2000, the exchange rate was determined according to the projected inflation and started to be determined according to the targeted inflation with the inflation reduction program implemented on January 1, 2000. There are two periods between 2000 and 2002, the first 18 months and the second 18 months in the inflation reduction program. It announced that the Central bank of Turkey implemented the exchange rate policy in the first 18-month period. The exchange rate policy based on the daily exchange rate adjustment applied according to the inflation target. And the procedure of gradually expanding the band system in the second 18-month period will be changed. With this system, a more flexible exchange rate has begun (TCMB, 1999).

With the Turkish 2001 crisis, the banking system of Turkey changed. However, the fluctuating exchange rate regime, which is determined according to supply and demand and continues to this day, has been changed. The most important task of the central bank is to format and implement the exchange rate policy. Exchange rate policy practices are carried out depending on the objectives, and changes can be made. However, the bank is taking measures against the Turkish lira's volatility to reduce the ill effects against its financial stability (TCMB, 2002).

CHAPTER 4

STOCK MARKET

4.1. An Overview of Stock Market

The platforms on which financial assets such as stocks, commercial goods, bonds, bills, foreign exchange, funds are traded are called stock markets. Investment vehicles that are traded on the stock exchanges change hands according to specific rules. Stock markets are a part of this financial system that allows buyers and sellers of equity to meet in an aggregate way. For that reason, stock markets are also called Equity Markets. In return for company ownership, stock markets serve corporations as sources of funding except for debt instruments. While there are several different types of stocks with various advantages and disadvantages, owning a common stock means taking all risks a corporation inherits as a corporation's partner (Güleç, 2014).

Stock market transactions were held in the markets where commercial goods were bought and sold. After that, these markets developed. Although it's not official, the basis of the stock market was laid down in Rome in 180 BC (Işık, 2012). The name of the stock exchange is in Brugge, Belgium; It was named after the square called "De Beurs" or "De Bourse" because of the name of the "Van Der Beurse" family. The first activities in this square took place in Anvers, thereby officially forming the oldest stock exchange in Western Europe. Later, the name of this stock market institution started to be used in the whole of Europe (Gümüş, 2019). Today, in many countries of the world; There are stock exchanges. And every stock exchange has its own specific rules. Nasdaq Stock Exchange was established in New York in 1971. And the most crucial feature of this exchange is the first electronic exchange. Tokyo Stock Exchange is the most important stock exchange of the Far East. In this exchange, transactions are carried out wholly and continuously with computer support. The London Stock Exchange has a long history of 300 years, and the first modern organized stock exchange was established here in 1801 (Aydın, 2012). In the stock exchange defined as the American stock market AMEX, small or newly established firms' financial assets are traded. The USA has the two largest stock exchanges in the world. NYSE Euronext is the largest stock market in the world, with a market value of 14 trillion. After the US stock exchanges, Tokyo and London Stock Exchanges follow them (Bilgen, 2009).

4.2. The Role of The Stock Market in Financial Markets

The financial market can be defined as the system that regulates the cash flow by providing effective transfer of funds from entities with surplus funds to entities in need of funds to invest in the projects that yield higher returns. This cycle creates efficiency in the economy by increasing investments, growth, and several other indicators; thus, increased prosperity in the overall economy is expected. As a crucial part of the economic system, financial markets require a stable and forecastable political and economic environment in order to function correctly. Poor environmental factors might cause irrational human behaviors like panicking, distrust, or misplaced trust in wrong instruments. This chain of undesired events often results in inefficient market situations (Güleç, 2014).

The stock return consists of two components, namely the capital gain (growth) and dividend yield. Some of the stock price movement theories have been explained. According to the Gordon Growth model is developed by Gordon (1956), the price of a stock is equal to the present values of its future cash flows, namely dividends and its face value. According to Modigliani, Franco, and Merton H. Miller (1958), the firm value is not related to how it finances its activities in the long run under assumptions of an efficient market, random walk price process, and in the existence of asymmetric information and no transaction costs. The theory is fundamental in the development of modern capital structure models. The capital asset pricing model (CAPM) was developed by Treynor, Jack L extending the classical work of the Portfolio Selection theory of Markowitz. CAPM model aims to determine the required rate of return of an asset while considering the market (non-diversifiable) risk.

Several assumptions in theories usually do not represent the experimental market conditions in several perspectives properly. There are scientific approaches used to describe stock markets' behavior, stock markets are dynamic, and resulting reactions are purely based on aggregate human behavior is irrational.

4.3. A Brief History of The Stock Market in Turkey

Borsa Istanbul-BIST consists of four main sectors: the services sector, the financial sector, the industrial sector, and the technology sector and includes stock return and stock price data on many sub-sectors within these main sectors. The services sector includes electricity, communications, sports, trade, tourism, and transport sub-sectors; the financial sector includes banks, financial institutions, real estate

investment trusts, holding and insurance sub-sectors and the industrial sector includes food, paper, chemical, metal main, metal goods, stone soil, and textile sub-sectors. Finally, the technology sector provides informatics and defense sub-sectors (Abdioğlu and Değirmenci, 2014).

In Turkey, four different stock market transactions were held up to April 4, 2013. April 4 December 2013, VOB (derivatives exchange) and IAB (Istanbul gold exchange) were united with the Istanbul Stock Exchange and gathered under one roof in order to become Istanbul's financial center with the agreement prepared by the Capital Market Board CMB, with the change made in the Istanbul stock exchange ISE, which started its activities on December 6, 1985 (Şahin, 2014). Istanbul Stock Exchange incorporated company, which has been privatized and collects other stock exchanges under one roof, has started to operate for profit.

With the opening of Borsa Istanbul, the ISE, which was established in 1985, disappeared. BIST was established as the Istanbul Gold Exchange; the ISE and the Futures Options Exchange are all under one name. Borsa İstanbul differs from ISE by establishing strategic partnerships such as technological infrastructure, liquidity, and capital market opinion leadership. The main reasons are ease of transaction in the international market and providing confidence. The primary purpose of the Stock Exchange in Istanbul is to gather under one roof of transactions to make international transactions easier. Besides, the aim of performing the transformation of the stock market in line with the Istanbul International Finance Center project of Borsa Istanbul has been adopted.

Borsa Istanbul offered its shares to the public on the stock exchange. The most crucial issue of this stock market is that the stock market should be presented to the public for the first time in what economic conditions, at what time, and at what price most appropriately (Karaoğlu, 2014). The primary purpose of Borsa Istanbul is to ensure that the easy trading of capital market instruments (securities, investment contracts, derivatives, and other instruments) in a safe environment with the provisions of the law and the related legislation. Borsa Istanbul BIST has a legal structure and can make any arrangements in the subjects and places it has the authority to make (Borsa Istanbul, 2013). Since the establishment of Borsa Istanbul, various indices have started to be created in Istanbul, both on a sectoral and group basis. In this respect,

negative or positive developments based on a sector created in the stock market, Istanbul, can directly affect these sectors (Kaderli, 2013).

4.3.1. Stock Exchange in Ottoman Era

Before the stock market was established, the bankers in Galata established an informal association. Later, bankers and this association started trading in Galata first. The first stock exchange in Turkey, the Ottoman Empire period established in 1866 with the Kırım War, is called "Dersaadet Tahvilat" (Borsaistanbul, 2020).

Since the industrial revolution in Europe, trade has developed rapidly. Companies established with this developing trade, bonds, and stocks were traded in important cities of the Ottoman Empire. This situation eliminated the needs arising from the expenses of the Kırım War in the Ottoman Empire. A large number of bonds were issued to meet the capital of the investments made after the war. The rapid exchange of bonds prepared the ground for establishing the stock exchange in the Ottoman Empire (Beşirli, 2009). This market's establishment was mostly non-Muslim bankers, and these bankers carried out the transactions in this market. In this way, the first official exchange of the Ottoman Empire, Dersaadet Tahvilat Stock Exchange, was established by these bankers' help and the states that the Ottoman Empire owes (Aydın, 2012).

The Ottoman Stock Exchange was included in Europe's numbered exchanges with its comprehensive trading volume in 1895. On 15 April 1886, commodity exchanges were established called the "Umum Borsalar Nizamnamesi," and the first commodity exchange market in Izmir, "İzmir Ticaret ve Sanayi Borsası," was established. Ottoman Bank director Sir Edgar Vincent's establishment of an unsubstantial company for gold mines transactions and sold the imaginary stocks. Vincent collected large sums of money for this unsubstantial company and went bankrupt in a short time, and a lot of losses occurred in the stock market. After the arrangements made by the Ottoman Empire were not successful (Beşirli, 2009).

All bonds and stocks lost great value by the Gold incident. At that time, the Ottoman Bank's failure to give advances also affected the stock exchange very severely. As a result of these big deceptions, people with small savings among them walked towards the stock market. After that, the Ottoman government stopped the stock market activities and was temporarily closed for four months (Varlık, 2017). In 1906 the stock market was regulated by a new rule. The name of the stock exchange has

been "Esham and Tahvilat Borsası." This stock market stagnated with the Ottoman Empire's fall and was closed during World War II (Gümüş, 2019).

4.3.2. The Pre-IMKB Period (1923-1985)

In 1926, the "Menkul Kıymetler ve Kambiyo Borsası" was established with the law issued to re-activate the stock market. In 1929, this article was amended, and the stock exchange was organized. The stock market was reorganized and tried to be carried out through the Ministry of Finance's stock market agents (Bulut, 2013).

In 1936, with the enactment of the Value of Turkish Currency Protection Law, the Stock Exchange was unsettled. Because the IMKB was working at those times based on the Turkish currency, which can be exchanged in foreign currency, depending on the European Stock Exchange. The stock exchange was moved to the city Ankara that is the headquarters of the state in 1938. IMKB was more affected negatively by this move. It was then decided to move the stock exchange back to Istanbul in 1941 because there were no IMKB activities in Ankara effectively. However, moving the deeply shaken stock market to Istanbul did not improve the stock market situation (Gümüş, 2019).

By the late 1970s, inflation increased, but the government's interest rates remained very low relative to inflation. Due to the low-interest rates, the users called bankers increased in the market. Due to the losses suffered by many companies, a new era of search and modern stock trading has begun. The Capital Market Law CML was enacted in 1981 after the crisis caused by these bankers (Bulut, 2013).

The period from the fall of the Ottoman Empire until 1929 can be described as a transition period for the Istanbul Stock Exchange and its economic policies. Although foreign capital was nationalized during this period, the construction of the Republic was focused. The stock market was only raised in 1929 when the foreign trade regime and foreign exchange policies were reconsidered.

In order to revive the stock exchange in 1929, the Istanbul Stock Exchange was established with the law numbered 1447 and the regulation issued according to this law. The Istanbul Stock Exchange, the first Republic stock exchange, was, in a sense, a continuation of the old stock exchange. In this period, the stock market was again reorganized close to the French stock market system, and the Ministry of Finance appointed a certain number of exchanges. However, with the introduction of the broker

institution, an English French mix working style emerged. German brokerage has been included to some extent with a commissioner.

More protectionist policies were adopted in the 1930s. A National Capital, Bank, and control of a stock market were tried to be created. During this period, policies aimed at achieving foreign exchange balances were observed. In parallel with these policies, the law on protecting Turkish currency's value was issued on February 28, 1930, and law No. 1715 on the Central Bank on June 11, 1930. When the reflections of the policy innovations in the early 1930s on the stock market are evaluated, the stock market's stock exchange aspect came to the fore rather than the securities aspect. In this period, where the people's savings power is limited and private enterprises are limited, there is no chance of developing the stock exchange. The central policies pursued in 1929-1939 are a stable and healthy balance policy that has been adopted to establish an economic environment: constant money supply, equivalent budget, and foreign trade balance. The statism system, which was carried out through this policy, also provided a growth without inflation. In the Republican period, stock market activities have the character of taking positions against more economic crises and wars. The 1929 Great Crisis and World War II caused government policies to have a protective nature. During World War II, when all economic activities were severely disrupted, stock markets either closed or stopped because there was no opportunity to operate (Çetkin, 2016).

4.3.3. ISE: Istanbul Stock Exchange

The first application of financial liberalization was the release of time savings deposits and loan interest rates in 1980. These financial liberalizations, which took place in July 1980, referred to as July banking, raised the demand deposit interest rates, and the banks were given the authority to issue deposit certificates. In this liberty environment, apart from deposit banks, some groups and individuals have collected market funds by marketing securities such as bonds and deposit certificates under banking. During this period, some small banks also risked their capacities by selling deposit certificates with bankers' support. The failure to use these collected funds from productive areas and not yield enough to meet the high interests paid caused the banker's crisis. This monetary market event broke out in 1982, causing the bankers and many banks to cease their activities (Fertekliçil, 1993).

The banker's crisis has now shown the necessity to establish a regulated capital market with new regulations. As a result, this requirement was fulfilled with the Capital Market Law dated 1981 and numbered 2499. The Capital Market Law No. 2499 aimed to ensure that the Capital Market operates with confidence and determination and to protect the rights of savers, to put the savings mobilized in the trust and perseverance at the disposal of economic development and to expand the ownership of the property by opening companies to the public in terms of capital.

In the first regulation regarding the restructuring of the stock exchange with the decree law-91 dated 1983 after the Capital Market Law, to ensure that securities operate openly, regularly, and honestly, securities are to be traded in confidence stability. This regulation aims to provide that the capital market plays a significant role in economic development by regulating the establishment, management, working principles, and controls. The decree-law includes framework provisions regarding establishing the stock exchange, management appointment, members, general assembly, and financial provisions. Again, with this decree-law, the Securities and Exchange Law dated 1929 was repealed. The regulation on the Establishment and Working Principles of the Securities Exchanges published in the Official Gazette No. 18537 in 1984 entered into force. At the stock exchange operating in Turkey, this director, organization, management, operation, and monitoring are organizing principles. As the last step of the establishment process, the ISE Directive entered into force on 18.12.1985 to determine the working principles and principles of the stock exchange, which was decided to be established on 19.10.1984 under the name of "Istanbul Stock Exchange" ISE. After this arrangement, Muharrem Karşlı was appointed as the first President of the ISE in March 1986. Istanbul Stock Exchange was established on 26 December 1985 and started operating at Ziraat Bank on 3 January 1986 (Borsa Istanbul, 2010).

4.3.4. BIST: Borsa Istanbul

The stock market activities carried out during the Ottoman Empire and the Republic is not activities carried out by directing a national capital. After the 1854 Crimean War in the Ottoman period, the debentures of bonds change hands and prepare the ground for the start of stock market activities. In the Republican era, the economic policies adopted were more defensive than integrated into the developing Capital Markets. The geostrategic and global parameters of the geography we live in have not

been considered. As a result, proactive strategies against the economic activities around us have not been developed. The possible integration with both the developing stock markets and the developing stock markets has not been achieved.

BIST was established with the merger of ISE, Gold Exchange, and Derivatives Exchange. The main reasons are ease of transaction in the international market and providing confidence. The aim is to make Istanbul a financial center, attract investments, and ensure the formation of a safe and deep capital market. BIST differs from ISE by establishing strategic partnerships such as technological infrastructure, liquidity, and capital market opinion leadership (Borsa Istanbul, 2013). BIST fills in the gaps in the capital market; to provide the necessary integration with the developing market in Turkey and Istanbul, the capital of activities gathers under the one roof the Istanbul International Financial Center (IFC) started on 5 April 2013.

With the opening of Borsa Istanbul, the ISE, which was established in 1985, disappeared. The Istanbul Gold Exchange, the ISE, and the Futures Options Exchange are all under one name. The primary purpose of the Stock Exchange in Istanbul is under one roof of transactions is to perform. Making international transactions easier with this it is intended to. Besides, the aim of performing the transformation of the stock market in line with the Istanbul International Finance Center project of Borsa Istanbul has been adopted. Borsa Istanbul was officially established in April 2013 with a capital of TL 423,234,000. In April 2013, the stock exchange's new name was registered with the Istanbul Chamber of Commerce. The board of directors of the company, which used to be 7, was created with Borsa Istanbul. Furthermore, the markets started to open at 9:45 in line with the international markets, and Borsa Istanbul BIST was started to be used as an index in the stock market instead of ISE.

The logo representing Borsa İstanbul is one of the most important stages of the great transformation process. First, the direction in which the logo should symbolize Turkey and Istanbul was the consensus. Seagull: freedom, dynamism, and promotion; Istanbul Strait: Istanbul, where cultures, continents, and regional economies meet, branding all over the world; Tulip: Tulips spread from Earth to Istanbul, victory, eternity, and Turkey; Logo Form: The circle that gives the form to the logo is the symbol of Borsa Istanbul, which plays an active and significant role in the global economy. Slogan: "Investment Value" is the transformation message of Borsa Istanbul.

4.4. Characteristics of BIST: Borsa Istanbul

Borsa İstanbul has various indexes created for investors to follow the movements in the market. Thus, Borsa Istanbul-BIST calculates different indexes in the markets. These indexes are equity market index, BIST-KYD indices, Borsa Istanbul BIST risk control indices, Borsa Istanbul-BIST leveraged indices, precious metals and diamond market, customer indices. The companies traded in BIST Stars and BIST Main consists of 30 shares selected from real estate capital and venture capital investment trusts.

Indices are calculated in terms of the Return Index and Price Index in TL, USD, and Euro currencies. (BIST-30, BIST-50 and BIST-100) are three major indices included in the stock market. There are four index periods for BIST 30, BIST 50, and BIST 100 indices, from January to March, from April to June, from July to September, and from October to December. The names of the markets, formerly called the National Market and Second National Market, were changed in 2015; It has been named as BIST Stars and BIST Main (BIST: 2018). BIST Stars specifies the trading locations of shares with 100.000.000 TL and above, included in the BIST-100 Index. BIST Main identifies the trading locations of shares below 100.000.000 TL that are not included in the BIST-100 Index.

BIST 50 indexes; Companies traded in BIST Starts and BIST Main consist of 50 shares selected from real estate capital and venture capital investment trusts and include the shares included in BIST 30 index. BIST 100 index; is used as the main index for the Borsa Istanbul Stock Market. It is the index that determines the market in Borsa Istanbul. The companies traded in the BIST Starts and the BIST Main consists of 100 shares selected from real estate capital and venture capital investment partnerships. BIST 100 index includes the shares of BIST 30 and BIST 50 indexes (BIST 2020).

Table 4. The Explanations of BIST Indices

Indices	Explanation of Indices
BIST 100	It is used as the main index for the Equity Market. It is the continuation of the Compound Index, which started in 1986 with the share of 40 companies and has been limited to 100 companies over time. It consists of 100 shares selected from companies traded in the National Market, real estate investment partnerships and venture capital investment partnerships traded in the Corporate Products Market-CPM.
BIST 100 Capped	It is an index consisting of the same shares as the BIST 100 index and the weight of the shares in its content is limited to 10%.
BIST 50	It consists of 50 shares selected from companies traded in the National Market, between real estate investment trusts and venture capital investment trusts traded in the CPM.
BIST 30	It consists of 30 shares selected from companies traded in the National Market, between real estate investment trusts and venture capital investment trusts traded in the CPM.
BIST 30 Capped	It is an index consisting of the same shares as the BIST 30 index, in which the weight of the shares in its contents is limited to 10%
BIST 100 Bank	It consists of 10 shares selected from among the banks traded in the national market.
BIST 100-30	It is included in the BIST 100 Index and consists of 70 shares that are not included in the BIST 30 index.
BIST DIVIDEND 25	The market value of the shares in the BIST Dividend Index, which is in the first 2/3 of the ranking in the ranking made according to the dividend efficiency as of the day of valuation, is the largest 25 shares.
BIST DIVIDEND	It consists of the companies traded in the National Market and the Second National Market, and the shares of companies that have been selected among real estate investment trusts and venture capital investment trusts traded in CPM and distribute cash dividends in the last 3 years.
BIST Corporate Governance	Stock exchange traded in Istanbul markets and designated by The Capital Markets Board -CMB the rating rating given by the rating agencies as a whole on compliance with corporate governance principles consists of the shares of companies with a minimum rating of 7 out of 10 and a minimum of 6.5 per sub-title.
BIST IPO	It consists of the shares of the companies that have started to be traded in the National Market and the second national Sunday, and real estate investment trusts and venture capital investment trusts that have started to be

	traded in the Cube. The weight of each share contained in the content is limited to 20%.
BIST ALL	It consists of the shares traded in the National Market and the Second National Market, and the shares of real estate investment trusts and venture capital investment trusts traded in the CPM.
BIST ALL 100	It consists of shares that are included in the BIST All Index and are not included in the BIST 100 index.
BIST NATIONAL	It consists of shares of companies traded on the national market.
BIST SME INDUSTRY	It consists of the shares of industrial companies that are traded in the National Market, Second National Market and Emerging Enterprises Market, except for the number of employees included in the small and medium sized enterprises-SME definition in the relevant regulation of the Ministry of Science, Industry and Technology, providing the annual net sales revenue or financial balance size.
BIST INDUSTRIALS PRICE	It consists of the shares of companies traded in the National Market and Second National Market.
BIST SERVICES	It consists of the shares of companies traded in the National Market and Second National Market.
BIST FINANCIAL	It consists of companies traded in the National Market and the Second National Market, and selected shares from real estate investment trusts and venture capital investment trusts traded in the CPM.
BIST TECHNOLOGY	It consists of the shares of companies traded in the National Market and Second National Market.

Source: Borsa İstanbul, " Cevaplarla Borsa ve Sermaye Piyasası", Nisan.2014, s.67

4.5. Legal Framework and Property Structure of Borsa

Capital Markets Board Law no. Six thousand three hundred sixty-two went into force after being published in the Official Gazette dated December 30, 2012. According to article 138 of the Law, Borsa İstanbul A.Ş. was founded in the same year for a security trade. Borsa İstanbul allows all the financial transactions in the Turkish capital markets under a single framework. The Capital Markets Board conducts its Articles of Association and following approved by the Minister in charge, and it was registered on April 3, 2013, thereby receiving a foundation and operation permit (Borsa Istanbul, 2020).

Published in the Official Gazette dated 19.07.2013, the Stock Exchange by-law regulates the market operator's principles and principles about the exchange of capital markets instruments, foreign exchange and precious metals, and precious stones and

other contracts, documents, and securities deemed appropriate by the Capital Markets Board. The stock exchange activities to be carried out within the law's scope, and the supervision of these activities, their activities temporarily and permanently to be stopped. Besides, the ISE Directorate published in the Official Gazette dated 19.02.1996 was abolished with the entry into force of the BIST regulation on principles of stock market Activities published in the Official Gazette dated 19.10.2014.

The stock exchange bodies are the General Assembly and the board of directors within the framework of the provisions of the Turkish Commercial Code. And there is also a Corporate Governance Committee, Audit Committee, early risk detection Committee, Dispute Committee, and Disciplinary Committee established to assist the board of directors. The founding capital of BIST is 423.234,00 Turkish Liras. This capital is divided into 42.323.400,000 shares worth 1(one) penny each. These shares representing the capital of Borsa Istanbul are divided among the shareholders is shown in the table below;

Table 5. The Shareholder Structure of BIST

Nominal Value (TL)	Number of Shares	Shareholder	%
383.450.004,41	38.345.000.441	Turkish Wealth Fund	90,6
5.502.042,00	550.204.200	Turkish Capital Markets Association (TCMA)	1,3
9.589.578,20	958.957.820	Borsa Istanbul A.Ş (BIST)	2,27
24.692.375,39	2.469.237.539	Other (Brokerage houses, banks, precious metal and foreign exchange companies and other companies)	5,83
423.234.000,00	42.323.400.000		100

Source: Borsaistanbul (2020), Corporate Governance p.1

On January 24, 2017, Borsa İstanbul shares belonging to Treasury were transferred to Turkey Wealth Fund TWF.

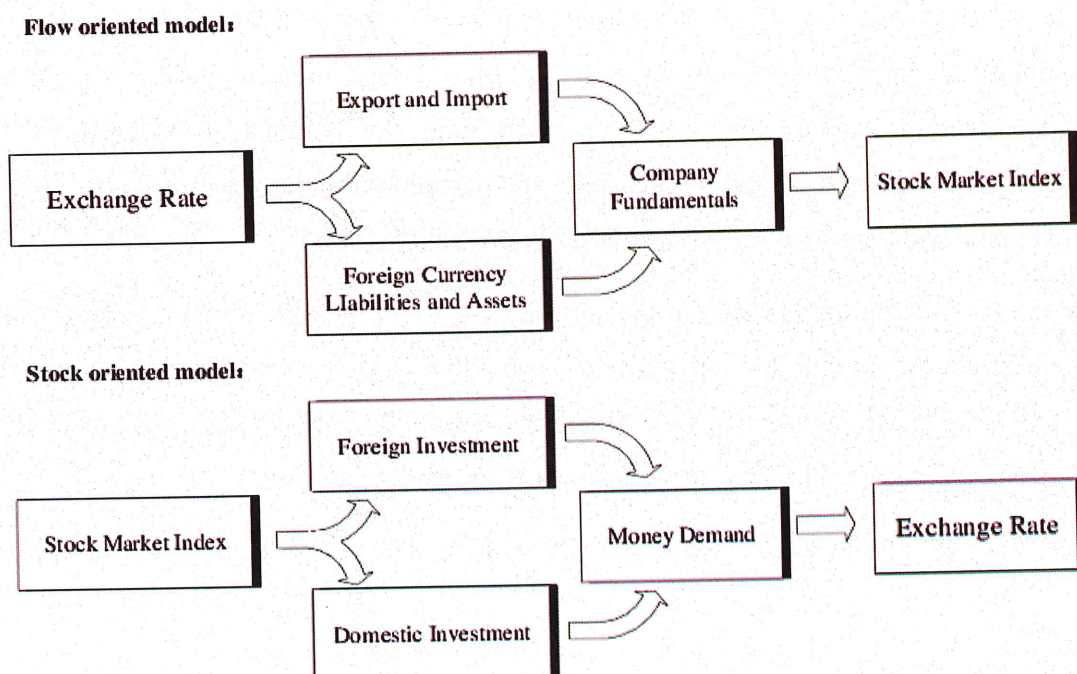
CHAPTER 5

THE LINK BETWEEN BIST100 INDEX VALUE AND EXCHANGE RATES

5.1. Theoretical Framework

The relationship between stock prices and exchange rates is not as straightforward as between these financial variables and monetary policy. Two main models attempt to determine exchange rate and stock price interactions, the “flow-oriented approach” or “the traditional approach” models postulated by Dornbusch and Fischer (1980) and the “stock oriented” or “the portfolio balance approach” model of Branson, Halttunen, and Masson (1977).

Table 6. The Flow Oriented Model and The Stock Oriented Model



Source: Yuan, Li, Shi, Chan, Ruan, & Zhu, (2017), Linkages between Chinese Stock Price Index and Exchange Rates-An Evidence from the Belt and Road Initiative, p.3

In a flow-oriented model, the appreciation of a country's currency will lead to a decrease in the cost of imports and a rise in the cost of exports, which will affect the operations of businesses and will ultimately be reflected in the stock price. On the other hand, the exchange rate change will affect the value of overseas assets and liabilities, causing both to fall and then affect the company's essential condition and

stock price. Based on the flow-oriented model, the effect of the exchange rate on the stock price is uncertain, and the final direction of the impact is determined by the degree of positive and negative effects.

In the stock oriented model, an increase in the stock price will attract foreign capital inflows. Demand for money will increase, and the local currency will gain in value. Furthermore, an increase in the stock price will boost investors' wealth and lead to increased demand for the local currency and local currency valuation. When a country's capital account can be freely convertible, the stock index will significantly impact the exchange rate (Zhu and Ruan, 2017).

5.4.1. Flow Oriented Model

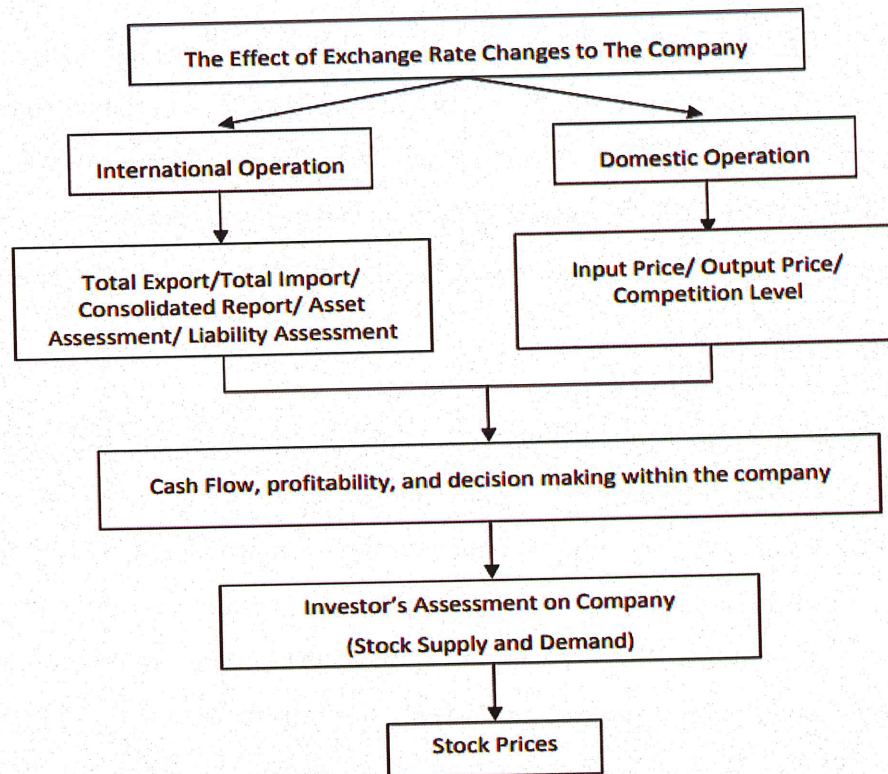
Flow oriented models of exchange rates based on the current account or the trade balance. Trade balances and international competition are affected by changes in exchange rates, and in this way, real input and real GDP are affected. Stock prices are linked to the future income, interest rate innovations, and current investment and consumption decisions regarding exchange rates. Innovations in the stock market affect aggregate demand through wealth and liquidity effects, thereby affecting money demand and exchange rates (Dornbusch and Fischer, 1980).

For example, in the depreciation situation, firms' international competitiveness will increase, and in the meantime firm's profit will increase. Accordingly, the firm's stock price will go up; in this direction, there is a positive relationship between exchange rates and stock prices (Kahraman and Birkan, 2016).

The flow-oriented model is based on the idea that the exchange rate is affected by the country's current account balance or trade balance. According to the figure. 1, the appreciation of a country's currency would lead to a fall down in its import businesses' cost. This decline will affect businesses' functioning and result in an increase in the cost of export businesses, which will reflect the stock price. Furthermore, the exchange rate change will affect the value of overseas assets and liabilities, resulting in a decrease of both and then affect the company's underlying state, the company's stock price. Based on the flow-oriented model, the impact of the exchange rate on the stock price is uncertain, and the final direction of the effect is determined by the degree of positive and negative effects. The below-mentioned table

summarized the impact of exchange rates on the stock market in the stock oriented model.

Table 7. The Effects Of Exchange Rates on Stock Prices in Stock Oriented Model



Sources: Fauziah, Moeljadi, and Ratnawati (2015). Dynamic Relationship Between Exchange Rates And Stock Prices In Asia, 2009-2013 p.127

FOM theory describes how currency or exchange rate movements affect a company's international competitiveness, and this effect reflects the present value of the company's future cash flow. This influence of a company's global competitiveness takes effect on corporate transactions such as exports, imports, interest income, and so on (Transactions Exposure) that convert one currency to another currency and the impact on the consolidated financial statements of the parent company. (Translation Exposure) (Madura, 2008).

According to Fauziah, Moeljadi, and Ratnawati (2015), exchange rate movements will cause changes in the company's book value. Changes in the book value reflect the power of supply and demand in the stock market, which will affect investors' evaluations regarding the performance of the company's current and expected performance in the coming period (Market Value). Thus, changes in the supply and demand for stocks will cause changes in the stock price.

The depreciation of the local currency will increase revenues and increase the stock price level by promoting export growth. Also, the company dominated by imports, the devaluation of the local currency causes an increase in production costs affecting the company's earnings and stock price decrease. (Yücel and Kurt, 2003).

According to Adler and Dumas (1984), the company operating in the domestic field, in general, is also affected by the exchange rate. The effect lies in company input and output price changes due to macroeconomic conditions resulting from changes in the exchange rate. Besides, the change in the local currency exchange rate would also affect the company's competitive position against foreign competitors in the country.

5.4.2. Stock Oriented Model

According to stock-oriented models, the exchange rate value is determined in the foreign exchange market, and the stock is firstly affected by the financial market. The capital account is highly important in determining exchange rate dynamics in this approach. The values of financial assets are determined by the present values of their future cash flows. In this way, expectations of relative currency values are important because of changes in price or price movements. Thereby exchange rate dynamics are affected by Stock price innovations or conversely (Branson and Frankel, 1984).

For example, a decrease in stock price value may fall into the investor's wealth and result in a reduction in the interest rate. Their demand for money falls; this means that depreciation of the domestic currency and capital outflows. This chain flow is coming from the stock market to exchange rates. Another example decreases in the stock price will lead to reducing demand for domestic assets and increasing demand for foreign assets, accordingly, foreign currency will be needed to have these assets. In this way, there is a negative relationship between stock prices and exchange rates (Kahraman and Birkan, 2016).

In contrast to the flow-oriented model, causality relative to the stock oriented model moves from the stock market to the exchange rate. According to this model, the change in the stock market index will affect domestic and overseas investors' behavior. This process will affect the exchange rate by causing a fluctuation in demand for money. A consistent rise in the stock price would increase foreign capital inflows. This situation leads to excessive demand for the local currency and boosts the local currency's value.

Furthermore, a rise in the stock price will boost investors' wealth, leading to increased demand for domestic money and the appreciation of the domestic currency. The stock oriented model highlights that capital and financial accounts are the main factors that cause the exchange rate changes. The stock oriented model only considers the impact of the stock index on the exchange rate and considers that a stronger stock index would bring in stronger local currency. When a country's capital account is freely convertible, the stock index will significantly impact the exchange rate.

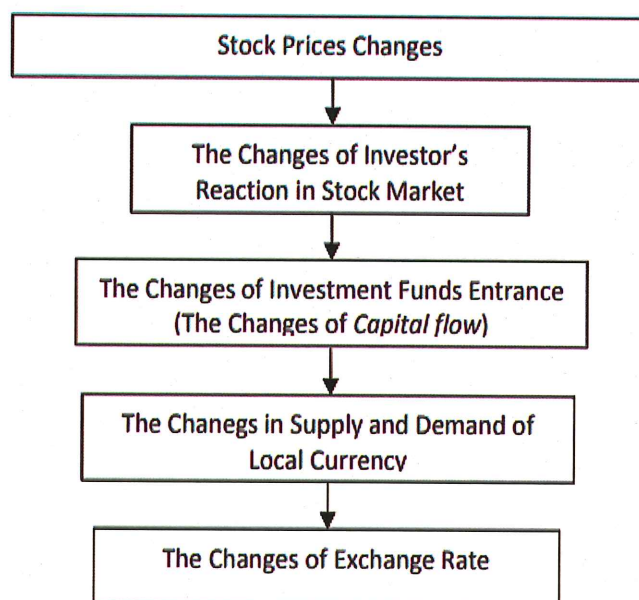
An important point in the Portfolio Balance Model is that the model does not contain an assumption about how the prices of goods move. This situation enables the implementation of monetary policy by purchasing open market transactions and domestic bonds. The period in which monetary policy can be implemented is defined as a "transition period from short-term balance to long-term balance." Besides, fiscal policy can be applied by placing domestic bonds on the market during this period. The change in the number of bonds in the market leads to an appreciation or loss in exchange rates. In the same way, the value of exchange rates can change depending on asset preferences (MacDonald, 2007).

According to the portfolio balance model, capital can affect exchange rates through money demand as part of a stock. The higher stock price can lead to a higher demand for money by guaranteeing a higher interest rate. Foreign exchange capital inflows with a relatively higher interest rate will result in an appreciation of the national currency. This situation will state that stock prices will be in a negative correlation with exchange rates. This approach highlights the role of the current account balance. As in all goods and services markets, exchange rates are determined by the market mechanism. Developing financial markets will increase the demand for national currency by making foreign capital inflows attractive. The general decrease in stock prices will cause investors to sell their stocks and replace the national currency with foreign currencies to prevent future losses. As a result, rising stock prices will cause an appreciation in the exchange rate, while decreasing stock prices will cause the exchange rate to depreciate. Also, changes in stock prices affect the exchange rate and demand for money. Because investors' wealth and cash demand depend on the stock market's performance, it can be mentioned a causality that may occur with the direct effect of the financial sector. The increase in the prices of the shares increases the exchange rates. There is causality from stocks to exchange rates (Mishra, 2004).

Exchange rate determination of portfolio balance models assumes that the relationship between the two markets is negative and causality is from stock prices to the exchange rate. In these models, individuals keep their portfolios with national and foreign currency assets. The increase in domestic stock prices may increase the demand of individuals for local goods, thereby increasing the national currency's value. The same negative relationship, increasing foreign demand for local goods, may increase the stock prices and cause the national currency's appreciation.

The theory suggests that the change in exchange rates will impact the company's foreign operations and overall profit, which will affect stock prices. The structure of the change in stock prices depends on the global nature of the firm. A general contraction in the equity market will lead investors to explore options to get higher returns. If foreign investors move to another country's market, it will reduce the demand for money and cause interest rates to move downward. This situation will result in the depreciation of the national currency by causing foreign capital to exit (Ramasamy and Yeung, 2005).

Table 8. The Effects of Stock Prices to Exchange Rate in Stock Oriented Model



Sources: Fauziah, Moeljadi, and Ratnawati (2015). Dynamic Relationship Between Exchange Rates And Stock Prices In Asia, 2009-2013 p.128.

5.2. Literature Review

Many studies are investigating the relationship between exchange rates and stock markets. Some studies argue that exchange rates affect stock prices and that there is a long-term relationship between them, and studies that say that there is no relationship. Therefore, it is not possible to talk about a consensus among the previous studies on this subject.

Frank and Young (1972) did the first pioneering studies investigating the relationship between exchange rates and stock prices. They found no meaningful relationship between variables. Aggarwal (1981) studied US stock prices, and the trade-weighted dollar is positively interrelated. Later, Giovannini and Jorion (1987) investigated the relationship between US stock prices and exchange rates and found a positive correlation between US stock prices and the USD, which has a stronger effect in the short term than in the long term.

Contrary studies by Soenen and Hennigar (1988) determined that a strong and statistically significant negative relationship between the value of the USD and stock prices is valid, using the monthly stock prices and effective exchange rates for the period 1980–1986.

According to Ma and Kao (1990), changes in currency values on stock prices in six industrial economies and currency appreciation for the export-based economy countries negatively affect the stock market. On the other hand, currency appreciation for the import base countries has a positive effect on the stock market.

Moreover, Bahmani-Oskooee and Sohrabian (1992), there is bidirectional causality between stock prices measured by the S&P 500 index and the dollar's effective exchange rates. For eight industrial economies, Ajayi ve Mougoué (1996) defended the increase in stock prices negatively affected the short-run. An increase in stock prices has a positive impact on the long-run domestic currency value.

Abdalla and Murinde (1997) used Granger causality tests for Pakistan, Korea, India, and the Philippines in 1985-1994 to examine the long-term relationship between the real effective exchange rate and stock price indices. Results have differed from country to country. In other countries except for the Philippines, one-way causality was found from the stock exchange rate.

Büberkökü (1997) examined the relationship between stock prices and exchange rates in developed and developing countries with Granger Causality Analysis. Developed countries in the study are Japan, Canada, England, Switzerland, Germany, and Australia; In developing countries, Singapore was chosen as South Korea and Turkey. As a result of the study, a one-way causality relationship was observed from stock prices to exchange rates in Canada and Switzerland. In contrast, no causality relationship was observed in Japan, Germany, the United Kingdom, and Australia. In Singapore and South Korea, there was a one-way causality relationship between exchange rates and stock prices. At the same time, there was a causality relationship between stock prices and exchange rates in Turkey.

Additionally, Phylaktis and Ravazzolo (2000) examined the correlation between exchange rates and stock prices; they determined a positive relationship between the variables in the period between 1980-1998 for the Pacific countries.

Granger, Huang, and Yang (2000) tested the causality relationship between exchange rates and stock prices using data from 1986-1998 on Asian countries. As a result of the study, it was determined that the exchange rate of South Korea is the reason for the stock prices, and this situation is compatible with the traditional approach. On the other hand, it has been determined that the Philippines' stock prices negatively affect the exchange rate and, therefore, are compatible with the portfolio balance approach. For the Indonesian and Japanese economy, no causality relationship could be determined between stock returns and the exchange rate.

Furthermore, Nieh and Lee (2001) have provided short-run evidence dynamics while no long-run relationship between stock prices and exchange rates for the G-7 countries.

Using the monthly frequency data covering the period 1994-2000, Muhammed, Rasheed, and Husain (2002) revealed no short-term relationship between stock prices and exchange rates for some countries in their studies for Pakistan, India, Bangladesh, and Sri Lanka. Bilateral causality was found between variables in Bangladesh and Sri Lanka. They have revealed no long-term relationship between the two variables for India and Pakistan, and there is a long-term relationship for Bangladesh.

Smyth and Nandha (2003) analyzed the relationship between exchange rates and stock prices by using daily data for Southeast Asian countries Bangladesh, India,

Pakistan, and Sri Lanka between 1995-2001. Both two-stage Engle-Granger and Johansen cointegration test results reveal no long-term equilibrium relationship between the two financial variables. Granger causality test results show that one-way causality from exchange rate to stock prices exists for India and Sri Lanka, and exchange rates and stock prices are independent of each other for Bangladesh and Pakistan.

Yang and Doong (2004) examined the volatility transfer mechanism between stock and foreign exchange markets for G-7 countries. The results of the study yielded findings supporting the asymmetric volatility propagation effect. It has been found that stock price movements affect the exchange rate, but changes in the exchange rate affect stock prices less.

In his study, Dimitrova (2005) used monthly (176 observations) data of the US and UK's foreign currency, stocks, and some macroeconomic values between January 1990 and August 2004. As a result of the statistical analysis, the Granger causality relationship was found a weak association between exchange rates and stock prices.

Yau and Nieh (2006) investigated a short-and long-term relationship between exchange rate and stock prices using data from Taiwan and Japan. This study covers the period of 01: 1991-07: 2005; they concluded that Taiwan and Japanese stock prices for the short term affected the exchange rate. The results obtained support the portfolio approach for the short term. However, there is no evidence of a significant relationship or causality relationship between the two variables in the long run.

Richards, Simpson, and Evans (2007) used the VAR model, Granger causality, and Johansen cointegration tests on daily data (2003:01-2006:06) in Australia. As a result of this study, causality from stock prices to exchange rates, and two variables are integrated into the long run.

Rahman and Uddin (2009) analyzed the relationship between exchange rates and stock prices using the Johansen cointegration test, Granger causality test for three emerging South Asian countries (Bangladesh, India, and Pakistan). According to this research results, there is no long-term correlation between exchange rates and stock prices, and these two variables do not have any causality relationship.

In the same context, Pan, Fok, and Liu (2007), in their study, examined the causal relationship between the exchange rate and stock prices for East Asian

economies by taking the period 1988-1998. The analysis was made for two separate periods as before and after the Asian crisis. Before the Asian crisis, the direction of causality in Hong Kong, Japan, Malaysia, and Thailand was determined from exchange rates to stock prices. During the Asian Crisis, a causality relationship was determined from exchange rates to stock prices in all countries except Malaysia.

Aggarwal, Srivastav, and Srivastava (2010), the Indian economy for the period of 2007-2009 due to their work, that there is a negative relationship between equity and exchange rate returns, exchange rate returns have found that stock of causality is correct. In the same year, Kutty (2010) examined the relationship between exchange rates and stock prices in Mexico for 1989-2006 and found no long-term relationship between the two variables. Besides, in the short term, two variables have a relationship.

Kasman, Vardar, and Tunç (2011) examined the effects of interest rate and exchange rate on banks' stock returns in Turkey using OLS and GARCH estimation methods. As a result of the study, it was observed that changes in the interest rate and the exchange rate had a negative effect on stocks.

In another study, Lee, Doong, and Chou (2011) analyzed the relationship between stock prices and exchange rates in many Asian countries using the STCCGARCH model. And They found significant price transitions from the stock market to the foreign exchange market for Indonesia, Korea, Malaysia, Thailand, and Taiwan. Especially in a period of high volatility for all Asian emerging markets except the Philippines, they found that the relationship between the stock market and the foreign exchange market increased and discussed its implications for investment strategies.

Katechos (2011) applied maximum likelihood regression with GARCH on weekly data for Australia, Euro Zone, Japan, New Zealand, Switzerland, UK, and the USA from 1999 to 2010. According to Katechos, global stock market returns and exchange rates are related to the currencies' nature. A positive correlation exists between the value of higher-yielding currencies and global stock market returns. Simultaneously, there is a negative relation between values of lower-yielding currencies and international stock market returns.

Eita (2012) applied the Johansen test on Namibia's quarterly data over the 1998–2009 period and tried to investigate the determinants of stock prices. The results

suggested that increases in income level and money supply raise stock prices while the inflation rate and interest rate had a negative impact on stock prices.

Tsai (2012) applied the Quantile regression approach on monthly data and tested the relationship between exchange rates and stock prices in 1992-2009 in 6 Asian countries (Singapore, Thailand, Malaysia, Philippines, South Korea, and Taiwan). The results showed a negative relationship between the two variables, and the causal relationship was from stock prices to the exchange rate.

Ray (2012) examined the relationship between share prices in India and different macroeconomic indicators using annual data between 1990 and 2010. The research's multiple regression results show that oil price and gold prices negatively affect share price, while trade balance, interest rate, foreign exchange reserves, gross domestic product, industrial production index, and money supply positively affect the share price. Besides, share price and foreign exchange reserve, money supply, crude oil price, and two-way causality were found among the whole price index.

Gulati and Kakhani (2012) analyzed the relationship between the 2004-2012 period daily closing data and the exchange rate and stock market indexes. As a result of the analysis made within the Granger causality test and correlation analysis scope, they stated that there is a weak but positive relationship between exchange rate and stock market indices.

According to Yıldız (2014), The relationship between the dollar rate and BIST 100 index, financial, industry, and service sector indices were investigated. Granger causality analysis, VAR, impact-response analyzes were used in the examinations made based on daily data for 2010-2013. As a result of the evaluations, it is stated that there is a negative and positive relationship between the dollar rate and the BIST 100 index, the service and industry sector index, and the financial sector analysis.

Moore and Wang (2014) examined the dynamic relationship between real exchange rate and stock returns. Analyses were made using the DCC-GARCH method in developing Asian markets and developed country markets. The results of the study indicated that there was a negative correlation between the two variables

Sensoy and Sobacı (2014), from January 2003 to September 2013, have analyzed the dynamic relationship between interest rates and the stock market. Significantly, they sought to answer the question of whether the correlation between

these variables changed sharply during periods of high volatility, and if so, this change is temporary or permanent.

Yang, Tu, and Zeng (2014) tested the relationship between stock prices and exchange rates for the period 1997-2010 for India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand. As a result of the applied Granger causality test in quantiles on daily data, they determined a bidirectional causality relationship between the two variables in all countries except Thailand during the Asian financial crisis.

Lee and Wang (2015) analyzed the relationship between stock and exchange rates using the 2000-2011 period data of 29 countries using dynamic panel data analysis methodology. As a result of their analysis, they stated a negative relationship between the exchange rate and the stock exchange in the short term. As a result, it supports the Portfolio Balance approach, whereas in the long term, there is a positive relationship between the two variables, and it supports the Traditional Approach.

In the study conducted by Boyacıoğlu, Çürük (2016), 42 companies included in the BIST 100 index as of 2006-2014 period stock returns and real exchange rate data were used. As a result of the analyzes made in the panel data methodology, it was stated that the change in the real exchange rate index had a positive and significant effect on the stock return.

Erer et al. (2016). Using monthly data in Turkey 2002-2015 USD / TRY and EUR / TRY exchange rate have examined the relationship between the stock market index. As a result of the analyzes made within the framework of Fractional Peer Integration analysis and Granger causality tests, it is stated that there is a positive relationship between exchange rates and stock market index in the long run.

Another study examines the relationship between stock prices and exchange rates (Koy and Ersoy, 2016). In this study, the daily closing data of the 2011-2014 period for BIST Bank, BIST Industry indices, and USD and Euro exchange rates were used. As a result of the analyzes made within the framework of the VAR model, it was stated that there is a negative relation between the stock indexes and exchange rates.

Kahraman and Birkan (2016) applied a series of non-causality tests to determine the direction of the relationship between stock price indices and exchange rates in emerging market economies. The monthly data set was used for the 21

countries in the MSCI Emerging Markets index between January 2003 and June 2013. Their empirical findings concluded that there was no universal pattern for the causal relationship between stock prices and exchange rates in emerging market economies.

5.3. Macroeconomic Factors that Affect The Stock Market and Foreign Exchange Market

In financial investment decisions shaped by expected returns and risks, these returns are open to various macro and micro factors. Inflation and interest rates can be shown as the main concepts among the most prominent of these factors at the macro level. Inflation, defined as the constant increase of the general level of goods and services, covers price increases in all goods and services consumers use, not just in a few items. Although the rate of positive effects is mentioned below 2%, out of control inflation rates, economies and businesses constitute a very important problem. The importance of inflation is due to the costs of distorting income distribution, negatively affecting economic growth, causing fluctuations in the economy, shrinking in the labor market, reducing competitiveness, etc. (TCMB, 2013).

Another concept, the interest rate on investments, is the Central Bank's rate to fund banks. The central bank is also seeking to control inflation by controlling the money supply with the market's current interest rate. As the central bank increases these rates, the money supply in the market decreases, while the money supply will expand as it reduces rates. Interest rates, which have such an impact, will inevitably affect all investment and spending decisions (Zügül and Şahin, 2015). In the 1980s and 1990s, there was an unexpected fluctuation in stock prices in many European countries, particularly in the United States and Japan. Many researchers have stated that macroeconomic factors may cause these fluctuations. The relationship between stock prices and macroeconomic variables such as money supply, inflation, interest rate, industrial production, gross national product, foreign trade balance, exchange rate, and oil prices were examined. Over time, approaches to the subject and results as a continuation of this have changed. Such speculative movements, rather than macroeconomic factors, caused fluctuations in stock prices (Binswanger, 1999 and Shiller, 2000). Despite all these evaluations, the relationship between stock prices and macroeconomic variables has continued to be discussed in the economic and financial literature from the 1970s to the present that played an important role. (Yılmaz, Güngör and Kaya, 1999).

When making investment decisions, policies are implemented by central banks are closely monitored by national and international investors. These policies influence the macroeconomic and financial factors of the countries. The global central banks' interest rate decisions, not only national central banks, simultaneously affect the international monetary system stability because of the high level of countries' worldwide economic integration (Aktaş, Güleç and Erer, 2018).

The relationship between money supply and stock price expresses with Changes in money supply primarily affect financial markets due to their direct effects on the general economy. If the increase in the money supply is high, market interest rates will fall due to the excess amount of money that can be lent as loans. Besides, the high rate of increase in the money supply will play a role in increasing the share prices of firms, leading to a rise in firms' activities and economic growth.

The relationship between inflation and stock price describes one of the main issues in macroeconomics: short-term inflation; it is their dynamics. Inflation means that aggregate demand is higher than aggregate supply at the current price level. In this case, the general level of prices will start to rise. Thus, inflation can be defined as a continuous increase in the general price level. In inflation periods, an increase occurs in the general level of prices, measured by price indices, which are the averages of consumer prices and wholesale prices (Ulaş, 2010)

In the securities markets, it is very important that investors are protected against inflation. Especially in countries with high inflation, such as Turkey, this variable's effect on stock prices should be investigated. Some studies have claimed a negative relationship between these two variables, and some have argued that there is a positive relationship between them. Fama (1981) indicates that stock and bond value is determined in the economy's real sector. According to Fama," the hypothesis for both common stocks and bonds is that expected real returns are determined in the real sector. Kaul (1987) was extended this view by explaining the negative shocks in the equilibrium process. This hypothesis, known as "agency theory" in the literature, claims that the negative correlation arises from the negative correlation between inflation and future production growth. Because stock prices reflect firms future earnings potential, the predicted economic collapse due to an increase in the inflation rate will lower stock prices and, therefore, stock returns. Some researchers see the negative correlation between inflation and return due to the shift of investors towards

other assets that bring interest from stocks during periods of inflation. In this regard, Mascaro and Meltzer (1993) stated that inflation uncertainty is positively related to the level of inflation and that the increase in inflation uncertainty will reduce demand for equities by increasing demand for money. Feldstein (1980) and Feldstein and Summers (1979) stated that the unexpected increase in inflation would reduce the stock's value, as it would reduce the real value of the tax shield provided for depreciation of fixed assets. Despite the negative relationship controversy, Kessel (1956) claimed that if firms were net debtors, increases in the inflation rate would increase firms' stock value. The authors emphasized the validity of Fisher's views on this subject. According to them, the negative relationship between inflation and stock prices contradicts Fisher's views, based on the logic that investors invest in stocks to protect themselves from inflation (Erdem, Arslan and Erdem, 2005).

5.3.1. The Relationship Between Interest Rates and Stock Price

The interest rate influences the stock market through several channels in an efficient market economy. The policy interest rate is managed to absorb and recover from domestic or external shocks as the policy interest rate is a short-term credit interest. Since the central bank lends funds to commercial banks through open market operations, the policy interest rate's effect on the stock market cannot be considered directly.

The main channel that policy interest rate affects the stock markets is the substitution of stock returns from a deposit account. The higher interest rate gets less, attracting the stock returns for investors. Companies do not instantly react to changes by increasing dividends. Even if they react, this will only be a short-term solution since their profitability will be reduced back due to a reduction in retained earnings Modigliani & Miller theory. Another channel that interest affects the stock market is through the banking system. The initial volatility caused within the banking system by a policy rate shift negatively affects the banking system's profitability. Therefore, it increases the firm's cost of debt and financial transactions (Hancock, 1985). Central banks generally control inflationary pressure by interest rate hikes. The increase in interest rates leads stock investors to treasury bills and bonds, leading to a decrease in demand for stocks, causing a decline in stock prices (Abdioğlu and Değirmenci, 2014).

5.3.2. The Relationship Between Exchange Rate and Stock Price

The establishment of stock markets in emerging economies and independently floating exchange rates policy has appeared in recent years. Less developed countries have been leading to being in stock markets. Rapid international trade improvement in the 1970s and accepting of independent floating exchange rates regime leads to increasing the exchange rate volatility. In this way, firms were under the influence of increased exchange rates. In the literature, independently floating exchange rate regime covers three types of risk (Abdalla, 1997).

According to (Ma and Kao, 1990 & Loudon, 1993), There are different types of risks under an independently floating exchange rate regime; First, Transaction exposure arises from investment transaction lost and gain in foreign currency terms. Secondly, economic exposure arises from variations in firms' discounted cash flows when exchange rates fluctuate. And finally, operating exposure arises from the volatility of the firm's exchange rates against domestic currency. In independently floating exchange rates policy in emerging market economies, implications for the ongoing attempts to develop stock markets are led by linkages between exchange rates and stock prices.

Developments in the emerging stock markets and the adoption of independently floating exchange rates are generated to analyze the causal interactions between the leading prices in exchange rates in the foreign exchange market and share price in the stock market. However, the behavior of domestic firms' stock prices tends to differ from that of multinational firms.

Any change in the exchange rate directly affects the value of a portfolio hence expected returns. On the other hand, the value of the firms' stock price. Not only the monetary assets or financial instruments but also precious metals, oils as one of the key raw materials are directly affected by the change in the exchange rate. For instance, it is predicted; if the real dollar exchange rate rises, firms' profits fall, and so does the firm's share price (Abdalla, 1997). Thus, appreciation or depreciation (or devaluation/revaluation depends on the exchange rate regime) macroeconomic indicators and policies are directly affected by the foreign exchange market (Loudon, 1993).

5.4. The Link Between BIST and Foreign Exchange Market

5.4.1 Data and The Methodology

This study performs the Granger causality test to investigate the relation between the exchange rates and BIST 100 index stock prices from 2009:01 to 2018:06. The data source is the Borsa Istanbul and the Turkish Central Bank.

5.4.2 Augmented Dickey-Fuller ADF Test

Among various testing strategies, this paper firstly tests for "stationarity" of each variable by employing two traditional unit-root test techniques, augmented Dickey-Fuller test-ADF (Dickey & Fuller, 1981), PP (Phillips & Perron, 1988). Augmented Dickey-Fuller ADF tests the null hypothesis that a unit root is present in a time series sample. ADF unit root test utilizes the Modified Akaike Information Criterion (MAIC) to determine the optimal lag length.

Table 9. ADF Unit Root Test

Variable	Intercept		Trend & Intercept		None	
	t-stat	Prob.	t-stat	Prob.	t-stat	Prob.
LNNER	1.612743	0.9995	-2.786880	0.2053	3.012636	0.9993
LNBİST	-1.687852	0.4344	-3.704322	0.0264**	1.291229	0.9496
D(LNNER)	-7.490874	0.0000***	-7.319492	0.0000***	-6.969574	0.0000***
D(LNBİST)	-3.344497	0.0154**	-3.377747	0.0601*	-3.094348	0.0023***

***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

The variables are tested by constant term (intercept), constant and linear trend, and none terms in the ADF unit root test equation. According to test results, the LNNER variable carries unit root in the significance level at 1% and rejects the null of "non-stationarity" in the first difference. So the first difference of the data series of the LNNER is stationary. The LNBİST is stationary while considering a single constant (intercept) and trend in case of the ADF test. The hypothesis of a unit root is rejected in intercept, trend & intercept, and none term (without constant) when the data series are first differenced at least at the 10% significance level for all series, and the variable's data series is stationary. The both LNNER and LNBİST time series are stationary at I (1) first differences.

5.4.3. Phillips-Perron Unit Root Test

The PP test (Phillips & Perron, 1988) for unit roots adopts the basic ADF-related hypothesis, which first calculates the ADF statistics and modifies them to PP statistical values under the circumstance that the error term is allowed to be of weak dependency and heterogeneous variance. According to test results, the LNNER variable carries unit root in the significance level at 1% and rejects the null of “non-stationarity” in the first difference. The data series of the variable is stationary similar to the ADF test. The LNBIST variable is first differenced at the 1% significance level for all series, and the data series stated the stationary.

Table 10. Phillips-Perron Unit Root Test

Variable	Intercept		Trend & Intercept		None	
	Adj t-stat	Prob.	Adj. t-stat	Prob.	t-stat	Prob.
LNNER	1.727991	0.9997	-1.862898	0.6671	3.734754	0.9999
LNBIST	-3.210708	0.0219*	-3.771731	0.0216*	2.015277	0.9894
D(LNNER)	-7.338723	0.0000**	-7.624980	0.0000**	-6.957338	0.0000**
D(LNBIST)	-9.707635	0.0000**	-9.940290	0.0000**	-9.342360	0.0000**

** %1 significance level, *%5 significance level

Table 11. LNNER- Correlogram Level and First Difference in Stationary Analysis

Date: 07/26/20 Time: 23:58
 Sample: 2009M01 2018M06
 Included observations: 114

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1	0.969	109.90	0.000
		2	0.939	213.99	0.000
		3	0.914	313.59	0.000
		4	0.890	408.88	0.000
		5	0.867	500.10	0.000
		6	0.844	587.24	0.000
		7	0.817	669.69	0.000
		8	0.788	747.15	0.000
		9	0.763	820.43	0.000
		10	0.740	890.09	0.000
		11	0.717	956.10	0.000
		12	0.693	1018.4	0.000
		13	0.669	1076.9	0.000
		14	0.645	1131.9	0.000
		15	0.619	1183.1	0.000
		16	0.591	1230.1	0.000
		17	0.561	1273.1	0.000
		18	0.530	1311.8	0.000
		19	0.501	1346.7	0.000
		20	0.473	1378.2	0.000
		21	0.449	1406.9	0.000
		22	0.425	1432.8	0.000
		23	0.399	1455.9	0.000
		24	0.374	1476.4	0.000
		25	0.350	1494.6	0.000
		26	0.326	1510.5	0.000
		27	0.303	1524.5	0.000
		28	0.278	1536.4	0.000
		29	0.252	1546.3	0.000
		30	0.225	1554.3	0.000
		31	0.200	1560.7	0.000
		32	0.177	1565.8	0.000
		33	0.154	1569.6	0.000
		34	0.129	1572.4	0.000
		35	0.106	1574.3	0.000
		36	0.086	1575.5	0.000

Date: 07/27/20 Time: 00:01
Sample: 2009M01 2018M06
Included observations: 113

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.316	0.316	11.589	0.001
		2 -0.018	-0.131	11.626	0.003
		3 -0.039	0.010	11.807	0.008
		4 -0.109	-0.113	13.214	0.010
		5 -0.060	0.011	13.649	0.018
		6 0.112	0.131	15.176	0.019
		7 0.012	-0.090	15.194	0.034
		8 -0.095	-0.074	16.309	0.038
		9 -0.063	-0.016	16.805	0.052
		10 -0.095	-0.069	17.941	0.056
		11 -0.054	0.004	18.308	0.075
		12 -0.028	-0.068	18.409	0.104
		13 -0.154	-0.165	21.475	0.064
		14 -0.075	0.039	22.206	0.074
		15 0.183	0.205	26.658	0.032
		16 0.103	-0.039	28.079	0.031
		17 0.105	0.082	29.572	0.030
		18 0.131	0.060	31.934	0.022
		19 0.065	0.093	32.518	0.027
		20 -0.039	-0.054	32.732	0.036
		21 0.069	0.052	33.408	0.042
		22 0.150	0.134	36.628	0.026
		23 -0.003	-0.094	36.629	0.036
		24 -0.012	0.024	36.649	0.047
		25 -0.068	-0.059	37.340	0.054
		26 -0.093	-0.013	38.623	0.053
		27 -0.003	0.053	38.625	0.069
		28 -0.025	-0.032	38.724	0.085
		29 -0.035	0.034	38.917	0.103
		30 0.014	0.011	38.948	0.127
		31 -0.065	-0.044	39.619	0.138
		32 -0.079	-0.017	40.619	0.141
		33 0.020	-0.019	40.685	0.168
		34 0.054	0.019	41.160	0.186
		35 -0.032	-0.030	41.333	0.214
		36 0.102	0.087	43.091	0.194

The correlogram shows that auto-correlation and partial autocorrelation is among the lagged values of the variable. However, autocorrelation and partial correlation disappear after the first difference. The series is stationary in the first difference. AC auto-correlation function, PAC Partial auto-correlation function. The LNBIST variable in stationary analysis of comparison of the correlogram level and the first difference.

Table 12. LNBIST- Correlogram Level and First Difference in Stationary Analysis

Date: 07/27/20 Time: 00:10
 Sample: 2009M01 2018M06
 Included observations: 114

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.933	0.933	101.76	0.000
		2	0.853	-0.124	187.75	0.000
		3	0.780	0.007	260.18	0.000
		4	0.718	0.043	322.12	0.000
		5	0.664	0.010	375.54	0.000
		6	0.611	-0.026	421.20	0.000
		7	0.563	0.015	460.35	0.000
		8	0.524	0.040	494.60	0.000
		9	0.487	-0.016	524.52	0.000
		10	0.445	-0.059	549.74	0.000
		11	0.405	0.004	570.80	0.000
		12	0.377	0.072	589.23	0.000
		13	0.352	-0.020	605.44	0.000
		14	0.324	-0.032	619.35	0.000
		15	0.308	0.091	632.02	0.000
		16	0.291	-0.029	643.44	0.000
		17	0.270	-0.046	653.38	0.000
		18	0.256	0.063	662.41	0.000
		19	0.250	0.057	671.08	0.000
		20	0.248	0.015	679.73	0.000
		21	0.250	0.022	688.61	0.000
		22	0.253	0.033	697.78	0.000
		23	0.252	-0.006	707.05	0.000
		24	0.253	0.003	716.44	0.000
		25	0.246	-0.047	725.40	0.000
		26	0.236	0.018	733.76	0.000
		27	0.230	0.023	741.79	0.000
		28	0.231	0.032	749.99	0.000
		29	0.232	0.012	758.38	0.000
		30	0.232	0.006	766.86	0.000
		31	0.225	-0.052	774.90	0.000
		32	0.205	-0.076	781.71	0.000
		33	0.195	0.085	787.89	0.000
		34	0.180	-0.056	793.22	0.000
		35	0.159	-0.049	797.47	0.000
		36	0.131	-0.070	800.38	0.000

Date: 07/27/20 Time: 00:12
 Sample: 2009M01 2018M06
 Included observations: 113

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.083	0.083	0.7992	0.371
		2	-0.063	-0.070	1.2612	0.532
		3	0.008	0.020	1.2694	0.736
		4	-0.028	-0.035	1.3629	0.851
		5	0.038	0.046	1.5364	0.909
		6	0.168	0.158	4.9527	0.550
		7	0.002	-0.021	4.9532	0.666
		8	-0.078	-0.059	5.7095	0.680
		9	0.154	0.169	8.6687	0.468
		10	-0.224	-0.273	15.001	0.132
		11	-0.032	0.040	15.129	0.177
		12	0.034	-0.032	15.279	0.227
		13	-0.141	-0.150	17.876	0.162
		14	-0.026	0.026	17.964	0.208
		15	0.177	0.145	22.111	0.105
		16	-0.051	-0.041	22.464	0.129
		17	-0.193	-0.155	27.489	0.051
		18	0.050	0.053	27.830	0.065
		19	-0.103	-0.018	29.302	0.061
		20	0.037	-0.029	29.488	0.079
		21	0.083	0.018	30.452	0.083
		22	-0.038	0.032	30.659	0.103
		23	0.002	0.008	30.659	0.131
		24	0.090	0.031	31.842	0.131
		25	-0.029	0.049	31.962	0.159
		26	-0.089	-0.091	33.134	0.158
		27	-0.015	-0.144	33.168	0.192
		28	-0.126	-0.022	35.579	0.154
		29	0.066	0.052	36.252	0.166
		30	0.177	0.067	41.159	0.084
		31	-0.045	-0.032	41.484	0.099
		32	-0.088	0.009	42.722	0.098
		33	0.021	0.039	42.796	0.118
		34	0.046	0.077	43.150	0.135
		35	0.024	0.001	43.245	0.160
		36	0.038	-0.066	43.487	0.183

The correlogram shows that the series is stationary after the first difference.

5.4.4. Co-integration Test

Table 13. Cointegration Test

Date: 07/27/20 Time: 00:59

Series: DLNNER DLNBIST

Sample (adjusted): 2009M02 2018M06

Included observations: 113 after adjustments

Null hypothesis: Series are not cointegrated

Cointegrating equation deterministics: C

Automatic lags specification based on Akaike criterion (maxlag=12)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
DLNNER	-9.255970	0.0000	-98.07004	0.0000
DLNBIST	-3.051762	0.1073	-38.65601	0.0004

*MacKinnon (1996) p-values.

Intermediate Results:

	DLNNER	DLNBIST
Rho - 1	-0.875625	-1.031626
Rho S.E.	0.094601	0.338043
Residual variance	0.000614	0.002918
Long-run residual variance	0.000614	0.000379
Number of lags	0	8
Number of observations	112	104
Number of stochastic trends**	2	2

**Number of stochastic trends in asymptotic distribution

The Engle-Granger Cointegration Test considers the case that there is a single cointegrating vector. The test follows the very simple intuition that if variables are cointegrated, then the cointegrating regression residual should be stationary. So, The Engle-Granger test was used to examine cointegration between error terms. Already know that both variables are stationary I (1) first difference at unit root tests. By looking at the prob. value, there is no cointegration between variables, and the hypothesis is rejected at a 1% significance level. Variables are cointegrated, and there is a long-term relationship. Granger causality test is applied to examine the causality aspect of this relationship. This test treats both variables as dependent variables (conducts two regressions and uses the error terms obtained) and rejects the tau and z statistics' hypothesis in both variables.

Table 14. The Lag Order Selection

VAR Lag Order Selection Criteria

Endogenous variables: DLNNER DLNBIST

Exogenous variables: C

Date: 07/26/20 Time: 03:58

Sample: 2009M01 2018M06

Included observations: 105

Lag	LogL	LR	FPE	AIC	SC	HQ
0	380.8484	NA	2.52e-06	-7.216160	-7.165608	-7.195675
1	400.3811	37.94929*	1.87e-06*	-7.512021*	-7.360366*	-7.450568*
2	401.0538	1.281358	2.00e-06	-7.448644	-7.195886	-7.346222
3	402.0391	1.839121	2.11e-06	-7.391220	-7.037359	-7.247829
4	403.0153	1.785150	2.24e-06	-7.333625	-6.878660	-7.149264
5	405.5646	4.564417	2.31e-06	-7.305992	-6.749924	-7.080663
6	408.6327	5.376460	2.35e-06	-7.288242	-6.631070	-7.021943
7	409.2122	0.993519	2.51e-06	-7.223090	-6.464816	-6.915822
8	414.4311	8.747744	2.46e-06	-7.246306	-6.386928	-6.898069

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

The lag value of the variables was determined using the Vector autoregression VAR method. The lag was determined according to the information criteria (Akaike = AIC, Schwarz, etc.). The proper lag value is 1, where the information criteria are the lowest level at 1.

5.4.5. Granger Causality (F test)

Table 15. Granger Causality (F Test)

Pairwise Granger Causality Tests

Date: 07/26/20 Time: 04:06

Sample: 2009M01 2018M06

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DLNNER does not Granger Cause DLNBIST	111	0.04085	0.9600
DLNBIST does not Granger Cause DLNNER		12.1658	2.E-05

The Granger causality test is a statistical hypothesis test whether a time series is useful in predicting another time series. If the variables are non-stationary and co-integrated, the adequate method to examine the causal relations is the Vector Error Correction Model (VECM) (Granger, 1988); otherwise, a VAR model is used in the case of no co-integration found among the variables (Granger, 1969).

In the Granger causality test, DLNBIST is not the cause of DLNNER hypothesis was rejected at a 1% significance level. DLNBIST is the cause of DLNNER and the causality runs from DLBIST to DLNNER;

DLNBIST => DLNNER.

Other complementarity statistics and graphs related to analysis are shown as below:

Table 16. LNNER

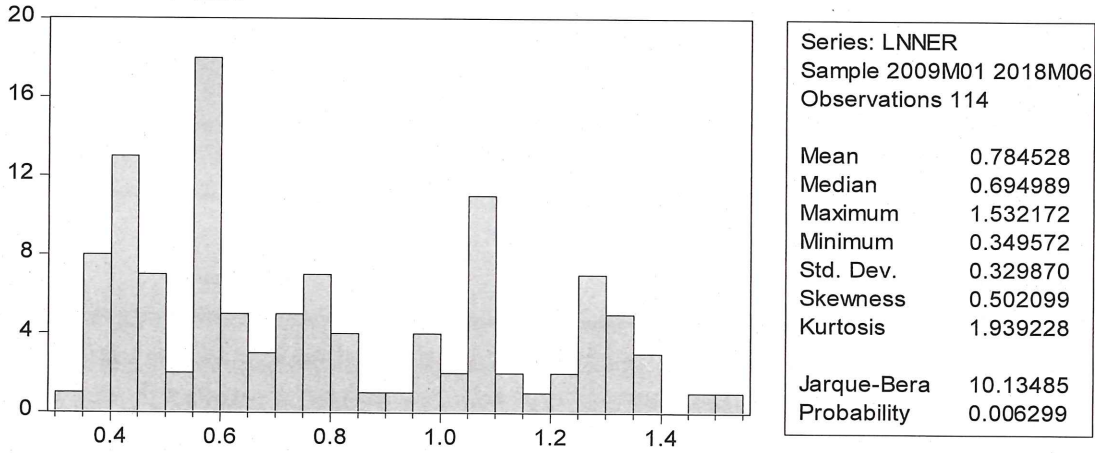


Figure 7. LNNER

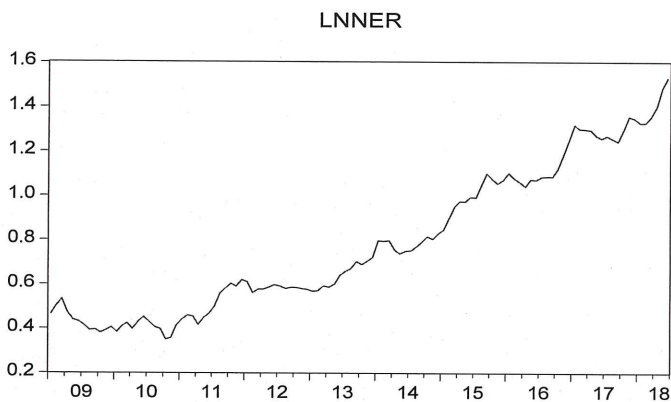


Table 17. 1st Difference of LNNER (DLNNER)

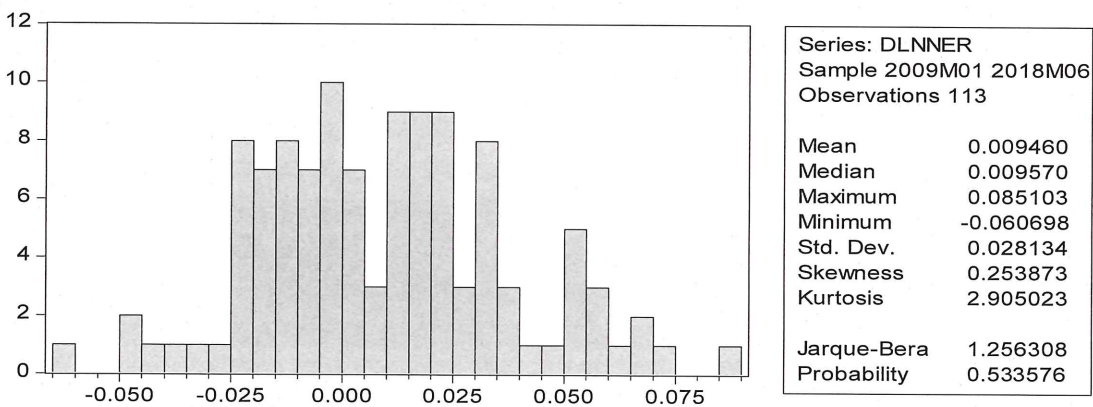
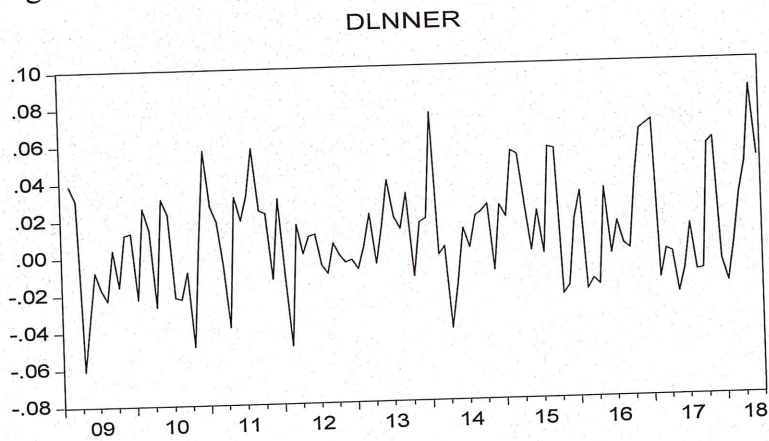


Figure 8. DLNNER



The series does not show normal distribution at the level (see Jarque-Bera Prob. Value 0.006299), but after the first difference at unit root tests showed normal distribution. The first difference would already be used in the analysis because the data series consists of unit-roots.

Table 18. LNBIST

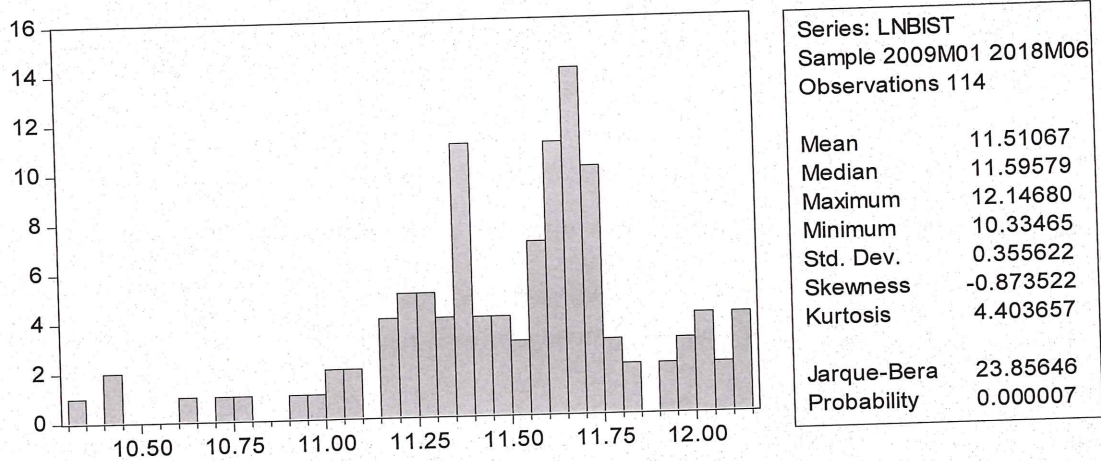


Figure 9. LNBIST

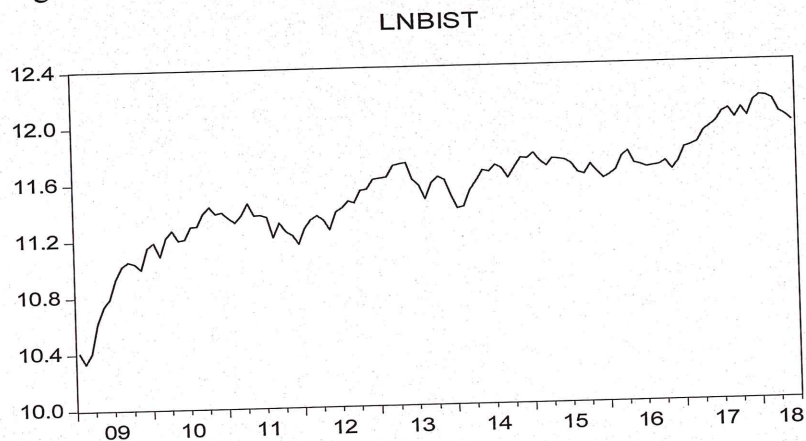


Table 19. 1st Difference of LNBIST (DLNBIST)

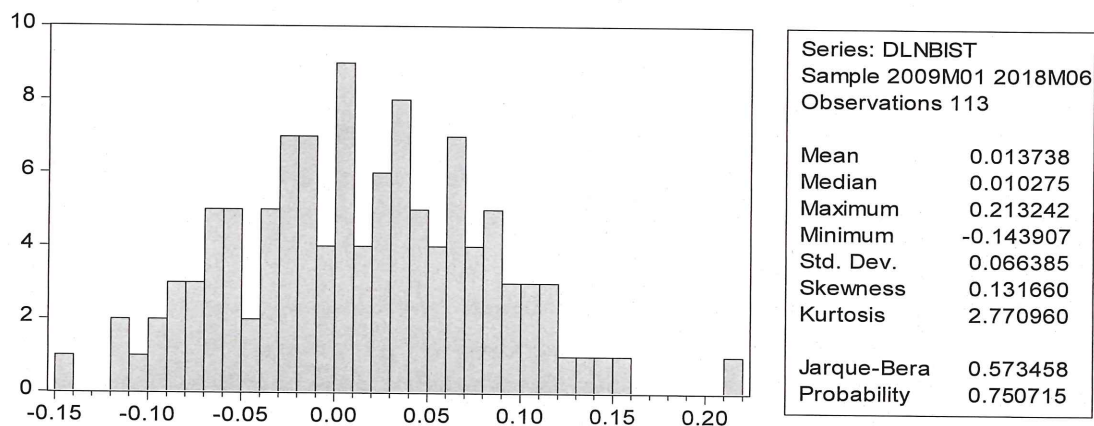
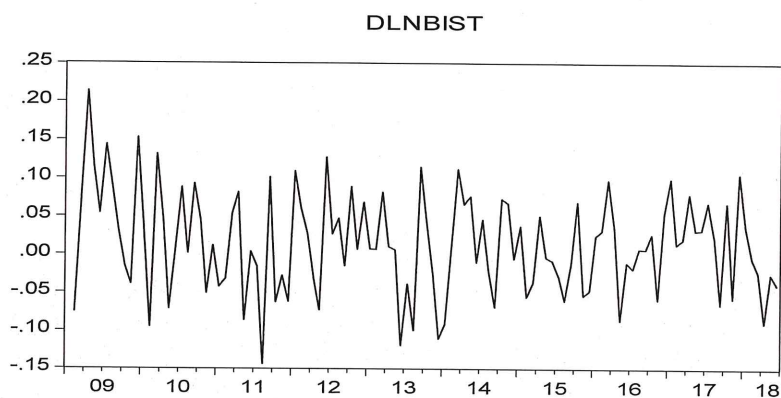
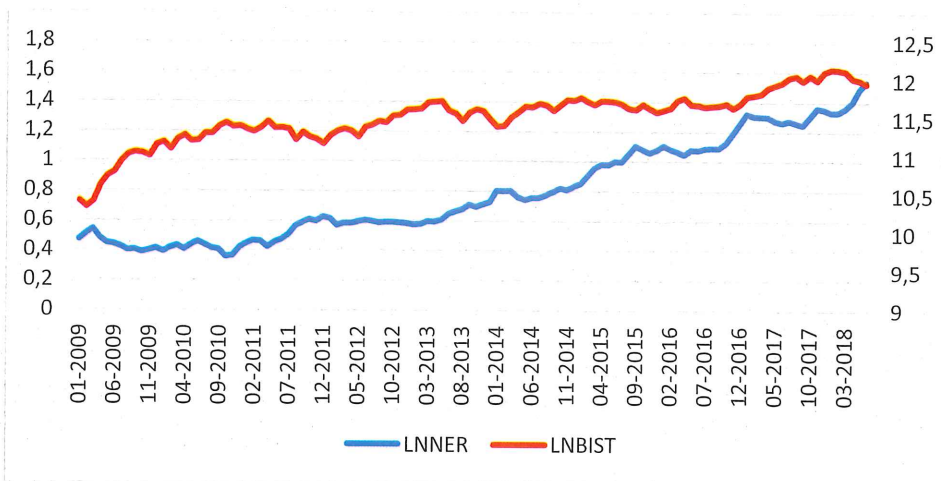


Figure 10. DLNBIST



The series does not show normal distribution at the level (see Jarque-Bera prob. value 0.000007), but after the first difference at unit root tests showed normal distribution(see prob. value (0.750715). The first difference would already be used in the analysis because the data serial consists of unit-roots.

Figure 11. LNNER and LNBIST



5.4.6. Empirical Results

In estimating the Granger causality models, the stationarity of the series involved must be first known. The ADF unit root test and the PP unit root test were performed for the stock prices and exchange rates. The results indicated that the series are non-stationary at their levels but are the first-difference stationary. Results show that DLNBIST stock price Granger causes DLNNER exchange rates of USD and, there is a causal relationship between stock prices and exchange rates of USD from DLBIST to DLNNER. As our test result of cointegration counters this belief and states that the variables are predictable based on the past values of other variables. The data series' stationarity result reveals that there is a chance of profitable speculation in the stock market or foreign exchange market.

CONCLUSION

After the 1980s, financial liberalization in emerging market economies influences individual and institutional investors' investment decisions. Economic, political, and social instability and volatility have negative impacts on financial markets. These factors also increase the spread effect in global markets. In this context, forecasting the value of financial assets became harder for portfolio decisions. Investors and also other economic agents try to choose optimal portfolio under the information asymmetry. As well known, asymmetric information may create two problems moral hazard and adverse selection in financial markets.

This thesis explores the causal interaction between two essential components of Turkey's financial markets: the exchange rates and BIST 100 index stock prices. The period from 2009:01 to 2018:06 is examined in this study using the Granger causality test to find out the direction of this causality. Our test results support the Stock Oriented Model approach that is valid between stock prices and exchange rate. There is a common belief among the investors that there is an association between exchange rates and stock prices. The change in stock price is an important indicator in predicting the direction of the market. Changes in stock prices and exchange rates increase capital inflow. The decline in the stock price and the decrease in local investors' wealth constitutes the demand for money at a lower interest rate. Low-interest rate causes the capital outflow, which may lead to a decrease in the value of the domestic currency.

The results of the empirical tests indicate that stock market granger causes exchange rates. This study's findings may use by the economic agents such as investors and policymakers for the portfolio decisions and reduce uncertainty and risk factors in financial markets. Thus, it is expected that this study is important in terms of being a guide to stock market investors as well as contributing to the literature by revealing the relationship between stock and exchange rate.

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