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MSc Accounting and Financial Management

The Relationship between Share Prices and Macroeconomic Factors: Evidence from Istanbul Stock Exchange

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EXECUTIVE SUMMARY

This paper investigates the relationship and causality between the ISE-100 National Price Index and macroeconomic factors; namely inflation, interest rate, exchange rate, money supply and real economy for the period of 2000-2011. Although the economy of Turkey has developed rapidly and the ISE has showed good performance among emerging markets, there are not enough studies which investigate the relation between the ISE-100 and macroeconomic factors for a period including most recent few years such as 2011. The current paper provides empirical evidence, which shows the relationship and causality between share prices and macroeconomic factors for Turkey during 2000-2011. To achieve the purposed aim, unit root test, correlation analysis, Granger Causality Test is implemented respectively throughout the paper. With the aid of the correlation analysis, the relationship between macroeconomic factors and share price is found for 2000-2011. According the results of the test, share price is correlated to interest rate, exchange rate and money supply negatively. By contrast, the positive correlation between share prices and both inflation and real economy is revealed during 2000-2011. On the other hand, no effects of stock market on real economy, inflation and money supply and the reverse effects are not observed from Granger Causality Test. Besides, the ISE-100 does Granger cause exchange rate used in the study namely U.S Dollar/ Turkish liras and GBP/ Turkish liras according to Granger Causality test. In contrast, it is observed that interest rate causes share prices.

Key words: Share prices, macroeconomic factors, the ISE, Granger Causality, and Correlation Analysis.

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Abbreviations

- ADF : Augmented Dickey- Fuller
- CPI : Consumer Price Index
- CRR : Chen, Roll, Ross
- DF : Dickey Fuller
- EM : Emerging markets
- ER1 : U.S Dollar/ Turkish liras
- ER2 : GBP/ Turkish liras
- GCT : Granger Causality Test
- GDP : Gross Domestic Product
- IP : Industrial Productio Index
- IR : Maximum interest rates on deposits for 12 month
- ISE : Istanbul Stock Market
- ISE-100: Istanbul Stock Exchange National 100 Index
- M1 : Money supply

Chapter-1

Introduction

In modern world, investment has been getting more and more difficult and significant due to the effects of globalization and rapid movements in economic conditions of countries. Although it is fairly vital to correctly predict the value of the investments to get high return from their capital, even investment profession and portfolio managers struggle to decide the value of a specific financial asset. The situation becomes more difficult for risky financial assets especially stocks, which are one of the most significant financial instruments for most of investors. In this case, the impact of macroeconomic conditions on stock prices has been an attractive and hot issue in economy in last few decades.

So far, a significant number of studies have investigated the relation between macroeconomic factors and share prices to be useful for investors, who need to predict the value of financial assets correctly. Apart from developed countries, the relation has been investigated for emerging markets by several researchers especially in recent years. Like these studies, the main purpose of the paper is to investigate the relation and causality between share prices (ISE-100) and macroeconomic factors; namely inflation, interest rate, real economy, exchange rate and money supply for Turkey during 2000-2011. Several theories were asserted to explain the relation and causality between share returns and macroeconomic factors. Besides, some models were devoted to investigate the subject empirically. Although important relation between stock prices and economic factors were mostly observed for both developing and developed countries, there is yet no consensus concerning neither the signs of relation nor the direction of causality.

This paper becomes interesting and important when working on a developing market which has been getting more attractive to investors in especially last decade. The study is also more attracted by examining a country in which robust movements were observed in economic conditions in especially 2001 due to the deep financial crisis. To overcome this deep crisis, the government of

Turkey took new policies in 2002 and indeed this year has become one of the most important years for Turkey's economy. In other words, the effects of the crisis have maintained since around late 2002s and Turkey has started a new era at the end of the year. The economy of Turkey has been showing a growing performance since 2003. Due to the improvements in the economy, Istanbul Stock Exchange has showed better performance after 2002. Merely in 2008, global crisis affected both economic conditions and stock market in Turkey. Nevertheless, share returns and macroeconomic factors recovered fast. Because of the all improvements in Turkey's economic conditions, Turkey has become an attractive emerging market for both foreign and local investors.

To achieve the purposed aim of the study, the data of variables used in the study is collected from Central Bank of Turkey, the ISE and Turkish Statistic Institute. To analyse the data, unit root test, correlation analysis and Granger causality model were used. With the aim of the unit root test, the time series used in the study are examined in terms of their stationary. Later, one of the main aim of the paper, which is to find out the correlation between the ISE-100 and selected macroeconomic variables, is found by using Correlation Analysis. Finally, Granger causality model is applied to reveal the causality between the variables.

The rest of the paper is organized as follows: Chapter 2 presents the theoretical background of the relation between share prices and selected macroeconomic factors for different countries and different periods by drawing upon empirical results from previous studies; Chapter 3 refers to the evolution of macroeconomic conditions and the stock exchange of Turkey; Chapter 4 offers methodology and data; Chapter 5 presents the empirical results and their analysis. Finally; Chapter 6 presents the conclusions and limitations of the study.

Chapter-2

Literature Review

In literature, a great number of studies sought to find the correlation between stock exchange and macroeconomic factors. These studies typically examined this correlation in terms of economic theories and empirical results. Like them, the current paper investigates the relation between the ISE-100 and selected macroeconomic factors; namely money supply, interest rate, inflation, exchange rate, and real economy. Thus, this chapter is devoted to examine previous academic work regarding to the relation between share prices and macroeconomic factors.

All sections of this chapter discuss the background of conceptual framework and empirical results. However, it should be pointed out that several methods such as regression analysis, correlation analysis, co integration model, granger causality test, scatter plot were developed to find the relationship between macroeconomic factors and share prices empirically. Although this study applies only correlation analysis and granger causality model, which are examined in details in Chapter-4, all academic studies applying different methods are presented in the following sections of this chapter.

The current chapter is divided into five sections. First section discusses the relation between share returns and inflation; second section gives information about the relationship between share prices and interest rate; third section and fourth section provides information regarding the relation between share prices and money supply and the relation between share prices and exchange rate respectively. And the final section discusses the link between share returns and real economy.

2.1 Real Economy and Share Returns

The relation between real economic activity and share prices has become one of the popular topics in economy in last decades. Although the empirical results concerning this relation are mixed; it was widely suggested by theories that real economic activity has a positive impact on stock prices. Likewise, empirical findings mostly showed positive relation between these variables.

In literature, several ways were suggested to proof the positive relation between real economic activity and stock prices. One of the most popular ways to explain the common belief is as follows. Upward trend in real economy such as GDP growth generally brings about greater revenues and profits for the companies, together with a great volume of cash flows, which therefore results in an increase in the stock prices (Erdogan and Ozlale, 2005).

On the other hand, Fama (1981) concluded the positive relation between real economy and share prices by presenting different explanation. He suggested that the positive relationship between stock prices and real economy is concluded by the negative correlation between inflation and, both real economy and stock prices. Namely, inflation affects real economic activity and stock returns negatively; hence it actually shows that the direction of both stock returns and economic activity is same according to the effects of inflation on them. Besides, Fama (1981) showed his suggestions with empirical evidence for U.S stocks. The theory also shows that other macroeconomic factors should be taken into consideration when considering on the correlation between one of macroeconomic variables and stock prices. Since, there is a crucial interaction between macroeconomic variables, which affects stock market.

When it comes to empirical results, most of them supported the theories whereas the opposite side was observed from some of empirical findings. Especially for U.S, a considerable number of studies conducted a positive linkage between share returns and real activity in economy. For instance, Fama (1981, 1990), Chen, Roll and Ross (1986), Kaul (1987), Barro (1990), Schwer (1990), Lee (1992) suggested that economic activity plays a central role in any

story about the variation of stock price by observing strong positive relation between U.S stocks and real economy. Similarly, most of developed markets have been affected by real economy positively. However, the manner between real activity and stock returns showed differences among even developed markets. As an illustration, Poon and Taylor (1991) carried out a set of test, which were used first by Chen, Roll and Ross (CRR) in 1986, to explore whether the findings of CRR for the US can be expended to London Stock Exchange. Although IP had a central role on the stock returns of the US, Poon and Taylor (1991) did not observe the similar effects of IP on London Stock Exchange in the manner described by CRR's findings for U.S stocks.

On the other hand, the types of economic activity in countries can affect the manner or direction of the relation between real economy and stock prices. Indeed, Mullins and Wadhwani (1989) showed that the correlation between real economy and stock returns in the UK and US is stronger than Japan and Germany. They attributed the difference to the higher possibility of mergers and acquisitions, lower gearing ratios, more pervasive use of stock option schemes in remuneration of top executives, and little role played by workers in decision making in the both U.S and UK. Likewise, liquidity of stock markets can have impact on this relationship. Lyocsa, Baumohl and Vyrost (2011) used the Granger Causality Framework to analyze the relation between stock returns and real activity in 4 central European countries namely Poland, Czech Republic, Hungary and Slovakia for the period 1996- 2009. They observed weak effect of economic activity on stock markets of these countries. They gave the low market liquidity as a reason of this weak impact.

By contrast to economic theories, positive relation between share prices and macroeconomic variables were not supported by some papers. For example, interestingly, Liljeblom and Seniues (1997) revealed negative relation between the volatility of stock prices and trading volume growth for Finland during 1920 and 1991.

As mentioned, the types of economic activity existing in countries affect the linkage between stock prices and real economy. Thus, it could be expected that the link between economy and stock market can show differences between emerging markets (EM) and developed markets. Indeed, a number of differences between EM and developed markets were revealed in literature. For instance, emerging stock markets are typically unstable and shadow, which results in higher volatility stocks. Additionally, they have generally low financial market liquidity (Erdogan& Ozlale, 2005). On the other hand, Tsouma (2009) found that economic activity includes important information regarding future stock return for more than half of EM under examination, whereas the same holds merely for a negligible number of developed markets. However, the forecasting ability running from stock returns to real activity is observed for a smaller group of emerging markets relative to mature markets according to Tsouma (2009). Nevertheless, the positive relation between stock prices and real economy was found for most of developing countries.

For Turkish stock market which is one of the emerging markets, variety of empirical results is found by several researchers. While Erdogan and Ozlale (2005) and, Tunali (2010) found positive and significant relationship between economic activity and stock returns for the ISE, Kandir (2008) revealed no effect of economic activity on the ISE. On the other hand, Kaplan (2008), Karamustafa and Kucukkale (2003), Kirankabes and Basarir (2012) observed a cointegration relationship between economic real activity and Turkish stock returns. However, when Kaplan (2008) found stock market returns as a helpful indicator of real economy to stock return. Like Kaplan (2008), Kirankabes and Basarir (2012) observed one-way causality running from Turkish stocks to GDP in the period between 1998 and 2010. By contrast to the positive relationship, Buyuksalvarci (2010) observed that IP has a negative effect on the ISE-100.

On the other hand, Erdogan and Ozlale (2005) pointed out that financial crisis affects the correlation between macroeconomic variables such as the relation between IP and stock prices; hence the relation does not stay intact. As an illustration, they generally found a positive impact of IP on the ISE whilst the positive effect disappeared the period that begins with the 1994 financial crisis and maintains with 1977 Asian crisis. Similarly, Schwert (1989) revealed that the relationship between real economic activity and stock returns can show

differences during recession. In addition to the effect of recession on the relationship, Kanas and Ioannidis (2010) revealed the impact of regime switching on the correlation. According to their findings, no evidence of causality from real stock market returns to the industrial products growth rate was observed in the high stock market volatility regime, whereas some evidence was found for the correlation in the low stock market volatility. As a result of the factors, Stock and Watson (1990& 1998) concluded that the correlation between real economic activity and stock market returns has not been stable over time.

2.2 Inflation and Share Prices

The effect of inflation rate on stock market returns has been a significant theoretical issue for a number of years. Besides, the issue has become a highly controversial topic in the sense of empirical results; since inflation rates vary around the world over time. Especially, the rate shows differences between developed and developing countries; hence finding a stable theory or empirical evidence has been getting more difficult in last decades due to the different economic conditions in several countries.

In the literature, the basic theoretical idea was typically attributed by Fisher (1930) who suggested that anticipated real asset returns should move one for one with anticipated inflation by leaving real returns rate independent of nominal return. In other words, Fisher hypothesis claimed that the inflation rate and stock returns move in the same direction; hence it indicates a positive linkage between inflation and share prices. Fisher (1930) also suggested common stocks as a good hedge against inflation. This hypothesis has been widely accepted by a great number of practitioners/ academicians and therefore Fisher (1930) has become one of the most crucial researchers for this subject, who contributed the development of this topic in its history. Fisher hypothesis has also become universal by having the slope between anticipated nominal return rate and anticipated inflation, which should be 1 for all countries in all time-

periods. However, assuming same slope in all countries for all periods is rather debatable issue in the literature. Since, economic conditions of all countries show differences quickly over time due to several financial crises in the world. As a result, accuracy of taking the same slope for all countries in all timeperiods has been discussed for many years.

Despite the limitations of Fisher hypothesis, a number of researchers supported Fisher hypothesis by showing a positive relation between shares and inflation in several countries. For instance, Solnik and Solnik (1997) showed the positive relationship for long and short run in 8 advanced countries, including the US, Germany, France, the Netherlands, the UK, Switzerland, Japan, Canada, for the period 1958- 1996. Additionally, Cozier and Rahman (1988) failed to reject Fisher model for Canada.

By contrast Fisher hypothesis, Fama (1981) correlated the common stock returns negatively to both expected and unexpected inflation by showing the negative relation between inflation and real output growth as a reason. Since, there is a positive relation between share prices and real output growth; hence the direction of the correlation between inflation and share prices should be same with the direction of the correlationship between inflation and real output growth. Namely, the negative relationship between stock market and inflation arises from another relation between share prices and another macroeconomic variable. This theory was called "Proxy hypothesis" supported by several papers.

Indeed, a number of papers rejected Fisher hypothesis and supported the proxy hypothesis of Fama. For especially the US, the negative linkage was generally shown by several researchers such as Bodie (1976), Jaffe and Mandelker (1976), Fama (1981), Geske and Roll (1983), Pindyck (1984) and Chen, Roll and Ross (1986), Kaul (1987). Similarly, Oudet (1973), Nelson (1976) found that common shares in USA are poor hedges against inflation. Gultekin (1983) also found predominantly negative regression coefficients in 26 countries, including USA, UK, Canada, Italy, France for the period 1947- 1979 using time-serious regression. According to his findings of cross sectional, during the 1947-1963 period, inflation was decreasing from the peak levels of the post war

period, whereas stock price were above the inflation rates of most countries. During the 1964-79 periods, however, inflation was increasing and stock returns were less than inflation rates in all countries apart from Canada and South Africa. Namely, stock returns decreases with increasing inflation in most countries Gultekin (1983) examined.

On the other hand, Poon and Taylor (1991) did a different research to examine the effects of different macroeconomic conditions on the relationship between inflation and stock returns. Indeed, they found out that highly volatile economic conditions have an impact on the linkage between shares and inflation; because the effects of unexpected inflation on stock returns can be observed when these variables are highly volatile. Similarly, Kim and In (2005) found positive linkage between stock market and inflation in short (e.g. a month) and long terms for the US. Interestingly, they observed a negative linkage in the medium term. Because of the conflict results, they concluded that the linkage between the two variables depends on the terms in length and change in time. In fact, these findings show us that the correlation between inflation and stock market can show differences according to fluctuations in the macroeconomic factors and time periods. (Erbaykal et al., 2008)

Likewise, Saryal (2007) found that inflation rate is one of the most significant determinants of the volatility of stock market notably in highly inflated countries like most of emerging markets. Thus, the relationship can show differences between emerging countries and developed countries. As an illustration, Saryal (2007) investigated the relationship between share prices and exchange rate for Canada and Turkey. She observed that inflation rate has great predictive power for the volatility of share returns in Turkey whereas it is weak in Canada. According to these results Saryal (2007) conducted that higher inflation rate results in higher stock market risk. Indeed, Apergis and Elefheriou (2002) correlated the inflation to share return strongly in Greece, which is one of the high inflated countries. Gultekin (1983) also found that countries with great inflation rates are associated with great nominal stock price. Similarly, Gultekin (1983) observed that the stock return- inflation relationship is not stable over time and the relationship shows differences among countries. Especially for

developing countries, different empirical results concerning the relationship were observed. While Omran and Pointon (2001) uncovered the linkage negative between inflation and stock market in Egypt and Choudhry (2001) found the stocks of Argentina, Chili, Mexico, and Venezuela as good hedge against inflation whereas Adrangi and others (1999) supported the validity of Fama proxy for Peru and Chile. (Erbaykal et al., 2008). Like them, different results were observed for Turkey . Erol and Aydogan (1991) found that portfolio returns are affected sensitively by macroeconomic factors as well as changes in unexpected inflation. Besides, Muradoglu and Metin (1996) and, Erbaykal and others (2008) supported the validity of proxy hypothesis of Fama for the ISE. By contrast, Kandir (2008), Sari and Soytas (2005), Tursoy and others (2008) observed no effect of inflation on stock exchange.

Briefly, the relation between inflation and share prices is one of the most debatable topics in economy in terms of theories and empirical results; since inflation rate varies in different countries for different periods. It mostly seems that the variation affects the relation.

2.3 Exchange Rate and Share Prices

In literature, two main theoretical models have been asserted to explain the correlation between stock returns and currency (Stavarek, 2004 & Georgios, 2011). One of these is "flow-oriented model", called "the goods market models" as well, and was suggested by Dornbush and Fischer (1980). According to this model, the currency rate is decided largely by the currency account and trading balance performance of a country. It claimed that changes in currency influence international competitiveness and trade balance by having an impact on real economic activity. Thus, Dornbush and Fisher (1980) suggested that stock returns should decrease in response to increasing the value of domestic exchange rate due to less favourable terms of trade. As a result, the positive relationship between exchange rate and stock returns running from currency to stock returns was asserted according to "flow-oriented model". In contrast,

second approach, "stock oriented models", also known "Portfolio Balance Sheet", suggested a negative relationship between exchange rates and stock returns running from stock returns to exchange rates. The assertion was explained as follows: an increase in local domestic stock prices brings about the appreciation of local currency though direct and indirect channels. Since an increase in returns encourages investors to buy or hold more domestic assets which results in an increase in demand of domestic currency increases its value (Stavarek, 2004 & Georgios, 2011).

However, in reality, the relationship is not fairly easy like theoretical models. As an illustration, Solnik and McLeavey (2009) discussed whether currency factor shows differences according to shares of exporting and importing firms. They suggested that an importing company could be affected positively by an appreciation of local currency whereas the reserve would be true for an exporting company. Besides, they claimed that exchange rate exposures can be prevented or cancelled if the firm adopts an exchange rate-hedging policy in its business operations.

In terms of the empirical evidence, there is a large variety among the studies. The first paper regarding to the relationship between exchange rate and share prices is a study done by Franck and Young (1972) who observed no significant correlation between the U.S stocks and U.S dollars. In contrast, Soenen and Hennigan (1988) and both Aggarwal (1981) and Jorion (1990) found robust positive and negative relation between U.S dollar and share prices respectively. Interestingly, according to Ajayi and Mougoue investigating eight industrial countries (1996), there was a negative short-run effect of increase in domestic stock prices on the value of domestic currency while its reverse was true for long-run. Additionally, Chamberlain and others (1997) worked on the U.S and Japan banks. While they observed positive and strong relationship between the US banks and exchange rate, solely a few of the Japanese banks' share prices moved with the currency rate.

When it comes to emerging markets, Wongbango and Sharma (2002) supported Portfolio Balance Sheet model by observing negative relationship between stock prices and exchange rate in Singapore and Thailand whereas

flow-oriented model was support by the reverse correlation for Indonesia, Malaysia and Philippines. By contrast, Yu (1997) observed no causality for Singapore. Similarly, Muhammad and Rasheed (2003) found no correlation between exchange rates and stock return in Pakistan and India for both long and short- run. Additionally, they observed a bidirectional linkage in Bangladesh and Sri Lanka. Bartram and Bodnar (2012) observed significant differences between developing and developed countries for the relationship between exchange rate and stock prices. While the average return on local currency depreciation and appreciation in developing countries was fairly significant, the stock returns' impact on local exchange depreciation and appreciation in developed countries is non-significant.

On the other hand, Portfolio Balance Sheet model was supported by much empirical results in terms of correlation and causality between exchange rate and share prices for Turkey. For instance, Akkum and Vuran (2005) and Buyuksalvarcı (2010) observed the negative relation between exchange rate and the ISE and also Kasman and others (2011) showed the negative and significant relation between exchange rate and share prices of Turkish banks. By contrast, Yildirtan (2007) observed no relationship between exchange rate and the ISE 100 index. On the other hand, Erdogan and Ozlale (2005) reported that currency appreciation has a positive impact on stock price until the financial crisis in 1994; whereas the situation was completely reserved afterwards.

As result of the conflict empirical findings and theories, it was concluded that the relationship between exchange rate and stock prices can vary in different time periods across countries. In addition, the types of companies namely exporting or importing types of companies also have an impact on the relationship. Thus, in reality, the relation between exchange rate and share prices is not easy to be explained (Wong and Li, 2010).

2.4 Interest Rate and Share Prices

Stock exchange and interest rate are two crucial financial instruments for investors to get high return from their capital; therefore both of them are also two significant factors of a country's economy (Alam, 2009). Due to the importance of the two items, the linkage between them has been attracted by a number of papers in literature (Flannery& James, 1984).

Interest rate is generally thought as the cost of capital; namely the price paid by bank for the use of capital for a certain period of time. On the other hand, stock exchange makes it possible for the overall economy to ensure long-run commitments in real capital. A number of investors consider whether bank account or share gives more return from their capital. Thus, the relationship has been tried to be explained by applying several ways. In general, there is a common belief that the linkage between share returns and interest rates is negative. Basic idea says that great interest rates induce the investors to keep their capital in saving bank accounts to get great return from their capital rather than putting the money into risky stock market. The reverse of the explanation is also true; since investors are most likely to switch their capital from bank to stock market if the risk free returns for stocks decrease or the return from shares increases. As a result, interest rate is correlated with stock market negatively. The another explanation claims that the great lending interest rate also causes a decrease in the investments in the economy, which leads to a decline in the share price. Briefly, all theories concerning the relationship between interest rate and share prices showed the same result by using different explanation (Flannery& James, 1984).

When it comes to empirical results, a number of papers showed a negative relation between interest rate and stock returns for both developing and developed countries. In fact, it could be expected that the effects of interest rate on share returns can show differences in emerging markets when comparing those on developed countries' shares due to the high inflation rate in emerging countries; hence high interest rate according to Fisher (1930) who claimed that interest rate follows inflation. However, empirical evidence generally showed

negative effects of interest rate on stock markets of both developed and developing countries. As an illustration, according to Rigobon and Sack (2004), NASDAQ index was affected negatively by an increase in short-term interest rate. Leon (2008) observed negative and significant relationship between interest rate and stock price in Korea. For South Africa, Coetzee (2002) revealed important and negative linkage between interest rate and stock prices during 1991- 2001 for both long run and short run. For another emerging market Karachi Stock Exchange, negative effect of interest rate on stocks was found by Rehman and others (2011).

As the other countries, it was typically found by a number of papers that interest rate was correlated with the ISE negatively although the interest rate varied in last decades. Until the financial crisis of 2001, Turkey had experienced great inflation rate; hence great interest rate. Indeed, on February 21, 2001, the government suggested the rate of interest of 144% per month treasury bills. However, after 2004, Central Bank of Turkey generally offered less than 10% interest rate. Despite rapid movements in the interest rate, the results are consistent with the theory in last few decades. As an illustration, Tunali (2010), Muradoglu and Metin (1996), Kandir (2008) and Buyuksalvarci (2010) revealed a negative linkage between interest rate and stock returns in Turkish stock markets. By contrast all the results, Tursoy and others (2008) did not observe any significant correlation between interest rate and Turkish stock returns. Nevertheless, generally, there is a negative relationship between stock returns and interest rate in Turkey.

Apart from getting high return from the capital of money, investors are interest in the causality between interest rate and share prices to predict the future movements in share price or interest rate. However, it is also open to discussion whether interest rate causes share returns, or vice versa. Theoretically, it is generally expected that movements in interest rate cause movements in share prices; since increase in the interest rate brings about reduction in the present value of future dividend payments, which depresses share prices. For Turkey, different results concerning the causality between share prices and interest rate were observed. For instance, Ozturk (2008) found that merely the lagged overnight interest rate does Granger cause stock prices whereas stock prices do Granger causes both interest rate of treasury and overnight. According to Acikalin and others (2008), movements in the ISE did merely Granger cause of the rate of interest, but its inverse was not true.

Briefly, the relation between interest rate and stock prices is quite consistent while comparing the relation between share prices and one of the other macroeconomic factors. Since, much empirical results, which were found by even different models, showed negative relation between share returns and interest rate by supporting economic theories. However, same consistency cannot be claimed for the causality between interest rate and stock prices.

2.5 Money Supply and Share Prices

Several theories and a number of papers tried to explain the correlation between money supply and stock return. However, neither theory nor the empirical evidence provided a unanimous suggestion for the linkage between money and stocks.

It has been long discussed whether money supply is a predictor of stock returns. While some, including Hamburger and Kochin (1972), assumed grown in money as a predictor of stock prices, a number of studies, such as Pesando (1974), Rogalski and Vinsco (1977), Rozeff (1974) assumed changes in money supply are not predictions of stock returns (Heimonen, 2010). Since, efficient market theory explained that merely anticipated changes in monetary policy will affect stock market (Bernanke& Kuttner, 2005).

On the other hand, according to Hamburger and Kochin (1972), it appeared to be generally that the effect of money on aggregate stock prices is mostly indirect by working mainly through its influences on inflation rate. It is explained as follows. Money leads to an increase in liquidity, which influence stock returns negatively according to Fama theory (1981). Since, a rise in liquidity generates anticipations of inflation bringing about a decline in aggregate supply. Lower output results in a lower dividend that is a reason of a decline in stock returns (Fama, 1981). By contrast, Homa and Jaffee (1971) suggested that an expansion in the money supply should lead to an increase in stock returns by raising the anticipated growth rate of dividends. Similarly, according to another hypothesis, money affects stock prices indirectly by working primarily through its impacts on the corporate earnings. Keran (1971) explained that changes in money supply have little direct influence on the stock price, but a main indirect effect on stock return through their effect on corporate earnings expectations. Jafari and others (2011) explained the theory as follows. When the corporate earning is affected by an expansion of the money, it would likely result in increased future cash flows and stock prices. As seen from different hypothesis, the variable of money supply could be related to stock prices in several ways.

In terms of empirical evidence, findings regarding to the relationship between money supply and stock returns are mixed. Jensen and Johnson (1995) showed direct evidence that monetary policy has an impact on stock returns in the U.S. They also observed that anticipated stock price are importantly greater during expansive monetary policy periods than restrictive periods. For the UK, Gunsel and Cukur (2007) observed that the effects of money supply on stock returns can vary by industry. Since they revealed that there is a positive relationship between money supply and stock returns in the UK for some industries/ companies whereas a negative linkage between money supply and stock price was found for others in the UK.

For emerging markets, Wongbangpo and Sharma (2002) reported the relationship for five Asian countries. According to their findings, there was a negative and long-term linkage between stock price and money supply in high inflation countries Indonesia and Philippines, whereas the money growth in Malaysia, Singapore and Thailand had a positive effect on stock prices. For South America, results are mixed as other results. While a money supply shock had a significant and negative impact in Brazil and Argentina, money supply is non-significant factor for stock returns in Mexico and Chile.

When it comes to Turkey, findings are mixed as other countries. While Yildirtan (2008) revealed the negative effect of money supply on Turkish stocks, Kandir

(2008) and Tursoy and others (2008) showed money supply as a nonsignificant factor on ISE. By contrast, Buyuksalvarci (2010) and Tunali (2010) found a positive and significant impact of money supply on stock returns for Turkey. Likewise, Muradoglu and Metin (1996) observed the positive correlation and explain it as follows. Monetary expansion enhance investors' budget and they invest in stocks, which results in an increase in stock prices.

To conclude the relation between share prices and macroeconomic factors, it mostly seems that empirical results and theories are quite mixed in last decades; since there are several external and internal factors affecting this relation such as global crisis in the word, economic conditions of countries and features of stock markets.

CHAPTER-3

Macroeconomic Conditions in Turkey and the ISE

The current chapter refers to recent macroeconomic conditions in Turkey and, history/ trend of Istanbul Stock Exchange. The first section of this chapter focuses on macroeconomic conditions of Turkey during 2000-2011. To discuss the crucial events in details for these years, this period is divided into three terms; namely 2000-2002, 2000-2008, and 2008-2011. In the second section, information concerning about history/trend of the ISE is provided in order to be helpful for the next steps of the paper.

3.1 Recent Trend in Economy of Turkey

Turkey's economy faced with crucial challenges and changes during the last decades. Surprisingly, economy of Turkey has moved from both great public debt and high- inflation environment to much stable economic condition. Because of the several International Monetary Fund backed programmes, public sector's role in the economy has been reduced. Besides, financial sector reforms were completed after the deep financial crisis of 2001 and these reforms helped to improve public debt dynamics, which were supportive for the recovery period in Turkey's economy.

Furthermore, Turkey has been taking benefits from the increased foreign investors' interest as a number of developing countries; therefore the condition has been attracting capital flows from both direct investment and portfolio flows. As a result of development in economy, the inflation rate was tamed and GDP growth has increased significantly after the crisis of 2001.

However, Turkey faced the global crisis of 2008 after the recovery process. The financial crisis was different from 2001 crisis; since it was a global crisis and had an impact on the economy of Turkey via the deterioration in external financial environment, and weakening foreign trade. Besides, the final IMF agreement ended in May 2008; therefore Turkey had to deal with the crisis without external support. Nonetheless, Turkey overcame the crisis successfully and even the GDP growth in 2010 was more powerful than expected, while inflation rate was still tamed (Fikirkoca, 2011)

To discuss the Turkish economy during 2000-2011 in details, the sample period is divided into three terms; namely 2000-2001, 2002-2008, and 2008-2011.

First Period, 2000-2002: Great inflation rate was a chronic and structural problem in the Turkey's economy for 1990s. In 2000, Turkey was still suffering with the great inflation and also public debt position was a steadily worsening

issue. Furthermore, increase in the fragility of banking sector was observed in its economy for this year.

On the other hand, current accounts deficit was one of the most permanent issues faced by economy of Turkey like great inflation. For Turkish economy, current account rate is used as a signal of a potential financial crisis if it comes close to around 5%. Indeed, a great current account deficit rate was experienced during 2000-2001 before the deep financial crisis of 2001 (Central Bank of Turkey).

In 2001, Turkish economy got from bad to worse. In January 2001, the initial signal of the economic slowdown was observed. In late January, maturities in Treasury bill auctions became short and the rate of interest increased to around 70% in February by treating the domestic public loan's sustainability. Finally, on the 19th of February, Turkey has experienced one of the deepest financial crises in its recent history. It faced a dramatic decrease in Gross National Product from \$201.4 billion to \$148 billion during 2000-2001. Domestic currency depreciated by around 30%. The rapid depreciation of the local currency led to damage in the balance sheet of private sector notably banking sector, which had already been shattered by the shocks of the rate of interest. Real GDP of Turkey collapsed by 7.5% in 2001, the rate of inflation jumped to 73.2%, and the unemployment rate increased from 5.5% in 2000 to the peak of 12.3% after the crisis (Okumus& Karamustafa, 2005).

To prevent the deep financial crisis, Turkish government developed some policies in 2002 and a new era for Turkish economy has been started.

Second Period, 2002-2008: 2002 is a turning point of the recent history of Turkey's economy; since Turkey began a new IMF and World Bank- endorsed stabilisation program by aiming robust disinflation, fiscal discipline and structural reforms in the sector of banking system and privatisation goals. Furthermore, the EU convergence process has backed in the sense of political and structural reforms in 2005. The new framework of European Union integration has led to powerful developments for the long-term expectations and sustainability of the reforms (Yorukoglu& Cufadar, 2008).

Indeed, these policies resulted in favourable economic conditions in Turkey. Especially, the decrease in the inflation rate was impressive. As seen from the graph1, the rate declined from around 70% to single digits during 2001-2004. Moreover, single digit level in the rate of inflation has maintained for the period of 2004-2007. Besides, fiscal discipline, privatisation and low inflation rate have led to reduction in the public sector pressure on the interest rate. Hence, real interest rate has also decreased to single digits like inflation rate.

As inflation and interest rate, the improvement in the growth rate of GDP was crucial. While the GDP growth rate decreased by -9.8 in the last quarter of 2001, the rate reached to 11.1 % in 2002. Furthermore, the growth rate was favourable during 2002-2007 (Turkish Statistical Institute).

Third period, 2008-2011: The year of 2008 is one of the most significant years for Turkish economy as the economy of many other countries. Since, the countries have faced a severe global crisis in the last quarter of 2008. Until the global crisis, the figures of macroeconomic variables such as GDP growth, inflation, and unemployment rate were favourable in Turkey. However, the global financial crisis was affected Turkish economy through deterioration in external financial environment, depreciation in Turkish currency, down trend in foreign trade. As a result, the inflation rate increased from single digits level to 10.1 % in 2008. Moreover, after 2001, it was the first time the economy of Turkey faced negative GDP growth in the last quarter of 2008. Private sector also has been affected by the global crisis due to the depreciation in local currency and down trend in foreign trade. As a result, unemployment rate has increased significantly.

Until the last quarter of 2009, the effects of global crisis has maintained as seen from the negative GDP growth rate; namely -14.7 %. Nevertheless, Turkey overcame the crisis without any external support. Indeed, more than 10% in the GDP growth was observed after crisis and the high growth rate has maintained in 2011. Because of the great GDP growth rate, Turkey has become one of the fastest growing countries in the world. Besides, the inflation rate decreased to single digits again in 2009 and 2010 (Central Bank of Turkey& Turkish Statistical Institute).



Graph 3.1: Inflation rate during 2000-2011

Graph 3.2: Growth Rate in GDP during 2000-2011



Source: Turkish Statistical Institute

3.2 History and Recent Trend of Istanbul Stock Exchange

The ISE was founded on the 26th December, 1985 to ensure securities traded in a secure, stable, fair and transparent environment, and commenced to operate on January 3, 1986. The Istanbul Stock Exchange has made contribution to the development of Modern Turkish Capital Markets and the economy of Turkey since the date of its founded.

Furthermore, the ISE National- 100 Index concerned by the study is the continuation of composite index started with 40 firms' stocks in 1986 and limited 100 firms' stocks in due course of time. This index includes the top 100 most actively traded equity options. The most active (top-6) stocks generally include the stocks of banking sector. Only one industrial corporation's stocks are contained in the most active (top-6) stocks as the third most active stock. Others are Garanti Bank, Is Bank, Akbank, and Vakıfbank, which are most popular banks in Turkish stock market.

On the other hand, the ISE is a significant emerging market for both domestic investors and foreign issuer and investors. Since, the ISE is one of the fastest growing markets in the world with an increasing amount of publicly traded firms, cutting edge technology and powerful foreign participation. Indeed, as seen from the Table 1, Turkish stock market has the biggest traded value after the stock market of China, Taiwan, Brazil and India.



Graph 3.3 : Stock Market Traded Value of Emerging markets in 2010

Source: Annual report (2010) of the ISE

In terms of the trend of Istanbul stock market during 2000-2011, there are important fluctuations in the values of the ISE National 100 Price Index. Because of the financial crisis of 2001 in Turkey, there was a dramatic drop in the closing values of the ISE National 100 Price in 2001. While the closing value of the ISE-100 Price Index was 16715 at the beginning of 2000, the figure decreased to 7626 in September, 2001. Despite of the rapid decrease, recovery period took time. At the end of the 2003, recovery in the prices of shares has been observed. Until 2008, Turkey's economy has grown rapidly,

which led to a significant increase in the values of stocks. However, the ISE was affected by the global crisis of 2008 as most of markets. Nevertheless, after the financial crisis, the world economy has gone to a new recovery period in the year of 2010. Indeed, Turkish economy has reached a growth rate of 8.9% in 2010 according to annual report of the ISE (2010).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Jan	16715	10685	13252	11032	17259	27330	44590	41183	42698	25934	54651	63278
Feb	15946	8792	11056	11574	18889	28396	47016	41431	44777	24027	49705	61284
Mar	15920	8023	11679	9475	20191	25558	42911	43661	39015	25765	56538	64435
April	19206	12367	11442	11510	18023	23592	43880	44984	43468	31652	57341	69250
Мау	16206	10880	10414	11381	17081	25236	38132	47081	39970	35003	54385	63046
Jun e	14466	11204	9380	10884	17968	26957	35453	47094	35090	36949	54839	63269
July	13870	9915	10236	10572	19381	29615	36068	52825	42201	42641	59867	62296
Aug	13132	9879	9547	11612	20218	30908	37286	50199	39844	46551	59973	53946
Sep	11350	7626	8842	13056	21954	33333	36925	54044	36051	47910	65774	59693
Oct	13538	9849	10252	15754	22900	31656	40582	57616	27833	47185	68760	56061
Νον	8748	11634	13300	14618	22486	38089	38169	54214	25715	45350	65351	54518
Dec	9437	13783	10370	18625	24972	39778	39117	55538	26864	52825	66004	51267

Table 3.1: Closing values of the ISE-100 Price Index during 2000-2011

Source: Istanbul Stock Exchange

CHAPTER-4 Data and Methodology

Before going to the last part of the current paper, it is significant to describe the data utilized in this study for the analysis. Most importantly, it is necessary to adjust the methodology that is used to get the best results from the analysis by using the data. Hence, the first and second sections of this chapter concern the data/ preliminary analysis and the methodology respectively.

4.1 Data and Preliminary analysis

To achieve the purposed objectives of this study, our research is based on data concerning stock prices and selected macroeconomic variables. Monthly data covering the sample period of January 2010 and December 2011 is used in order to investigate the relationship between the ISE National-100 Price Index and selected macroeconomic factors.

Economic series used in the study are daily closing values of the ISE National-100 Price Index (ISE-100), consumer price index (CPI), current Gross Domestic Product growth (GDP) maximum interest rates on deposits for 12 month (IR), money supply (M1), the exchange rate of U.S Dollar/ Turkish liras (ER1) and GBP/ Turkish liras (ER2). To get the monthly closing values of the ISE-100 Index, the closing values of the last trading day in each month are used. Besides, the data of CPI's base year before 2006 is 1994 while its base year is 2003 after 2006. The data of the ISE-100,and both IP and CP are collected from the ISE database and Turkish Statistical Institute respectively, while IR, M1, U.S Dollar/ Turkish Liras exchange and GBP/ Turkish Liras exchange rate are observed from Central Bank of Republic Turkey Electronic Data System Dissemination. There are some specific reasons to choose the selected economic series as proxy of macroeconomic factors. As an illustration, consumer price index is the most popular proxy for inflation; since the index measures the average change in the prices, which are paid by households for consumer goods and services. Thus, consumer price index and inflation are directly correlated with the same direction. On the other hand, interest rate and stocks are one of the most significant financial instruments in the economy. The rate of the interest is important for most investors; therefore it is a good idea to take maximum interest rate on deposits for 12 months to investigate the relationship between interest rate and stock prices. For the exchange rate, two most crucial currencies of GDP and U.S dollar are considered to find out the effects of depreciation or appreciation of domestic currency on the ISE-100; since these exchange rates have important impact on the economy and also important for especially importing and exporting companies and their shares' prices. Finally, Gross Domestic Product is a measure of the total market value of a nation's output of goods and services within a country in a given period. It is widely claimed that GDP is the most widely-used measure of a country's overall real economic activity and like a gauge of fundamental economic health of a country. Thus, GDP growth rate is used as proxy of real economy.

Before the next sections, it is needed to examine the trend of the data used in the study for the period 2000-2011. It is generally accepted that the trends of the macroeconomic variables follows the macroeconomic conditions in countries. As mentioned the economic conditions of Turkey in Chapter-3, there are two crucial years; namely 2001 and 2008 affecting its economy deeply. Thus, downtrend in macroeconomic variables can be expected in these years. Indeed, it is true for most of them. For instance, the most outstanding influence from the financial crisis of 2001 is seen from the rate of interest; since the maximum interest rate on deposits increased approximately 40% to more than 300% in 2001. After the financial crisis, the rate tamped and remained the similar level; namely around 15%. The trend of inflation is also similar to interest rate. Additionally, exchange rate is one of the significant macroeconomic variables affected from the 2001 financial crisis; since U.S dollar and GBP became quite strong against Turkish currency in 2001. While the rate of U.S dollar/ Turkish liras is around 0.7 in 2001, the rate increased to 1.6 in the same year. After 2001, even there are fluctuations in exchange rates; they remain the similar level for the period 2001-2011.

In addition, the following two tables show the descriptive information of time series used in the study.

SERIES	LISE-100	LER1	LER2	LCPI	LM1	IR	GDP
Mean	10.17191	0.280325	0.792303	9.146935	17.20902	3.238.861	1.955713
Median	10.27503	0.350270	0.881860	9.279933	17.46199	2.287.000	0
Maximum	11.14548	0.619958	1.077835	9.769419	18.48043	3.441.000	31.96045
Minimum	8.939302	-0,609027	-0,114917	7.853954	15.33758	1.201.000	-9.67742
Std. Dev.	0.661163	0.264984	0.298149	0.504235	0.864962	3.191.365	8.043732
Skewness	-0,250061	-2,059214	-2,147912	-1,04677	-0,47053	6.819.163	1.395885
Kurtosis	1.631104	6.528154	6.435414	3.187693	2.120023	6.481.190	5.527226
Jarque-Bera	12.74399	176.4559	181.5370	26.50898	9.959803	24040.29	85.0851

 Table 4.1: Descriptive Information (Level Specifications)

Table 4.2: Descriptive Information (First Difference)

SERIES	DLISE-100	DLIER1	DLER2	DLCPI	DLM1	DIR	DGDP
Mean	0.007837	0.008594	0.008253	0.013395	0.021759	-0,18147	-0.020116
Median	0.017190	-7.00E-06	0.000426	0.009988	0.022700	-0,07	-3.22581
Maximum	0.432783	0.269039	0.260685	0.098347	0.142490	292.5600	35.18626
Minimum	-0,436744	-0,08783	-0,078982	-0,01441	-0,09445	-219,66	-31.96045
Std. Dev.	0.117741	0.048582	0.047586	0.015181	0.038328	31.16541	12.1911
Skewness	-0,156518	2.077897	2.018141	1.955034	-0,09717	3.379815	0.517516
Kurtosis	4.621622	10.72309	10.00649	9.759007	3.911119	72.67754	3.861099
Jarque-Bera	16.25225	458.2951	389.5707	363.2964	5.171286	29199.72	10.80116

Briefly, although there are fluctuations in the trends of macroeconomic variables, all the figures say that there are upward trends in macroeconomic factors used in this study during 2000-2011.

4.2 Methodology

A great number of papers investigate the relationship and causality between two or more variables as the current study. For both correlation and causality, several methods were developed. In this study, "correlation analysis" is utilized to examine the relationship between the stock prices and macroeconomic variables. Then, the causality between them is sought with the aid of "Granger Causality test" (GCT). Before GCT and correlation analysis, unit root test is applied to test whether time series used are stationary. To understand these methods in details, next sections of the chapter is devoted for the three methods.

4.2.1 Unit Root Test

Most of macroeconomic time series are trended and hence in most cases they are not stationary (called "non-stationary"). To be stationary is significant for time series since, all the typical findings of the regression analysis are not valid if the series are not stationary. A non- stationary time series cannot be studied for the period under consideration. Each set of time data should be for a specific episode. Regressions with non-stationary series, which have a unit root, may be meaningless and incorrect; hence are called "spurious regression", which has a great and t-statistics. As a result, it is strongly suggested that never run a non-stationary time-series.

To avoid from the spurious regression, unit root test is implemented to determine whether time series used in the study are stationary. A unit root test is often necessary to avoid from spurious regression before empirical studies. Indeed, the test must be used before Granger causality model to find out time series having a unit root. Thus, the unit root test has become a widely common stationary test over the last decades.

There are several unit root methods to examine the stationary of variables. Augmented Dickey- Fuller (ADF) test is one of the most popular unit root test
used in the study. Dickey and Fuller (1979, 1981) developed a formal procedure called Dickey Fuller (DF) in order to find out non- stationary time series. DF is different from other methods since it does not follow conventional t- distribution and critical value, which is not depend on a number of lagged introduced As the error term is unlikely to be white noise, they improved DF test procedure by offering an augmented version of DF test that includes extra lagged terms of the dependent variable with the aim of eliminating autocorrelation. The lag length on the extra terms can be determined by both Akaika information criterion and the Schwartz Bayesian criterion, which is used in this study. ADF is conducted by using the following equation.

In this equation, is a white noise error term. ADF assumes that the error term is independent and a constant variance. Besides, and are deterministic elements whereas is the coefficient of interest. is also the variable for the analysis (Asteriou& Hall, 2011: 335-344)

ADF tests whether is 0. The null hypothesis of the unit root is written as follows if is 0.

Ho: Variables have a unit root (non-stationary): _0

H1: Variables have not a unit root (stationary): <0

Despite of its usefulness, unit root has some limitations as other types of unit root test. According to Gujarati (2003), uniformly powerful test of the unit root hypothesis is not existed yet. ADF, DF and also Phillips- Perron models have low power. Moreover, there is an important shortcoming of ADF for the analysis of the study. Some big issue included in the sample period affects the results got by ADF. As mentioned in the chapter-3, the sample period includes the deep financial crisis of 2001. Hence, the issue is the limitation of the study and should be kept in mind.

Thus, it should be pointed out that the government of Turkey has taken new policy about exchange regime after 2001 financial crisis. As a result, Turkey has been following floating exchange rate policy since 23 February 2001. Thus, this is one of the shortcomings of the present study because the regime of exchange rate is not same during the sample period. This can affect the results thus this limitation should be kept in mind.

4.2.2 Correlation Analysis

The aim of the correlation analysis is to measure the strength or degree of linear relationship between two variables (e.g. stock prices and interest rate). Correlation coefficient measures the strength of linear correlation. For the correlation analysis, any two variables are treated symmetrically; there is no distinction between two variables of both dependent and explanatory. The variables used in the correlation analysis are assumed as random. Thus, most correlation theory is based on assumption of variables' randomness.

Let take A and B as a variable (e.g. stock returns and inflation) and let also suppose that their data on i=1,.., N. different units. The correlation between A and B is denoted by small letter, r, and indicates the correlation between them. Once the correlation between two variables is calculated, a number (e.g. r= 0.5) will be obtained. The r value always lies between -1 and +1. Positive values of r show a positive correlation between the variables whereas negative values of r indicate a negative correlation. No correlation exists when r equals to zero. Besides, greater positive values of r and r=1 show stronger and excellent positive correlation respectively. Similarly, greater negative values of r is an indicator of stronger negative correlation and r=-1 means a perfect negative correlation. Nevertheless, it should be kept in the mind that correlation is the measure of linear togetherness or linear dependence between two

selected variables. Thus, it does not necessarily show independence of these variables if the zero value of correlation coefficient.

On the other hand, correlation does not necessarily imply causality since correlation analysis evaluates the dependence of one variable on other variables. Namely, the existence of a correlation between variables is not evidence of causality. Thus, the study will take the next step by applying Granger causality, which tests whether there is causality between two variables. (Koop, 2000: 23-28).

4.2.3 Granger Causality

In notably economy, causality has become a quite common technique to analyse dynamic correlation between groups of variables in the time process. Some specific methods are developed to investigate the dynamic relationship between variables. In the current study, one of the most common causality methods; namely Granger Causality test is used to examine the causality between stock prices and selected macroeconomic variables.

Granger (1969) developed a simple test which defined causality as follows: a is claimed to Granger case if can be estimated with accuracy variable by drawing upon past values of variable rather than not drawing upon such past values, all other terms remaining unchanged. Thus, the causality does not aim to predict of future; it merely finds out the possible dynamic correlation between two or more variables. As a result, the Granger causality method assumes that the information regarding the forecast of the respective variables included merely in the time series data on the variables. For the current study, let assume two variables, say stock prices and inflation. The frequently asked question in economy can be considered for also this paper. Is the inflation that "causes" stock prices (inflation \rightarrow stock prices) or vice versa? Finding out the answer of the causality is quite helpful for investors and researchers. Since, it does not show solely the sample relationship, it shows the direction of the relationship, which is fairly worthwhile to forecast movements in a variable by drawing upon movements in another variable.

To find out the causality, the GCT uses the following pair of regressions in which A and B is variables.

Equation-1

Equation-2

Where it is assumed that both and is uncorrelated white-noise error term.

According to the result for GCT, there are four cases distinguished.

- "Unidirectional causality from B to A" is revealed if the predicted coefficients on the lagged B in the first equation are statistically different from zero as predicted coefficients on the lagged A in the second equation is not statistically different from zero
- By contrast "unidirectional causality from A to B" is found if the set of lagged B coefficients in the first equation is not statistically from zero and conversely the set of lagged A coefficients in the second equation is statistically different from zero.
- "Feedback or bilateral causality" is found when the sets of B and A coefficients are statistically and importantly different from zero in both regressions.
- 4. Finally, "independence" exists when the sets of both A and B coefficients are not statistically important different from zero in both regressions.

To find out macroeconomic variables cause the stock returns or vice versa, the following hypothesis test is used.

Ho: The macroeconomic variables do not Granger cause the ISE-100 National Index

H1: The macroeconomic variables do Granger cause the ISE-100 Index

If the null hypothesis is rejected, then it is concluded that macroeconomic variables does Granger- cause the stock prices. In addition, the causality can be from stock prices to macroeconomic factors. Similarly, the hypothesis for this causality is as follows:

Ho: The ISE-100 index does not Granger cause the macroeconomic variables.

H1: The ISE-100 index does Granger cause the macroeconomic variables.

If the null hypothesis is rejected, it is concluded that the ISE-100 index does Granger cause the macroeconomic variables (Enders, 1995& Asteriou& Hall, 2011)

Before applying Granger causality, the importance of the number of lags introduced should be taken into consideration. Since, GCT is sensitive in terms of the number of lags used. Different results could be found if it was relevant and was not contained in the model. Thus, the empirical evidence of the two variables GCT is fragile. Moreover, no model giving the exact true lag number is existed yet in the literature. This issue is one of the limitations of Granger Causality Test (Gujarati, 2003).

CHAPTER-5

Empirical Findings and Analysis

The correlation between the ISE-100 National Index and selected macroeconomic variables is measured in this study by applying Correlation Analysis. Additionally, the causality between the ISE-100 and macroeconomic factors is observed using Granger Causality Model. Before going to these tests, unit root test is needed to determine whether time series used in the analysis are stationary. Thus, the current chapter refers to the findings of Unit Root, Correlation Analysis and Granger Causality test. Besides, it analyses these empirical results by comparing them to previous academic researchers in terms of both theories and empirical evidence.

This chapter is divided into three sections. First section presents the results of unit root. Second section shows the findings from correlation tests and analysis of the findings. Final section also provides results of GCT.

5.1. Results of Unit Root Tests

The test for unit root is conducted by using ADF test with automatic selection of Schwarz info criterion. The natural logarithmic forms of all variables apart from interest rate are used for ADF test.

The aim of the study to apply Unit Root test is to get stationary time series by finding non-stationary time series for the paper's next steps namely; Correlation Analysis and GCT. If the time series are non-stationary, further tests of first difference or second difference should be taken to get stationary time- series.

ADF-LEVEL				ADF-First Differences
Series	Prob.*	Ho (Lo)	Prob.*	Ho (Lo)
LSP	0.2957	Not Rejection	0.0000	Rejection
IR	0.1881	Not Rejection	0.0000	Rejection
СРІ	0.4848	Not Rejection	0.0000	Rejection
GDP	0.7648	Not Rejection	0.0000	Rejection
LER1	0.1796	Not Rejection	0.0000	Rejection
L FR2	0 3357	Not Rejection	0.0000	Rejection
	0 4404	Not Rejection	0.0000	Rejection
	0.4404	Not Rejection	0.0000	Rejection

The results of the Dickey Fuller test for the level part are presented at the first section of the table. Null hypothesis of unit root test, which means time series have a unit root, can be rejected at 5% significance level. As seen from the table, all variables cannot reject the null hypothesis; hence they have a unit root. Thus, further test of first difference of the series is taken.

The results of the first differences of the time series are shown from the second section of the table. For this test, first differenced time series do not have unit root in all cases; since the probability arising from Dickey Fuller test are less than 5% critical value, which lead to rejection of the null hypothesis. Namely, the first difference test is enough to get stationary time series to take next steps; namely correlation Analysis and GCT.

5.2 Correlation Analysis

The aim of the correlation analysis is to determine whether there is a relation between two or more variables. Additionally, this analysis shows the degree and side of the relation. For the current study, correlation analysis presents the side and degree of the correlation between stock returns and selected macroeconomic variables.

Series	Correlation	Series	Correlation	
	Coefficient LISE100		Coefficient DLISE100	
LCPI	0.813472	DLCPI	0.038983	
IR	-0.582896	DIR	-0.114941	
LER1	0.321618	DLER1	-0.169497	
LER2	0.458887	DLER2	-0.071333	
GDP	-0.091937	DGDP	0.130375	
LM1	-0.582896	DLM1	-0.074742	

 Table 5.2: Correlations between the ISE-100 and Macroeconomic Variables

The table presents the results concerning the correlation between the ISE-100 prices and selected macroeconomic variables. First section of the table shows the correlation between natural logarithmic forms of series and stock prices. Only logarithmic form of GDP and interest rate (IR) are not taken; since GDP includes negative values and it is not needed to take the logarithmic form of IR. According to the results from the first section, there is a clear relation between stock prices and macroeconomic variable. This relation is neither robust nor insignificant. However, the natural logarithmic forms of these variables include non-stationary time series. As mentioned in the Chapter-4, it is highly possible

that the analysis made by non-stationary series can result in spurious correlation. To avoid from spurious correlation, first differenced of the time series are used for correlation analysis as can be seen from the second section of the table. However, the correlation between variables becomes more insignificant when comparing them to results from the first section of the table. But nevertheless, there is a relation between the ISE-100 index prices and selected macroeconomic variables.

To examine the correlation analysis results in details, next 5 sub-sections are devoted to compare them to previous findings.

5.2.1. Correlation between Real Economy and the ISE-100

According to theories and a number of studies, there is a positive relation between share prices and real economic activity. The theory claims upward trend in real economy such as high growth in Gross Domestic Product or great IP results in great cash flows of firms, which lead to increase in share prices. Thus, the economic theory obviously claims that there is positive relation between real economic activity such as GDP and share prices. Indeed, much empirical evidence also supports the positive relation as the theory. Nevertheless; negative and neutral relationship was observed by a number of studies for several countries (Erdogan and Ozlale, 2005).

The present study also supports the economic theory according to the results of correlation analysis; since the correlation coefficient between the ISE-100 and GDP is 0.13037 indicating low positive relation between these variables. Like the current paper, Erdogan and Ozlale (2005) and Tunali (2010) observed positive influence of real economy on stock prices. On the other hand, the correlation coefficient found by this study is low; hence it could be claimed that there is no significant correlation between the ISE-100 and GDP. Similarly, Kandir (2008) and Tursoy and others (2008) found no important effects of IP on the ISE. For other countries especially U.S, empirical evidence generally found positive relation between share returns and real economy. As an illustration, Fama (1981, 1990), Chen, Roll and Ross (1986), Kaul (1987), Shah (1989), Barro (1990), Lee (1992) observed the positive linkage between the variables. Additionally, Poon and Taylor (1991) and Mullins and Wadhwani (1989) found important effects of economic activity on stock exchange in the UK and both Germany and Japan respectively.

By contrast, some of empirical findings failed to support the economic theory; because they observed negative relation between stock prices and real economy. Buyuksalvarci (2010) revealed a negative correlation between the ISE and real economy. Besides, Liljeblom and Steniues (1997) showed the negative relation between share prices and real economy for Finland. Differently, Lyocsa, Baumohl and Vyrost (2011) revealed no significant impact of real economy on stock markets of 4 European countries.

5.2.2. Correlation between Inflation and the ISE-100

The relation between inflation and stock prices is rather debatable issue in terms of both theories and empirical evidence. Since, empirical results and theories are mixed in different countries for different time-periods in especially modern life.

In literature, there are two main theories asserted by Fisher (1930) and Fama (1981). These theories supported two opposite side regarding the relation between share prices and real economy; thereby using different ways. Firstly, Fisher (1930) suggested that expected real asset returns should move with the inflation rate. In other words, expected returns of real assets increase when inflation rate increases or vice versa. Therefore Fisher (1930) described common stock as a good hedge against inflation. Although Fisher hypothesis is widely accepted, a great number of papers failed to support the theory. By contrast Fisher, Fama (1981) correlated the stock prices negatively to both expected and unexpected inflation rate. The theory of Fama is called "Fama proxy", which was supported by much empirical evidence in modern finance and recent literature.

This study is supported Fisher hypothesis by finding 0.038983 correlation coefficient rate indicating a low positive relation between inflation (CPI) and the ISE-100. In other words, it fails to support "Fama proxy" and much empirical results. Nevertheless, the insignificant positive relation between these variables is quite low; hence it may not be true to define shares as a good hedge against inflation.

As the current study, the positive correlation between share returns and inflation was found for 8 advanced countries, including the US, Germany, France, the Netherlands, the UK, Switzerland, Japan, Canada, in the period 1958- 1996 by Solnik and Solnik (1997). Cozier and Rahman (1988) also failed to reject Fisher model for Canada like this paper. Similar to this paper's findings indicating insignificant relation between the variables, Kandir (2008), Sari and Soytas (2005), Tursoy and others (2008) observed no significant relationship between stock prices and inflation for Turkey.

However, there is much more empirical evidence supporting the "Fama proxy". As an illustration, Bodie (1976), Jaffe and Mandelker (1976), Fama (1981), Geske and Roll (1983), Pindyck (1984) and Chen, Roll and Ross (1986), Kaul (1987) revealed a positive relation between share prices and inflation.

Nevertheless, it should be pointed out that the correlation between inflation and share prices can vary according to the fluctuation in the economic conditions for different time-periods.

5.2.3 Correlation between Exchange Rate and the ISE-100

There is no doubt that the correlation between exchange rate and share prices is one of the most debatable issue among academic topics; since empirical evidence and theories regarding this relation are rather mixed and complex with the different factors (e.g. economic conditions of countries, types of organizations like exporting or importing organizations, different time periods).

To begin with the theories, two major opposite theoretical sides have been discussed to reveal the linkage between currency and stock prices. Firstly,

"flow-oriented" suggested by Dornbush and Fischer (1980) discusses that fluctuations in exchange rate affect international competitiveness and trade balance. They claimed that appreciation in the domestic currency brings about less favourable trade conditions resulting in regression in economic activity of the country. These conditions typically affect stock prices negatively. Namely, appreciation in local currency has a negative impact on share prices. Thus, the positive relation between exchange rate and stock prices is conducted according to this theory.

On the other hand, the second approach called "stock oriented models" suggests a negative relation between currency and stock returns; since it claims that an increase in the local domestic stocks helps to add value to domestic currency. It can be explained as follows. High stock returns encourage investors to buy or hold local assets, which results in increase in their values (Stavarek, 2004 & Georgios, 2011).

In terms of the results of the current study, negative correlation coefficients; namely -01694497 and -0.071333 are found for U.S dollar/ Turkish liras and GBP/ Turkish liras; namely the negative correlation between the ISE-100 and these exchange rates is revealed. Indeed, empirical evidence for Turkey is predominantly negative such as the papers suggested by Akcaraoglu and Yurdakul (2002), Akkum and Vuran (2005), Buyuksalvarcı (2010). Likewise, Kasman and others (2011) found a negative and important relation between movements in exchange rate and the ISE. Besides, Wongbango and Sharma (2002) for Singapore and Thailand, Ajayi and Mougoue (1996) for eight industrial countries showed the negative correlation.

Nevertheless, empirical evidence concerning exchange rate and stock prices is quite mixed. Thus, a number of papers also observed no relation or positive relation between these factors. For example, Yildirtan (2007) found no relationship between exchange rate and the ISE 100 index. Differently, Aggarwal (1981) and Jorion (1990) reported a positive relationship between the

effective exchange rate of the American dollar and the prices of U.S stocks for the period 1974-1978.

5.2.4 Correlation between Interest Rate and the ISE-100

The correlation between interest rate and stock market is one of the hot issues in economy; since the two elements are crucial financial instruments and therefore investors are quite interested in the relation between them. The correlation between these variables is fairly consistent in the sense of empirical evidence and theory. Basically, theory says that stock exchange and interest rate are correlated negatively; since investors typically would like to get high return from their capitals via any financial instruments. Thus, when the interest rate is great, they prefer to get returns from interest rate instead of shares. The case results in a decline in the demand of shares; namely decrease in the prices of shares. The reverse is also correct. As a result, there is a negative relation between stock market and interest rate. In the literature, no other theory concerning this relation explains different side. Like the theory, empirical evidence generally shows negative linkage between the variables for even different countries.

Indeed, the correlation analysis of the study finds a negative relation between maximum interest rate for one month and the ISE-100 index due to the negative figure of coefficient correlation; namely -0.114941. As the paper, Tunali (2010), Muradoglu and Metin (1996), Kandir (2008) and Buyuksalvarcı (2010) observed a negative correlation between interest rate and the ISE. Only Tursoy and others (2008) revealed no important correlation between interest rate and the ISE.

In terms of the other countries, the existing results for Turkey are generally true for other countries as well. Leon (2008) found negative and important relation between interest rate and share prices of Korea. Rigobon and Sack (2004) also concluded a negative correlation between interest rate and NASDAQ index. As seen from the empirical results and theory, the correlation between share prices and interest rate is different from the correlation between share prices and other macroeconomic variables; since mixed empirical results and theories were generally observed for others. However, the correlation between share prices and interest rate is really consistent and the study also supports them.

5.2.5 Correlation between Money Supply and the ISE-100

Several theories were asserted with the aim of explaining the relation between money supply and share prices. Besides, empirical results were devoted to discuss this relation. But nevertheless, neither theories nor the empirical results provide a unanimous suggestion for the correlation between money and stocks.

In general, it is claimed by the theories that the impact of money supply on stock market appears indirectly. For instance, Hamburger and Kochin (1972) suggested that the relation between money supply and stock market arises from the effect of money supply on inflation rate with the following explanation. Money brings about an increase in liquidity, which generates an expectation of high inflation rate resulting in a decrease in aggregate supply. The case leads to lower output; hence lower dividend payment results in a decline in the share returns. Briefly, money supply is correlated with the stock market negatively according to this theory. In contrast, other theories defend the opposite side. They claimed that money supply affects the share returns positively via the expectations of high dividend payment arising from the expansion in the money; namely the high future flows of the corporation.

This paper like the theory suggested by Hamburger and Kochin (1972) reveals that there is a negative correlation between money supply (M1) and the ISE-100 index; since it is found a negative correlation coefficient value -0.074742. But, the correlation coefficient is quite low. Thus, it could be concluded that there is an insignificant correlation between money supply and the ISE-100. In literature, there are some studies supporting the result of the current study whereas the different results are revealed for Turkey and also other countries in

the different time periods. Yildirtan (2008) showed the negative effects of money supply on the stock exchange for Turkey like the current study. Additionally, Kandir (2008) and Tursoy and others (2008) observed non- significant relation between money supply and the ISE similar to our results.

On the other hand, there is a significant and positive correlation between share returns and money for Turkey according to Buyuksalvarci (2010), Tunali (2010) and Muradoglu and Metin (1996). Furthermore, Gunsel and Cukur (2007) correlated money with the stock market positively for the UK. Jensen and Johnson (1995) also showed that expected share prices are significantly higher during the expansive monetary policy than restrictive periods.

5.3 Granger Causality Test

No satisfactory theory would discuss that the correlation between stock markets and macroeconomic variables is completely in one direction. However, stock returns are generally considered as responding to external factors (Chen, Roll& Ross, 1986). Besides, there is no exact result arising from empirical evidence, which is mixed in the literature.

With the aim of discussing the theory and empirical evidence, Granger causality test is implemented in this study to determine whether changes in selected macroeconomic variables cause changes in stock returns or vice versa. The test can be considered as the next the step of the correlation analysis. Since, the degree and side of the relationship between macroeconomic variables and stock prices are observed from the correlation analysis. However, correlation analysis does not show the causality between two or more variables. Thus, it is needed to apply Granger Causality model to observe whether there is any causality between variables. To avoid from spurious causality, first differenced of natural logarithmic form of time series are used in Granger causality between two variables in details.

5.3.1. Causality between Real Economy and the ISE-100

It is expected according to the theory as mentioned in the part of 4.2.2 that grown in the real economic activity leads to an increase in the cash flows of entities, which results in high stock returns. Namely, the causality runs from real economy to stock prices. By contrast, it is also claimed that stock prices reflect the expectation of public towards the future real economic activity according to traditional valuation model; hence stock market can be suggested as a supportive factor of real economy (Mun et al, 2008).

The following table shows the result of Granger causality test between real economy (IP) and stock prices (ISE-100).

Table 5.3: Causality between real economy and the ISE-100

Null Hypothesis:	F-Statistic	Probability
DGDP does not Granger Cause DLISE-100	3.05333	0.05045
DLISE-100 does not Granger Cause DGDP	2.81309	0.06352

As this study, Karamustafa and Kucukkale (2008), and Ozbay (2009) observed no causality running from the ISE to real economy in Turkey, or vice versa. By contrary, Toda and Yamamoto (1995) showed stock market indexes as suitable leading indicators of real economy for the Czech Republic, Poland and Hungary (Lyocsa et al, 2011).

5.3.2 Causality between Inflation and the ISE-100

In general, it is widely believed that inflation causes share prices; since there is a common belief saying the causality running from macroeconomic variables to stock market. Additionally, it is suggested that the causality between them can show differences according to the level of inflation rate such as high rate or low rate. For instance, it is claimed that inflation rate is one of the most important determinants of the volatility of stock market in especially highly inflated countries as Turkey (Saryal, 2007). Nevertheless, no satisfactory theory would explain the causality between share returns and inflation entirely.

Null Hypothesis:	F-Statistic	Probability
DLCPI does not Granger Cause DLISE100 DLISE100 does not Granger Cause DLCPI	0.31721 2.58293	0.72872 0.07926

Table 5.4: Causality between Inflation and the ISE-100

In this study, no causality between the ISE-100 and CPI is found. The results are consistent with the empirical result of Ozturk (2008) for Turkey. In contrast, Saryal (2007) described inflation rate in Turkey as great indicator of share prices. She found the same result for Canada as well; but inflation rate has a weaker predictive power for shares in Canada when comparing the case for Turkey. Muradoglu, Taskin and Bigan (2000) run Granger causality model for several countries. They concluded causality from inflation to stock market for Brazil whereas domestic share prices Granger- cause inflation in Jordan and Zimbabwe. They also revealed bidirectional causality between the variables for Argentina.

It seems that the causality between share prices and inflation is quite mixed as seen from empirical results. It is highly possible that the causality is affected by some crucial financial events. Besides, this causality can show differences according to economic conditions of counties. Thus, the empirical evidence can be mixed.

5.3.3 Causality between Exchange Rate and the ISE-100

To discuss the causality between exchange rate and stock prices, two major theories are used like the aim of examining the correlation between these variables. One of these, "flow oriented model", claims that movements in currency affect economic activity, which has an impact on stock prices. Thus, changes in exchange rate cause fluctuations in stock prices according to this theory (Dornbush and Fischer, 1980). On the other hand, stock oriented models suggests that increase in the stock prices encourages investors to buy or hold local assets such as domestic currency, which result in appreciation of currency. Thus, stock oriented models claims that exchange rate causes stock prices.

Null Hypothesis:	F-Statistic	Probability
DLER1 does not Granger Cause DLISE100	0.20000	0.81897
DLISE100 does not Granger Cause DLER1	14.6404	1.7E-06
DLER2 does not Granger Cause DLISE100	0.91571	0.40268
DLISE100 does not Granger Cause DLER2	13.1393	6.1E-06

Table 5.5: Causality between Exchange Rate and the ISE-100

According to Granger causality test of this paper, the rates of probability for the causality from the ISE-100 and exchange rates are too smaller than the significance level. As a result, the current study supports "stock oriented model"

by finding causality running from the ISE to exchange rate. The empirical evidence regarding this causality is rather mixed for several countries; nevertheless a number of studies conclude the result the paper finds. For instance, Hatemi-I and Irandoust (2002) revealed unidirectional causality from share prices to effective exchange rates for Sweden. Aballa and Murinde (1997) also showed the same causality for the Philippines. Additionally, Rittenberg (1993) and Ozturk (2008) observed that the ISE causes exchange rate as this study.

Nevertheless, different results concerning this causality were shown for several countries including Turkey. As an illustration, Kasman (2003) revealed causality runs from exchange rate to the ISE. Besides, Aydemir and Demirhan (2009) found bidirectional causality between these variables for Turkey. Differently, Erbaykal and Okuyan (2008) observed no causality between the ISE and exchange rate. For other countries, Qiao (1997) observed bidirectional causality for Tokyo. On the other hand, the author found causality from exchange rate to stock prices for Hong-Kong whereas no causality is found for Singapore.

5.3.4 Causality between Interest Rate and the ISE-100

Negative coefficient with causality running from the rate of interest to share returns is often expected; because an increase in the interest rate reduces the present value of future dividend payments, which depresses share returns. This causality is expected with the direction from interest rate to stock market in terms of the theory; but empirical results on this causality are conflicts.

Table 5.6: Causality between Interest Rate and the ISE-100

Null Hypothesis:	F-Statistic	Probability
DIR does not Granger Cause DLISE100	5.53529	0.00489
DLISE100 does not Granger Cause DIR	0.64184	0.52791

From the table, the probabilities for the causality from IR to the ISE-100 is lower than the significance level; but not vice versa. As a result, the study reveals that the causality runs from interest rate to stock market; but the reverse causality is not true. These results also support the theory. Like the paper, Ozturk (2008) found the causality from overnight interest rate to stock market for Turkey; but he also observed the causality running from stock market to overnight interest rate. Differently, he showed that there is causality from the ISE to treasury interest rate; but not vice versa. Similarly, there was causality running from stock market to interest rate in one direction according to Acikalin (2008). By contrast, Tunali (2010) found no causality between one month time deposit and the ISE-100. For other countries, Hashemzadeh and Taylor (1988) observed causality from interest rate to share returns for the U.S; but the reverse causality was found for Hong-Kong by Cheung (1990).

5.3.5 Causality between Money Supply and the ISE-100

There is no satisfactory theory explains the causality between money supply and share return. Nevertheless, it is generally claimed that money supply is a leading indicator of share prices. Thus, money supply causes share prices according to this belief. The theory was supported by a number of papers, whilst there are some studies refuting the theory.

Table 5.7: Causality between Money Supply and the ISE-100

Null Hypothesis:	F-Statistic	Probability
DLM1 does not Granger Cause DLISE100	0.44999	0.63858
DLISE100 does not Granger Cause DLM1	1.75442	0.17690

As seen from the table, the probability of the causality between M1 and the ISE-100 is higher than the significance level; therefore there is no causality between them according to the GCT. The results of this study are consistent with Ozbay (2009), Ozturk (2008), Tursoy and others (2008), and Karamustafa and Kucukkale (2003), who investigated the causality for Turkey. However, the causality running from share returns to money was also found by some papers such as Pesando (1994), Rozeff (1974) (Heimonen, 2010).

CHAPTER-6

Conclusions

A great number of papers have sought to find out whether there is a relation/ causality between share prices and macroeconomic factors for both advanced and developing markets. It is crucial to know the interaction between economic factors and stock exchange when determining future values of stocks. Since it is widely believed that there is a significant and strong relation between share prices and macroeconomic factors; therefore some economic variables as well as inflation, interest rate and GDP are widely utilized to predict the value of financial assets at the valuation process. In present study, the relation between the ISE-100 National Price Index and macroeconomic factors; namely inflation, interest rate, money supply, real economy, and exchange rate is examined for the period of 2000-2011.

The results of present study are conducted by Correlation Analysis and Granger Causality Test. Before these tests, unit root test is applied to determine whether time series used in the study are stationary. For further studies, it should be pointed out that Granger Causality test has an important limitation relating to the numbers of lags introduced. In addition, it is quite crucial that the considered period including critical events can be result in wrong results and the period, which is worked by the study namely 2000-2011, includes deep financial crisis of 2001. Thus, it should be kept in mind.

When it comes to results of the study, a relation between share prices (ISE-100 National Price Index) and macroeconomic factors; inflation (CPI), exchange rate (ER1, ER2), interest rate (IR), money supply (M1), real economy (GDP) is observed by correlation analysis test. However, the results of the test indicate a low correlation between share prices and macroeconomic factors for Turkey. The results of the correlation test are as follows. Increase in CPI and GDP is an indicator upward trend in share prices for Turkey. While the positive interaction between share prices and CPI is insignificant, stronger but nevertheless low relation between the ISE-100 and GDP is observed. By contrast, the negative correlation between interest rate and share prices is revealed. Indeed, it is widely believed that investors focus on any financial instruments to get high returns from their capital. When they prefer interest rate, the demand in shares decrease; hence share prices increases. Likewise, the reverse relation is found for the ISE-100 and exchange rate. In present study, U.S dollar/ Turkish liras and GBP/ Turkish liras are used as proxy of exchange rate. Results indicate that the correlation between U.S dollar/ Turkish currency and the ISE-100 is stronger than the correlation between GBP/ Turkish liras while both of them show negative correlations. Thus, it can be concluded that U.S dollar is more important currency than GBP for Turkish stocks. Finally, low negative relation between money supply (M1) and share prices is revealed.

Apart from the correlation between stock prices and macroeconomic factors, the causality between these variables are quite significant in economy; since investors can predict the movements in share prices by using the past values of macroeconomic variables, or vice versa if there is causality between them. As an illustration, the interaction between interest rate and stock prices is hot issue for investors who prefer one of these to get high return from their capital. Indeed, interest rate can used as a predictor of share prices; since interest rate causes stock prices for Turkey in the given period. However, stock exchange does not cause interest rate; thus the reverse causality is not true. In contracts, it is found that stock returns cause exchange rate regarding to the study; namely GBP/ Turkish liras and U.S dollar/ Turkish liras. Namely, share prices have an impact on exchange rate; therefore shares can be used as predictor of

exchange rate; but the reserve causality is not found. Lastly, there is no effect of stock exchange on real economy, inflation and money supply and vice versa. In other words, there is no causality between these variables.

Finally, it can be concluded that the results of the current paper are not consistently stable with the findings of the previous researchers because of the macroeconomic variables used in the papers, the frequency of time series, the given period, the methodology implemented and the countries investigated. Thus, it can be suggested for further studies to compare the results of them and the paper, they can investigate the same period for Turkey by using different methodology or time series.

CHAPTER-7

Reflections

In the process of doing present dissertation, I have learned many things such as the information about the subject area, planning the whole work and managing time. Besides, I released my strengths and weaknesses during the dissertation process. I cannot claim that the process of the project was quite straightforward; because it was the first time I have undertaken a project. Nevertheless, I believed that I overcame the challenges successfully with the support of my dear supervisor. Whole dissertation process was quite enjoyable for me because stock market and economic conditions of countries are one of the topics I am interested deeply. At the end of the dissertation I really believed that I have gained new skills concerning the research area of the dissertation and I created stronger background for my future career in sense of academic and business.

At the beginning of the dissertation, I first determined the objectives of the research subject. Later, I did a research to find out the previous papers. My supervisor supported the topic I choose and I started my dissertation by doing my plan step by step. The first step was to research previous papers regarding

to my research topic. When I was doing literature review, I sometimes felt missing since there is huge literature about the subject. Several researchers investigated the topic for different countries for different time period. I managed the difficulties by reading several articles. With the help of the previous papers, my knowledge on the subject was enhanced and I was clear about the objectives and the aims of the study.

After the reviewing previous works, I faced with the most difficult part of the dissertation namely my results/ analysis. To achieve my results, I had to use a software program called "eviews". It was first time I have used this program. I was so hopeless about eviews since it looked like rather complex at first glance. I used the handbook of eviews to learn it. But the book was very long and I spent too much time to understand how it works. I also required assistance from my supervisor and thus I managed the program successfully. On the other hand, I also would like to point out that I found the data, which was needed for my analysis before the results and analysis. The data was required from some specific websites such as Central Bank of Turkey and Istanbul Stock Exchange. Unfortunately, the websites were quite complex and really struggled when trying to find the data. Nevertheless, this was quite useful for me since the data concerns about economy and stock exchange, which I will need them in the future. Next time, I will be more profession about websites and I will find the figures easily.

In general, the dissertation process has been interesting for me; since I am interest in the subject area and I improved my several skills that will be certainly useful in my business life. Furthermore, I learnt to plan the work with someone, who was my supervisor for the dissertation process. I deeply believed that planning and setting the objectives of a research is the key point of being successful. Apart from that, managing the time is quite important for dissertation to check the work again and again. Finally, I would like to say that I have enjoyed when doing my dissertation and I am sure I will not forget the experience ever in my life.

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APENDIX-A

A. The Series





B. The Logarithmic Series





C. The First Differences Logarithmic Series









Appendix-B: The Dual Graphs





B. Exchange Rate and the ISE-100





C. Interest Rate and the ISE-100



D. Inflation and the ISE-100



E. Money Supply and the ISE-100



Appendix-C

The Overview of my Dissertation / Integrated

Project area

Family Name:DEMIRGiven name:GONCASRN:11624035Programme:MScAccounting and Financial Management

Section 1: Academic area within which your research will fall – tick <u>ONE ONLY</u> as appropriate:

Marketing	
Accounting and Finance	
Economics	
Human Resource Management	
Tourism	
Project Management	
Strategy	
Information Systems	
OR/Mgt Science	

The key aims and objectives of your research are to:

• To analyse the relationship and causality between macroeconomics factors and share price.

• Investigating the effects of macroeconomic factors on fluctuations of the ISE.

• To find out the differences of the impact of macroeconomic factors on stock market between developing and developed markets.

• To show evidence from the ISE by implementing Correlation Analysis and Granger Causality model to analyse effects of the macroeconomics factors on the ISE-100 index during 2000-2010.

• Not aiming to mention all factors affecting share price. My aim is to focus on merely selected macroeconomic factors; namely inflation, interest rate, exchange rate, money supply and real economy.

• Using secondary data which can be collected from ISE, Central Bank of Turkey and Turkish Statistical Institute.

• Not intending to focus on any specific industry or company listed on stock market. In place of this, the dissertation is focused on the ISE-100 index.

Section 2: Key questions to answer:

2.1 Within what academic area will your research be?

There are several factors having an impact on share returns as well as dividend policy, performance of the industry, major government orders, take-over or merger and macroeconomic factors. However, I do not intend to discuss all these factors. The aim of my dissertation is to investigate selected macroeconomic factors affecting share price; namely interest rate, money supply, inflation, exchange rate and real economy. In addition, some of the macroeconomic factors have a different influence on developed and emerging capital markets (Ozbay, 2009). The dissertation intends to examine the effects of these factors on both advanced and emerging capital markets' stock price. Furthermore, the effects will be tried to proof by taking as a reference of the Istanbul Stock Market data.

In terms of my topic's academic area, I think that my dissertation topic is mostly based on the academic area of finance. As known, stock market is one of the financial markets. The module of financial markets is taken by most finance students. Moreover, there are some postgraduate finance students, who tackled similar topics on their dissertation. Namely, I personally think that my dissertation's academic area is finance and suitable for me.

2.2 Will your research be industry based? If yes, which industry or industries will your research focus on? If no, what will your research be based on (e.g. stock market data, a particular company, a particularly country, etc.)?

My research is not based on any specific industry. As mentioned, it concerns about the effects of macroeconomics factors on share price, being based on stock market data. Also, I will intend to focus on the ISE 100 index in the period of 2000 -2010 to narrow my area. Namely, my research is basically based on stock market data especially the Istanbul Stock Exchange data.

2.3 What will the general topic area be, and can you give us a general overview of the developments to date in this area? What is already known about the area/industry/issue?

The general topic of the dissertation concerns stock market, macroeconomic factors and mostly the interaction between these variables. A number of studies tried to find out the relation between share prices and macroeconomic factors. In literature, the topic has become popular in 1970s and 1980s. After these years, the fluctuations in macroeconomic variables and share prices have been felt significantly because of financial crisis and globalization. Thus, the relation between share returns and macroeconomic factors has become more important in last decades and therefore more papers investigated the topic, which resulted in more empirical findings.

Choi and Jen (1991) indicate that the expected returns from common stocks are systematically related to the interest rate risk. Humpe and Macmillan (2007) report a negative relationship between a long term interest rate and share price. Likewise, such a relationship is found in emerging capital markets as well as China (Wang, 2010). Namely, it is hypothesized that there is a negative correlation between interest rates and stock prices because of several reasons.

Fama and Schwert (1977) show that USA stock prices are negatively correlated to inflation rate. Recently, there is empirical evidence found by Hoguet (2008) in the US that high inflation leads to decrease in share price because high inflation is associated with a high equity risk premium.

Another macroeconomic factor is real economy and its effects on stock market were reported by several researches. In 1981, Fama has showed that the growth rate of industrial production has correlated positively to stock returns. According to Nardari and Scruggs (2005), changes in the volatility of" news about future returns" brings about changes in the stock market (CRSP NYSE) volatility over time. In terms of the direction of the relationship, Humpe and Macmillan (2007) show that there is a positive relationship between industrial production and both Japan and US share prices. On the other hand, industrial production has a massive positive influence on share return in emerging markets such as India, China, Pakistan, Brazil, Argentina, Mexico, Jordon, Turkey, Chile. In the light of the information, both developing and advanced markets generally show positive correlation between economic and stock returns.

When it comes to money supply, effects of the factor on stock market is more complicated that others' effects. Since, its effect varies over countries and time. As an illustration, there is a positive (although insignificant) relationship between US share prices and money supply whereas Japan share prices are affected negatively by the money supply (Humpe & Macmillon, 2007). Moreover, the result of studies for developing markets such as Turkey is contradictory. Therefore, the correlation between money supply and stock price is still an empirical question.

Likewise money supply and inflation, the correlation between exchange rates and stock prices shows differences among countries regardless of either advanced or developing markets. Furthermore, the effects of exchange rate on exporter and importer firms' share prices are converse. The assertions were supported by many researchers (Ozbay, 2009).

2.4 What issues and objectives are to be included in this research?

- To analyse the relationship and causality between macroeconomics factors and share price.
- Investigating the effects of macroeconomic factors on fluctuations of the ISE.
- To find out the differences of the impact of macroeconomic factors on stock market between developing and developed markets.

• To show evidence from the ISE by implementing Correlation Analysis and Granger Causality model to analyse effects of the macroeconomics factors on the ISE-100 index during 2000-2010.

• Not aiming to mention all factors affecting share price. My aim is to focus on merely selected macroeconomic factors; namely inflation, interest rate, exchange rate, money supply and real economy.

• Using secondary data which can be collected from ISE, Central Bank of Turkey and Turkish Statistical Institute.

• Not intending to focus on any specific industry or company listed on stock market. In place of this, the dissertation is focused on the ISE-100 index.

2.5 How, precisely, are you going to tackle this work? (Methodology)

The dissertation is based on data collection. Necessary data will be collected from ISE, Central Bank of Turkey and Turkish Statistic Institute. After the data collection, the time series will be used for the analysis of the dissertation. This analysis will be finalized by applying Correlation Analysis and Granger Causality Test.

Before Correlation Analysis and Granger Causality Test, unit root test will be run to test whether time series are stationary. Since stationary time series should be used for Correlation Analysis and Granger Causality test. After the unit root test, first correlation analysis will be applied to find whether there is correlation between share prices and macroeconomic factors. If there is relation, the correlation analysis also shows the sign and degree of the relation. For instance, the test can show there is strong or low/ negative or positive correlation between share prices or macroeconomic variables.

After the correlation analysis, Granger Causality test will be implemented to show the causality between ISE-100 and selected macroeconomic factors. The test is quite useful for especially investors. Since, it shows whether one variable can use to predict the other one or vice versa. With the aim of this information, they can predict the future value of stock market by using the past value of macroeconomic variables or vice versa, if there is causality.

I also would like to add that there are several methods developed to find out the relation between two or more variables. I prefer the methods mentioned above since there are some specific reasons. For instance, correlation analysis does not show a simple relation, it shows sign and degree of relation and it is quite significant for the analysis of the dissertation. Likewise, Granger causality test is one of the most popular causality tests in last decades. Since it shows the two side of causality and it is very important for portfolio managers, investors and researchers.

Briefly, the two main tests will be implemented to find the results of the study. First, correlation analysis to find out whether there is relation between macroeconomic variables and share prices; and later Granger Causality will be implemented to show the causality between these variables.

2.6 Identify relevant sources (at least six, ideally more) and summarise what information these will generate (this is the beginning of your literature review)

In the literature, the relation between macroeconomic factors and stock market has become one of the most popular topics; thus a great number of studies investigated the topic. Several theories concerning the subject were asserted by important researchers. While some of empirical results supported the theories, others failed to support them.

There are several papers examined the relation between share prices and macroeconomic factors. However, I would like to mention about the most important researchers in the history. For instance, Fisher (1930) is one of the most important researchers investigating the relation between inflation and

stock market. He asserted that shares are good hedges against inflation. Thus, he actually claimed positive relation between inflation and share prices. The idea was called "Fisher hypothesis" and it became very popular theory in literature. By contrast, Fama (1981) asserted that negative relation between inflation and share prices. The theory was called "Fama proxy" and supported by several papers with empirical results. The two esteemed people contributed the subject significantly.

Like Fama and Fisher, there are several researchers, who contributed the development of the subject. As an illustration, Hamburger and Kochin (1972) are one of the most important researchers for the topic concerning the relation between money and stock market. They assumed grown in money as a predictor of stock price. By contrast, Rogalski and Vinsco (1977), Rozeff (1974) assumed movements in money supply are not predictions of stock returns and they are researchers, who examined the subject very early. In addition, there are other esteemed researchers, who worked on U.S. They are Bodie (1976), Geske and Roll (1983), Chen, Roll and Ross (1986), Kaul (1987).

For Turkey, several researchers investigated the topic with the help of their empirical results. For instance, Saryal (2007) investigated the relation between inflation and share prices for Turkey and Canada. She found that inflation is one of the most important determinations of stock volatility for high inflated countries like Turkey. She observed the idea by the results for Turkey and Canada. Since, Canada is not high inflated country whereas the inflation was quite important problem for the Turkey's economy. Erdogan and Ozlale (2005) and Buyuksalvarcı (2010) investigated the relation between macroeconomic factors and ISE.

As a result, it can be concluded that the topic of the dissertation is quite vital in literature and therefore a number of studies investigated the topic in terms of theories and empirical results.



2.7 Using the proforma provided, complete a time line/Gantt chart

Appendix-D

A. Time Series – Level

Month/Year	ISE-100	ER1	ER2	IR	СРІ	M1	GDP growth (current)
Oca.00	16714,95	0,54388	0,89144	41,85	2575,9	4581701,76190	6,20998
Şub.00	15945,93	0,5624	0,90058	41,54	2671,3	4784440,23810	-6,45161
Mar.00	15920,1	0,57938	0,91417	38,47	2749,3	5163149,47826	6,89655
Nis.00	19205,71	0,59441	0,9417	38,85	2813,2	5372933,00000	11,22254
May.00	16206,42	0,61609	0,93153	38,82	2875,6	5480860,69565	3,33333
Haz.00	14466,12	0,6151	0,92738	43,51	2895,1	5720597,22727	-3,22581
Tem.00	13870,23	0,62642	0,94481	36,08	2960,1	6009422,23810	28,58947
Ağu.00	13132,06	0,64429	0,96174	30,71	3024,4	6152958,21739	0
Eyl.00	11350,3	0,66311	0,9509	42,53	3117,4	6358028,52381	-3,22581
Eki.00	13538,44	0,67575	0,98083	41,49	3214	6248560,63636	0,05192
Kas.00	8747,68	0,68292	0,97458	48,91	3333,3	6560957,22727	-3,22581
Ara.00	9437,21	0,67771	0,9871	81,2	3415,5	7565741,04762	3,33333
Oca.01	10685,07	0,67062	0,99082	51,54	3501,1	7086030,43478	-2,79437
Şub.01	8791,6	0,73811	1,07243	344,1	3564,1	7257465,95000	-9,67742
Mar.01	8022,72	0,96597	1,39182	124,44	3780,5	8259000,95455	10,71429
Nis.01	12367,36	1,20695	1,73054	90,23	4171,2	8441957,19048	18,78023
May.01	10879,83	1,12979	1,61111	69,91	4382	8620423,21739	3,33333
Haz.01	11204,24	1,21268	1,69915	67,06	4519,3	9452627,85714	-3,22581
Tem.01	9914,61	1,31733	1,86115	67,32	4627,5	10014506,13636	31,73253
Ağu.01	9878,88	1,39758	2,00436	66,25	4763,5	10501188,69565	0
Eyl.01	7625,87	1,46632	2,14364	65,94	5044	10408858,25000	-3,22581
Eki.01	9848,76	1,59631	2,31715	64,6	5350,3	9960014,26087	1,29124
Kas.01	11633,93	1,51755	2,18211	60,7	5576,4	10028754,63636	-3,22581
Ara.01	13782,76	1,4487	2,08123	59,78	5756,2	10837016,00000	3,33333
Oca.02	13252,32	1,36589	1,95838	61,6	6062,4	10220411,95652	1,95949
Şub.02	11055,67	1,34673	1,91423	61,43	6168,7	11246411,05000	-9,67742
Mar.02	11679,43	1,35373	1,92439	58,32	6242,1	10919971,09524	10,71429
Nis.02	11441,5	1,31457	1,89249	52,71	6370,4	10836723,04545	8,83352
May.02	10413,7	1,38621	2,02227	49,67	6407,3	11397555,34783	3,33333
Haz.02	9379,92	1,52027	2,2503	52,04	6444,7	11975127,75000	-3,22581
Tem.02	10236,46	1,64912	2,55995	52,7	6537,6	12427368,08696	31,96045
Ağu.02	9547,3	1,6355	2,5127	53,13	6680,4	12892539,95455	0
Eyl.02	8842,24	1,64301	2,55258	53,34	6912,7	13550991,23810	-3,22581
Eki.02	10251,92	1,6469	2,56448	53,83	7139,9	13835666,21739	1,38681
Kas.02	13300,4	1,60389	2,52105	49,59	7347,8	14626663,14286	-3,22581
Ara.02	10369,92	1,58361	2,51046	48,19	7468,6	15079436,40909	3,33333
Oca.03	11032,03	1,65584	2,67212	48,55	7661,9	14667065,60870	0,16438
Şub.03	11574,44	1,62323	2,61575	48,55	7834,9	16276508,25000	-9,67742
Mar.03	9475,09	1,65539	2,61911	48,89	8077,8	14809439,42857	10,71429
Nis.03	11509,95	1,6272	2,5588	48,6	8246,5	14854460,13636	3,19737

May.03	11381,42	1,49038	2,4124	45,34	8377	15793621,77273	3,33333
Haz.03	10884,43	1,4191	2,35566	42,73	8362,6	16248769,80952	-3,22581
Tem.03	10572,04	1,39711	2,27123	41,21	8331,4	17711121,17391	24,25857
Ağu.03	11611,84	1,3971	2,2284	38,19	8344,3	18293068,90476	0
Eyl.03	13055,9	1,37235	2,2037	34,3	8502,6	18895407,90909	-3,22581
Eki.03	15754,34	1,42127	2,37968	29,23	8623,6	20573619,39130	-1,48537
Kas.03	14617,53	1,47245	2,48038	29,13	8762,6	21359241,50000	-3,22581
Ara.03	18625,02	1,42912	2,49726	28,59	8839,5	20917010,13043	3,33333
Oca.04	17259,25	1,34342	2,4444	25,63	8904,7	22690186,22727	-1,39063
Şub.04	18889,2	1,32383	2,47683	24,39	8953,9	22071201,25000	-6,45161
Mar.04	20190,83	1,31586	2,40482	22,81	9033,3	22420272,91304	6,89655
Nis.04	18022,69	1,35137	2,44377	22,77	9086,2	23757865,36364	6,084
May.04	17081,08	1,50134	2,67862	23,33	9120,9	24513814,76190	3,33333
Haz.04	17967,6	1,48875	2,72154	23,87	9109,4	25305566,54545	-3,22581
Tem.04	19380,86	1,44824	2,66647	24,32	9129	26133265,95455	23,03576
Ağu.04	20218,37	1,46737	2,6724	24,4	9181,8	26515956,63636	0
Eyl.04	21953,52	1,49834	2,68496	23,4	9268,2	28153397,72727	-3,22581
Eki.04	22899,89	1,48478	2,6772	23,18	9474,2	27766117,09524	-1,15397
Kas.04	22486,2	1,44542	2,68193	23,2	9620,3	28100674,00000	-3,22581
Ara.04	24971,68	1,39334	2,68548	22,06	9663,3	27842194,65217	3,33333
Oca.05	27330,35	1,35004	2,53928	21,12	9747,64	28608113,04762	-4,38936
Şub.05	28396,17	1,31016	2,4691	19,74	9781,17	27716617,50000	-9,67742
Mar.05	25557,76	1,30496	2,48504	19,45	9820,72	29626435,34783	10,71429
Nis.05	23591,64	1,35351	2,56202	18,76	9926,39	31437739,19048	4,3112
May.05	25236,48	1,36505	2,54006	19,1	10033,32	31120861,50000	3,33333
Haz.05	26957,32	1,35468	2,46482	20,31	10079,6	32651927,18182	-3,22581
Tem.05	29615,29	1,33273	2,33574	20,01	10065,43	34311539,23810	20,69513
Ağu.05	30908,02	1,33663	2,39556	19,94	10168,74	35090110,56522	0
Eyl.05	33333,23	1,33421	2,41343	19,92	10308,92	37317372,36364	-3,22581
Eki.05	31656,05	1,3512	2,38148	19,93	10505,42	37636802,95238	-1,82426
Kas.05	38088,65	1,35369	2,34775	19,89	10634,65	37515906,27273	-3,22581
Ara.05	39777,7	1,34571	2,34875	20,38	10680,72	39050786,81818	3,33333
Oca.06	44590,22	1,32793	2,33739	19,54	10760,84	41039075,04545	-5,1475
Şub.06	47015,88	1,32016	2,30857	19,24	10784,35	37789187,50000	-9,67742
Mar.06	42911,32	1,32873	2,31685	19,07	10813,96	38898042,56522	10,71429
Nis.06	43880,43	1,33092	2,34444	17,97	10958,52	40698369,00000	9,80945
May.06	38132,21	1,41385	2,63533	17,77	11164,03	43300273,78261	3,33333
Haz.06	35453,31	1,59285	2,93831	21,74	11201,48	45524188,31818	-3,22581
Tem.06	36067,92	1,55078	2,85636	23,58	11296,4	44036419,76190	18,70788
Ağu.06	37285,94	1,46219	2,76347	23,7	11246,76	43884265,82609	0
Eyl.06	36924,86	1,47214	2,77815	23,72	11391,32	44326061,00000	-3,22581
Eki.06	40582,25	1,47624	2,76465	23,83	11535,88	43928892,68182	-2,44372
Kas.06	38168,53	1,45102	2,76937	23,74	11684,79	42255762,31818	-3,22581
Ara.06	39117,46	1,4264	2,8001	23,72	11711,79	43247313,33333	3,33333
Oca.07	41182,99	1,4198	2,78035	23,71	11829,35	41664769,30435	-4,5902

Şub.07	41430,99	1,39025	2,71941	22,93	11879,86	40551156,05000	-9,67742
Mar.07	43661,12	1,40287	2,72979	23,02	11988,71	41211560,68182	10,71429
Nis.07	44984,45	1,35528	2,6895	22,48	12133,27	42045231,52381	3,51678
May.07	47081,49	1,33186	2,64247	22,43	12194,22	43300581,65217	3,33333
Haz.07	47093,67	1,3152	2,60894	22,4	12164,62	45626358,09524	-3,22581
Tem.07	52824,89	1,27597	2,59206	22,3	12075,79	45942613,36364	16,77987
Ağu.07	50198,6	1,30828	2,62795	22,08	12078,4	46677857,00000	0
Eyl.07	54044,22	1,26131	2,5426	22,03	12202,93	47942130,00000	-3,22581
Eki.07	57615,72	1,19659	2,44215	21,66	12424,12	49398309,65217	-2,25701
Kas.07	54213,82	1,18475	2,45385	21	12666,21	48044463,77273	-3,22581
Ara.07	55538,13	1,17296	2,37353	21,03	12694,08	51946216,66667	3,33333
Oca.08	42697,56	1,17044	2,30468	21,15	12795,97	48566458,30435	-0,78133
Şub.08	44776,88	1,18817	2,33265	21,22	12960,55	48707472,80952	-6,45161
Mar.08	39015,44	1,23238	2,4658	21,12	13085,08	51748435,23810	6,89655
Nis.08	43468,12	1,29671	2,56779	21,12	13304,51	53171555,86364	7,43783
May.08	39969,63	1,247	2,45026	21,62	13503,05	52513055,50000	3,33333
Haz.08	35089,53	1,2278	2,40948	22,66	13455,19	54035389,95238	-3,22581
Tem.08	42200,75	1,20995	2,40575	23,05	13532,69	54100722,56522	12,0436
Ağu.08	39844,48	1,17267	2,22305	22,97	13499,6	54416804,85714	0
Eyl.08	36051,3	1,22964	2,21148	23,86	13560,56	56880579,90909	-3,22581
Eki.08	27832,93	1,47327	2,49189	24,98	13913,24	57929787,05556	-8,17355
Kas.08	25714,98	1,58785	2,44044	25,67	14029,06	57648830,50000	-3,22581
Ara.08	26864,07	1,53881	2,29484	25,68	13971,59	59462440,69565	3,33333
Oca.09	25934,37	1,58905	2,29367	20,32	14011,65	56225100,40909	-8,84597
Şub.09	24026,59	1,65236	2,38061	18,29	13963,75	57098457,00000	-9,67742
Mar.09	25764,83	1,70454	2,41735	18,17	14117,89	59802434,31818	10,71429
Nis.09	31651,81	1,60415	2,35241	17,49	14120,5	59685518,36364	5,21429
May.09	35002,99	1,55176	2,38206	17,36	14211,07	60003753,38095	3,33333
Haz.09	36949,2	1,53978	2,51527	17,42	14226,74	61263013,09091	-3,22581
Tem.09	42641,26	1,51369	2,47551	17,01	14262,44	61445065,73913	17,02866
Ağu.09	46551,19	1,47922	2,44709	16,84	14219,77	61662764,12500	0
Eyl.09	47910,3	1,48523	2,42636	16,55	14275,51	66121180,68182	-3,22581
Eki.09	47184,71	1,46214	2,3607	15,67	14619,49	65338594,95455	0,42724
Kas.09	45350,17	1,48002	2,45819	15,62	14804,97	67828924,19048	-3,22581
Ara.09	52825,02	1,49951	2,43625	15,67	14883,35	69659732,69565	3,33333
Oca.10	54650,58	1,46632	2,37144	15,47	15158,53	68549657,14286	-3,13272
Şub.10	49705,49	1,50556	2,35844	15,55	15377,98	69079946,50000	-9,67742
Mar.10	56538,37	1,52831	2,30017	15,53	15467,67	71388227,39130	10,71429
Nis.10	57341,03	1,48787	2,2775	15,54	15559,98	72722619,77273	5,6266
May.10	54384,94	1,53481	2,25822	15,64	15504,25	75949587,33333	3,33333
Haz.10	54839,46	1,57029	2,31122	15,67	15417,16	79104196,72727	-3,22581
Tem.10	59866,75	1,53631	2,34243	15,06	15343,14	80110049,45455	13,73726
Ağu.10	59972,59	1,50163	2,35254	15,22	15404,97	80932439,64706	0
Eyl.10	65774,37	1,48892	2,31425	15,08	15593,94	85115111,22727	-3,22581
Eki.10	68760,46	1,41846	2,24758	14,05	15879,58	84670864,47619	3,25836

65350,85	1,42953	2,28409	14,14	15883,93	91387891,00000	-3,22581
66004,48	1,51315	2,3595	12,98	15836,03	89808661,21739	3,33333
63278,07	1,55382	2,44565	12,07	15901,35	91367463,23810	-0,46991
61283,87	1,58283	2,54996	12,01	16017,17	92314755,70000	-9,67742
64434,87	1,57467	2,54496	12,16	16084,22	94227778,08696	10,71429
69250,14	1,51562	2,47662	13,27	16223,55	96391252,71429	4,85079
63046,02	1,56416	2,55761	14,74	16616,3	98950823,13636	3,33333
63269,4	1,59401	2,58723	14,81	16378,56	102220158,50000	-3,22581
62295,68	1,64671	2,65244	14,99	16311,51	104282165,42857	13,92496
53946,09	1,74424	2,85401	14,9	16429,94	105969235,65217	0
59693,43	1,78652	2,82273	14,92	16553,6	104983422,72727	-3,22581
56061,47	1,82708	2,87134	15,13	17095,25	105505527,76191	-0,16309
54517,76	1,80378	2,84696	15,33	17390,46	106156908,63636	-3,22581
51266,62	1,85885	2,90169	15,9	17490,61	102887055,31818	3,33333
	65350,85 66004,48 63278,07 61283,87 64434,87 69250,14 63046,02 63269,4 62295,68 53946,09 59693,43 56061,47 54517,76 51266,62	65350,851,4295366004,481,5131563278,071,5538261283,871,5828364434,871,5746769250,141,5156263046,021,5641663269,41,5940162295,681,6467153946,091,7442459693,431,7865256061,471,8270854517,761,8037851266,621,85885	65350,851,429532,2840966004,481,513152,359563278,071,553822,4456561283,871,582832,5499664434,871,574672,5449669250,141,515622,4766263046,021,564162,5576163269,41,594012,5872362295,681,646712,6524453946,091,744242,8540159693,431,786522,8227356061,471,803782,8469651266,621,858852,90169	65350,851,429532,2840914,1466004,481,513152,359512,9863278,071,553822,4456512,0761283,871,582832,5499612,0164434,871,574672,5449612,1669250,141,515622,4766213,2763046,021,564162,5576114,7463269,41,594012,5872314,8162295,681,646712,6524414,9953946,091,744242,8540114,9256061,471,827082,8713415,1354517,761,803782,8469615,3351266,621,858852,9016915,9	65350,851,429532,2840914,1415883,9366004,481,513152,359512,9815836,0363278,071,553822,4456512,0715901,3561283,871,582832,5499612,0116017,1764434,871,574672,5449612,1616084,2269250,141,515622,4766213,2716223,5563046,021,564162,5576114,7416616,363269,41,594012,5872314,8116378,5662295,681,646712,6524414,9916311,5153946,091,744242,8540114,916429,9459693,431,786522,8227314,9216553,656061,471,803782,8469615,3317390,4651266,621,858852,9016915,917490,61	65350,851,429532,2840914,1415883,9391387891,000066004,481,513152,359512,9815836,0389808661,2173963278,071,553822,4456512,0715901,3591367463,2381061283,871,582832,5499612,0116017,1792314755,7000064434,871,574672,5449612,1616084,2294227778,0869669250,141,515622,4766213,2716223,5596391252,7142963046,021,564162,5576114,7416616,398950823,1363663269,41,594012,5872314,8116378,56102220158,5000062295,681,646712,6524414,9916311,51104282165,4285753946,091,744242,8540114,916429,94105969235,6521759693,431,786522,8227314,921653,6104983422,7272756061,471,827082,8713415,1317095,25105505527,7619154517,761,803782,8469615,3317390,46106156908,6363651266,621,858852,9016915,917490,61102887055,31818

B. The Logarithmic Series

Month/Year	LISE-100	LER1	LER2	LCPI	LM1
Oca.00	9,724059	-0,60903	-0,11492	7,853954	15,33758
Şub.00	9,676959	-0,57554	-0,10472	7,890321	15,38088
Mar.00	9,675338	-0,5458	-0,08974	7,919102	15,45706
Nis.00	9,862963	-0,52019	-0,06007	7,942078	15,49688
May.00	9,693163	-0,48436	-0,07093	7,964017	15,51677
Haz.00	9,579565	-0,48597	-0,07539	7,970775	15,55958
Tem.00	9,5375	-0,46773	-0,05677	7,992978	15,60884
Ağu.00	9,482812	-0,43961	-0,03901	8,014468	15,63244
Eyl.00	9,336999	-0,41081	-0,05035	8,044755	15,66523
Eki.00	9,513288	-0,39193	-0,01936	8,075272	15,64786
Kas.00	9,076544	-0,38138	-0,02575	8,111718	15,69665
Ara.00	9,152416	-0,38904	-0,01298	8,136079	15,83914
Oca.01	9,276603	-0,39955	-0,00922	8,160832	15,77364
Şub.01	9,081552	-0,30366	0,069927	8,178667	15,79754
Mar.01	8,990033	-0,03462	0,330612	8,237612	15,92681
Nis.01	9,422816	0,188097	0,548433	8,335959	15,94872
May.01	9,294666	0,122032	0,476923	8,385261	15,96964
Haz.01	9,324048	0,192833	0,530128	8,416112	16,0618
Tem.01	9,201765	0,275607	0,621195	8,439772	16,11955
Ağu.01	9,198154	0,334742	0,695325	8,468738	16,167
Eyl.01	8,939302	0,382756	0,762505	8,525955	16,15817
Eki.01	9,195101	0,467695	0,840338	8,584908	16,11409
Kas.01	9,361681	0,417097	0,780292	8,626299	16,12097
Ara.01	9,531174	0,370667	0,732959	8,658033	16,19848
Oca.02	9,491928	0,311806	0,672118	8,709861	16,1399
Şub.02	9,310699	0,297679	0,649315	8,727243	16,23556

Mar.02	9,365584	0,302864	0,654609	8,739072	16,2061
Nis.02	9,345002	0,27351	0,637893	8,759418	16,19845
May.02	9,250878	0,326573	0,704221	8,765193	16,24891
Haz.02	9,146327	0,418888	0,811064	8,771013	16,29834
Tem.02	9,233711	0,500242	0,939988	8,785325	16,33541
Ağu.02	9,164014	0,491949	0,921358	8,806933	16,37216
Eyl.02	9,087296	0,49653	0,937105	8,841116	16,42197
Eki.02	9,23522	0,498895	0,941756	8,873454	16,44276
Kas.02	9,495549	0,472432	0,924675	8,902156	16,49836
Ara.02	9,246665	0,459707	0,920466	8,918463	16,52884
Oca.03	9,308558	0,504308	0,982872	8,944015	16,50112
Şub.03	9,356554	0,484418	0,961551	8,966343	16,60523
Mar.03	9,156422	0,504037	0,962835	8,996875	16,51078
Nis.03	9,350967	0,486861	0,939538	9,017544	16,51381
May.03	9,339737	0,399031	0,880622	9,033245	16,57512
Haz.03	9,295089	0,350023	0,856821	9,031525	16,60353
Tem.03	9,265968	0,334406	0,820322	9,027787	16,6897
Ağu.03	9,359781	0,334399	0,801284	9,029334	16,72203
Eyl.03	9,476995	0,316525	0,790138	9,048127	16,75443
Eki.03	9,664871	0,351551	0,866966	9,062258	16,83952
Kas.03	9,589977	0,386928	0,908412	9,078248	16,877
Ara.03	9,832261	0,357059	0,915194	9,086986	16,85607
Oca.04	9,756104	0,295219	0,8938	9,094335	16,93744
Şub.04	9,846346	0,280529	0,90698	9,099844	16,90978
Mar.04	9,912984	0,27449	0,877475	9,108673	16,92548
Nis.04	9,799387	0,301119	0,893542	9,114512	16,98342
May.04	9,745727	0,406358	0,985302	9,118324	17,01475
Haz.04	9,796325	0,397937	1,001198	9,117062	17,04653
Tem.04	9,872041	0,370349	0,980756	9,119211	17,07872
Ağu.04	9,914347	0,383472	0,982977	9,124979	17,09326
Eyl.04	9,996683	0,404358	0,987666	9,134344	17,15318
Eki.04	10,03889	0,395267	0,984771	9,156328	17,13933
Kas.04	10,02066	0,3684	0,986537	9,171631	17,1513
Ara.04	10,1255	0,331704	0,987859	9,17609	17,14206
Oca.05	10,21575	0,300134	0,931881	9,18478	17,1692
Şub.05	10,25401	0,270149	0,903854	9,188214	17,13754
Mar.05	10,1487	0,266172	0,910289	9,19225	17,20418
Nis.05	10,06865	0,302701	0,940796	9,202952	17,26352
May.05	10,13605	0,311191	0,932188	9,213667	17,25339
Haz.05	10,20201	0,303565	0,902119	9,218269	17,30141
Tem.05	10,29605	0,287229	0,848329	9,216862	17,35099
Ağu.05	10,33877	0,290152	0,873617	9,227074	17,37343
Eyl.05	10,41431	0,288339	0,881049	9,240765	17,43497
Eki.05	10,36268	0,300993	0,867722	9,259647	17,44349
Kas.05	10,54767	0,302834	0,853457	9,271873	17,44028

Ara.05	10,59106	0,296922	0,853883	9,276196	17,48037
Oca.06	10,70527	0,283621	0,849035	9,283669	17,53004
Şub.06	10,75824	0,277753	0,836628	9,285851	17,44753
Mar.06	10,66689	0,284224	0,840209	9,288593	17,47645
Nis.06	10,68922	0,28587	0,852047	9,301873	17,5217
May.06	10,54881	0,346316	0,969008	9,320452	17,58367
Haz.06	10,47597	0,465525	1,077835	9,323801	17,63375
Tem.06	10,49316	0,438758	1,049548	9,332239	17,60053
Ağu.06	10,52637	0,379935	1,016487	9,327835	17,59707
Eyl.06	10,51664	0,386717	1,021785	9,340607	17,60708
Eki.06	10,61109	0,389498	1,016914	9,353217	17,59808
Kas.06	10,54977	0,372267	1,01862	9,366043	17,55925
Ara.06	10,57432	0,355154	1,029655	9,368351	17,58245
Oca.07	10,62578	0,350516	1,022577	9,378339	17,54517
Şub.07	10,63178	0,329484	1,000415	9,3826	17,51807
Mar.07	10,68421	0,33852	1,004225	9,391721	17,53423
Nis.07	10,71407	0,304008	0,989355	9,403707	17,55426
May.07	10,75964	0,286576	0,971714	9,408717	17,58368
Haz.07	10,75989	0,273989	0,958944	9,406287	17,636
Tem.07	10,87474	0,243707	0,952453	9,398958	17,6429
Ağu.07	10,82374	0,268713	0,966204	9,399174	17,65878
Eyl.07	10,89756	0,232151	0,933187	9,409431	17,68551
Eki.07	10,96155	0,179476	0,892879	9,427395	17,71543
Kas.07	10,90069	0,169532	0,897658	9,446693	17,68764
Ara.07	10,92483	0,15953	0,864378	9,448891	17,76572
Oca.08	10,6619	0,15738	0,834942	9,456886	17,69844
Şub.08	10,70945	0,172414	0,847005	9,469665	17,70134
Mar.08	10,57171	0,208947	0,902516	9,479228	17,7619
Nis.08	10,67978	0,25983	0,943046	9,495858	17,78903
May.08	10,59588	0,220741	0,896194	9,510671	17,77657
Haz.08	10,46566	0,205224	0,879411	9,50712	17,80515
Tem.08	10,65019	0,190579	0,877862	9,512864	17,80636
Ağu.08	10,59274	0,159283	0,79888	9,510415	17,81218
Eyl.08	10,4927	0,206721	0,793662	9,514921	17,85646
Eki.08	10,23398	0,387484	0,913041	9,540596	17,87474
Kas.08	10,15483	0,462381	0,892178	9,548886	17,86988
Ara.08	10,19854	0,431009	0,830663	9,544781	17,90086
Oca.09	10,16332	0,463136	0,830153	9,547644	17,84487
Şub.09	10,08692	0,502205	0,867357	9,54422	17,86029
Mar.09	10,15677	0,533295	0,882672	9,555198	17,90656
Nis.09	10,36255	0,472594	0,85544	9,555383	17,9046
May.09	10,46319	0,43939	0,867966	9,561777	17,90992
Haz.09	10,5173	0,43164	0,92238	9,562879	17,93069
Tem.09	10,66058	0,41455	0,906446	9,565385	17,93365
Ağu.09	10,74831	0,391515	0,8949	9,562389	17,93719

Eyl.09	10,77709	0,39557	0,886392	9,566301	18,007
Eki.09	10,76183	0,379901	0,858958	9,590111	17,99509
Kas.09	10,72217	0,392056	0,899425	9,602718	18,0325
Ara.09	10,87474	0,405138	0,89046	9,607998	18,05913
Oca.10	10,90872	0,382756	0,863497	9,626319	18,04307
Şub.10	10,81387	0,409165	0,858	9,640692	18,05078
Mar.10	10,94267	0,424163	0,832983	9,646507	18,08364
Nis.10	10,95677	0,397346	0,823078	9,652458	18,10216
May.10	10,90384	0,428407	0,814577	9,648869	18,14558
Haz.10	10,91217	0,45126	0,837776	9,643236	18,18628
Tem.10	10,99988	0,429383	0,851189	9,638424	18,19891
Ağu.10	11,00164	0,406551	0,855496	9,642445	18,20913
Eyl.10	11,09399	0,398051	0,839086	9,654638	18,25952
Eki.10	11,13838	0,349572	0,809854	9,672789	18,25428
Kas.10	11,08753	0,357346	0,825968	9,673063	18,33062
Ara.10	11,09748	0,414194	0,85845	9,670043	18,31319
Oca.11	11,05529	0,440716	0,894311	9,674159	18,3304
Şub.11	11,02327	0,459214	0,936078	9,681417	18,34071
Mar.11	11,07341	0,454046	0,934115	9,685594	18,36123
Nis.11	11,14548	0,415825	0,906895	9,694219	18,38393
May.11	11,05162	0,447349	0,939073	9,718139	18,41013
Haz.11	11,05516	0,466253	0,950588	9,703728	18,44264
Tem.11	11,03965	0,498779	0,97548	9,699626	18,46261
Ağu.11	10,89574	0,556319	1,048725	9,706861	18,47866
Eyl.11	10,99698	0,58027	1,037705	9,714359	18,46931
Eki.11	10,9342	0,602719	1,054779	9,746556	18,47427
Kas.11	10,90628	0,589884	1,046252	9,763677	18,48043
Ara.11	10,8448	0,619958	1,065293	9,769419	18,44914

C. The First Difference Logarithmic Series

Month/Year	DLISE-100	DLER1	DLER2	DIR	DLCPI	DLM1	DGDP
Oca.00	NA	NA	NA	NA	NA	NA	NA
Şub.00	-0,0471	0,033485	0,010201	-0,31	0,036367	0,0433	-12,6616
Mar.00	-0,00162	0,029745	0,014977	-3,07	0,028781	0,07618	13,34816
Nis.00	0,187625	0,025611	0,02967	0,38	0,022976	0,03982	4,32599
May.00	-0,1698	0,035824	-0,01086	-0,03	0,021939	0,01989	-7,88921
Haz.00	-0,1136	-0,00161	-0,00447	4,69	0,006758	0,04281	-6,55914
Tem.00	-0,04207	0,018236	0,018621	-7,43	0,022203	0,04926	31,81528
Ağu.00	-0,05469	0,028128	0,01776	-5,37	0,02149	0,0236	-28,5895
Eyl.00	-0,14581	0,028792	-0,01134	11,82	0,030287	0,03279	-3,22581
Eki.00	0,176289	0,018882	0,03099	-1,04	0,030517	-0,01737	3,27773

Kas.00	-0,43674	0,010554	-0,00639	7,42	0,036446	0,04879	-3,27773
Ara.00	0,075872	-0,00766	0,012765	32,29	0,024361	0,14249	6,55914
Oca.01	0,124187	-0,01052	0,003762	-29,66	0,024753	-0,0655	-6,1277
Şub.01	-0,19505	0,095891	0,079149	292,56	0,017835	0,0239	-6,88305
Mar.01	-0,09152	0,269039	0,260685	-219,66	0,058945	0,12927	20,39171
Nis.01	0,432783	0,22272	0,217821	-34,21	0,098347	0,02191	8,06594
May.01	-0,12815	-0,06607	-0,07151	-20,32	0,049302	0,02092	-15,4469
Haz.01	0,029382	0,070801	0,053205	-2,85	0,030851	0,09216	-6,55914
Tem.01	-0,12228	0,082774	0,091067	0,26	0,02366	0,05775	34,95834
Ağu.01	-0,00361	0,059135	0,07413	-1,07	0,028966	0,04745	-31,7325
Eyl.01	-0,25885	0,048014	0,06718	-0,31	0,057217	-0,00883	-3,22581
Eki.01	0,255799	0,084939	0,077833	-1,34	0,058953	-0,04408	4,51705
Kas.01	0,16658	-0,0506	-0,06005	-3,9	0,041391	0,00688	-4,51705
Ara.01	0,169493	-0,04643	-0,04733	-0,92	0,031734	0,07751	6,55914
Oca.02	-0,03925	-0,05886	-0,06084	1,82	0,051828	-0,05858	-1,37384
Şub.02	-0,18123	-0,01413	-0,0228	-0,17	0,017382	0,09566	-11,6369
Mar.02	0,054885	0,005185	0,005294	-3,11	0,011829	-0,02946	20,39171
Nis.02	-0,02058	-0,02935	-0,01672	-5,61	0,020346	-0,00765	-1,88077
May.02	-0,09412	0,053063	0,066328	-3,04	0,005775	0,05046	-5,50019
Haz.02	-0,10455	0,092315	0,106843	2,37	0,00582	0,04943	-6,55914
Tem.02	0,087384	0,081354	0,128924	0,66	0,014312	0,03707	35,18626
Ağu.02	-0,0697	-0,00829	-0,01863	0,43	0,021608	0,03675	-31,9605
Eyl.02	-0,07672	0,004581	0,015747	0,21	0,034183	0,04981	-3,22581
Eki.02	0,147924	0,002365	0,004651	0,49	0,032338	0,02079	4,61262
Kas.02	0,260329	-0,02646	-0,01708	-4,24	0,028702	0,0556	-4,61262
Ara.02	-0,24888	-0,01273	-0,00421	-1,4	0,016307	0,03048	6,55914
Oca.03	0,061893	0,044601	0,062406	0,36	0,025552	-0,02772	-3,16895
Şub.03	0,047996	-0,01989	-0,02132	0	0,022328	0,10411	-9,8418
Mar.03	-0,20013	0,019619	0,001284	0,34	0,030532	-0,09445	20,39171
Nis.03	0,194545	-0,01718	-0,0233	-0,29	0,020669	0,00303	-7,51692
May.03	-0,01123	-0,08783	-0,05892	-3,26	0,015701	0,06131	0,13596
Haz.03	-0,04465	-0,04901	-0,0238	-2,61	-0,00172	0,02841	-6,55914
Tem.03	-0,02912	-0,01562 -7,00E-	-0,0365	-1,52	-0,00374	0,08617	27,48438
Ağu.03	0,093813	06	-0,01904	-3,02	0,001547	0,03233	-24,2586
Eyl.03	0,117214	-0,01787	-0,01115	-3,89	0,018793	0,0324	-3,22581
Eki.03	0,187876	0,035026	0,076828	-5,07	0,014131	0,08509	1,74044
Kas.03	-0,07489	0,035377	0,041446	-0,1	0,01599	0,03748	-1,74044
Ara.03	0,242284	-0,02987	0,006782	-0,54	0,008738	-0,02093	6,55914
Oca.04	-0,07616	-0,06184	-0,02139	-2,96	0,007349	0,08137	-4,72396
Şub.04	0,090242	-0,01469	0,01318	-1,24	0,005509	-0,02766	-5,06098
Mar.04	0,066638	-0,00604	-0,02951	-1,58	0,008829	0,0157	13,34816
Nis.04	-0,1136	0,026629	0,016067	-0,04	0,005839	0,05794	-0,81255
May.04	-0,05366	0,105239	0,09176	0,56	0,003812	0,03133	-2,75067
Haz.04	0,050598	-0,00842	0,015896	0,54	-0.00126	0.03178	-6,55914

Tem.04	0,075716	-0,02759	-0,02044	0,45	0,002149	0,03219	26,26157
Ağu.04	0,042306	0,013123	0,002221	0,08	0,005768	0,01454	-23,0358
Eyl.04	0,082336	0,020886	0,004689	-1	0,009365	0,05992	-3,22581
Eki.04	0,042207	-0,00909	-0,0029	-0,22	0,021984	-0,01385	2,07184
Kas.04	-0,01823	-0,02687	0,001766	0,02	0,015303	0,01197	-2,07184
Ara.04	0,10484	-0,0367	0,001322	-1,14	0,004459	-0,00924	6,55914
Oca.05	0,09025	-0,03157	-0,05598	-0,94	0,00869	0,02714	-7,72269
Şub.05	0,03826	-0,02999	-0,02803	-1,38	0,003434	-0,03166	-5,28806
Mar.05	-0,10531	-0,00398	0,006435	-0,29	0,004036	0,06664	20,39171
Nis.05	-0,08005	0,036529	0,030507	-0,69	0,010702	0,05934	-6,40309
May.05	0,0674	0,00849	-0,00861	0,34	0,010715	-0,01013	-0,97787
Haz.05	0,06596	-0,00763	-0,03007	1,21	0,004602	0,04802	-6,55914
Tem.05	0,09404	-0,01634	-0,05379	-0,3	-0,00141	0,04958	23,92094
Ağu.05	0,04272	0,002923	0,025288	-0,07	0,010212	0,02244	-20,6951
Eyl.05	0,07554	-0,00181	0,007432	-0,02	0,013691	0,06154	-3,22581
Eki.05	-0,05163	0,012654	-0,01333	0,01	0,018882	0,00852	1,40155
Kas.05	0,18499	0,001841	-0,01427	-0,04	0,012226	-0,00321	-1,40155
Ara.05	0,04339	-0,00591	0,000426	0,49	0,004323	0,04009	6,55914
Oca.06	0,11421	-0,0133	-0,00485	-0,84	0,007473	0,04967	-8,48083
Şub.06	0,05297	-0,00587	-0,01241	-0,3	0,002182	-0,08251	-4,52992
Mar.06	-0,09135	0,006471	0,003581	-0,17	0,002742	0,02892	20,39171
Nis.06	0,02233	0,001646	0,011838	-1,1	0,01328	0,04525	-0,90484
May.06	-0,14041	0,060446	0,116961	-0,2	0,018579	0,06197	-6,47612
Haz.06	-0,07284	0,119209	0,108827	3,97	0,003349	0,05008	-6,55914
Tem.06	0,01719	-0,02677	-0,02829	1,84	0,008438	-0,03322	21,93369
Ağu.06	0,03321	-0,05882	-0,03306	0,12	-0,0044	-0,00346	-18,7079
Eyl.06	-0,00973	0,006782	0,005298	0,02	0,012772	0,01001	-3,22581
Eki.06	0,09445	0,002781	-0,00487	0,11	0,01261	-0,009	0,78209
Kas.06	-0,06132	-0,01723	0,001706	-0,09	0,012826	-0,03883	-0,78209
Ara.06	0,02455	-0,01711	0,011035	-0,02	0,002308	0,0232	6,55914
Oca.07	0,05146	-0,00464	-0,00708	-0,01	0,009988	-0,03728	-7,92353
Şub.07	0,006	-0,02103	-0,02216	-0,78	0,004261	-0,0271	-5,08722
Mar.07	0,05243	0,009036	0,00381	0,09	0,009121	0,01616	20,39171
Nis.07	0,02986	-0,03451	-0,01487	-0,54	0,011986	0,02003	-7,19751
May.07	0,04557	-0,01743	-0,01764	-0,05	0,00501	0,02942	-0,18345
Haz.07	0,00025	-0,01259	-0,01277	-0,03	-0,00243	0,05232	-6,55914
Tem.07	0,11485	-0,03028	-0,00649	-0,1	-0,00733	0,0069	20,00568
Ağu.07	-0,051	0,025006	0,013751	-0,22	0,000216	0,01588	-16,7799
Eyl.07	0,07382	-0,03656	-0,03302	-0,05	0,010257	0,02673	-3,22581
Eki.07	0,06399	-0,05268	-0,04031	-0,37	0,017964	0,02992	0,9688
Kas.07	-0,06086	-0,00994	0,004779	-0,66	0,019298	-0,02779	-0,9688
Ara.07	0,02414	-0,01	-0,03328	0,03	0,002198	0,07808	6,55914
Oca.08	-0,26293	-0,00215	-0,02944	0,12	0,007995	-0,06728	-4,11466
Şub.08	0,04755	0,015034	0,012063	0,07	0,012779	0,0029	-5,67028
Mar.08	-0,13774	0,036533	0,055511	-0,1	0,009563	0,06056	13,34816

Nis.08	0,10807	0,050883	0,04053	0	0,01663	0,02713	0,54128
May.08	-0,0839	-0,03909	-0,04685	0,5	0,014813	-0,01246	-4,1045
Haz.08	-0,13022	-0,01552	-0,01678	1,04	-0,00355	0,02858	-6,55914
Tem.08	0,18453	-0,01465	-0,00155	0,39	0,005744	0,00121	15,26941
Ağu.08	-0,05745	-0,0313	-0,07898	-0,08	-0,00245	0,00582	-12,0436
Eyl.08	-0,10004	0,047438	-0,00522	0,89	0,004506	0,04428	-3,22581
Eki.08	-0,25872	0,180763	0,119379	1,12	0,025675	0,01828	-4,94774
Kas.08	-0,07915	0,074897	-0,02086	0,69	0,00829	-0,00486	4,94774
Ara.08	0,04371	-0,03137	-0,06152	0,01	-0,00411	0,03098	6,55914
Oca.09	-0,03522	0,032127	-0,00051	-5,36	0,002863	-0,05599	-12,1793
Şub.09	-0,0764	0,039069	0,037204	-2,03	-0,00342	0,01542	-0,83145
Mar.09	0,06985	0,03109	0,015315	-0,12	0,010978	0,04627	20,39171
Nis.09	0,20578	-0,0607	-0,02723	-0,68	0,000185	-0,00196	-5,5
May.09	0,10064	-0,0332	0,012526	-0,13	0,006394	0,00532	-1,88096
Haz.09	0,05411	-0,00775	0,054414	0,06	0,001102	0,02077	-6,55914
Tem.09	0,14328	-0,01709	-0,01593	-0,41	0,002506	0,00296	20,25447
Ağu.09	0,08773	-0,02304	-0,01155	-0,17	-0,003	0,00354	-17,0287
Eyl.09	0,02878	0,004055	-0,00851	-0,29	0,003912	0,06981	-3,22581
Eki.09	-0,01526	-0,01567	-0,02743	-0,88	0,02381	-0,01191	3,65305
Kas.09	-0,03966	0,012155	0,040467	-0,05	0,012607	0,03741	-3,65305
Ara.09	0,15257	0,013082	-0,00897	0,05	0,00528	0,02663	6,55914
Oca.10	0,03398	-0,02238	-0,02696	-0,2	0,018321	-0,01606	-6,46605
Şub.10	-0,09485	0,026409	-0,0055	0,08	0,014373	0,00771	-6,5447
Mar.10	0,1288	0,014998	-0,02502	-0,02	0,005815	0,03286	20,39171
Nis.10	0,0141	-0,02682	-0,00991	0,01	0,005951	0,01852	-5 <i>,</i> 08769
May.10	-0,05293	0,031061	-0,0085	0,1	-0,00359	0,04342	-2,29327
Haz.10	0,00833	0,022853	0,023199	0,03	-0,00563	0,0407	-6,55914
Tem.10	0,08771	-0,02188	0,013413	-0,61	-0,00481	0,01263	16,96307
Ağu.10	0,00176	-0,02283	0,004307	0,16	0,004021	0,01022	-13,7373
Eyl.10	0,09235	-0,0085	-0,01641	-0,14	0,012193	0,05039	-3,22581
Eki.10	0,04439	-0,04848	-0,02923	-1,03	0,018151	-0,00524	6,48417
Kas.10	-0,05085	0,007774	0,016114	0,09	0,000274	0,07634	-6,48417
Ara.10	0,00995	0,056848	0,032482	-1,16	-0,00302	-0,01743	6,55914
Oca.11	-0,04219	0,026522	0,035861	-0,91	0,004116	0,01721	-3,80324
Şub.11	-0,03202	0,018498	0,041767	-0,06	0,007258	0,01031	-9,20751
Mar.11	0,05014	-0,00517	-0,00196	0,15	0,004177	0,02052	20,39171
Nis.11	0,07207	-0,03822	-0,02722	1,11	0,008625	0,0227	-5,8635
May.11	-0,09386	0,031524	0,032178	1,47	0,02392	0,0262	-1,51746
Haz.11	0,00354	0,018904	0,011515	0,07	-0,01441	0,03251	-6,55914
Tem.11	-0,01551	0,032526	0,024892	0,18	-0,0041	0,01997	17,15077
Ağu.11	-0,14391	0,05754	0,073245	-0,09	0,007235	0,01605	-13,925
Eyl.11	0,10124	0,023951	-0,01102	0,02	0,007498	-0,00935	-3,22581
Eki.11	-0,06278	0,022449	0,017074	0,21	0,032197	0,00496	3,06272
Kas.11	-0,02792	-0,01284	-0,00853	0,2	0,017121	0,00616	-3,06272
Ara.11	-0,06148	0,030074	0,019041	0,57	0,005742	-0,03129	6,55914