ANALYSIS OF THE EFFECTS OF MACROECONOMIC FACTORS ON ISTANBUL STOCK EXCHANGE (2000-2010)

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ANALYSIS OF THE EFFECTS OF MACROECONOMIC FACTORS ON ISTANBUL STOCK EXCHANGE (2000-2010)

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Approval of the Graduate School of Social Sciences

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Financial Economics.

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ABSTRACT

ANALYSIS OF THE EFFECTS OF MACROECONOMIC FACTORS ON ISTANBUL STOCK EXCHANGE (2000-2010)

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This thesis analyzes reasons of observed fluctuations at Istanbul Stock Exchange National-100 Index in terms of macroeconomic factors by using monthly data and test the hypothesis that 'volatility of financial markets consists of macroeconomic effects' that is suggested b economic theory for ISE using correlation and Granger Causality Tests. At the end of the study, significant binary correlations between ISE National-100 Index and all other variables were determined. Moreover, as a result of the study, it was determined that traded volume of ISE, CPI and WPI Granger Cause ISE National-100 Index. On the other hand ISE National-100 Index Granger Causes currency basket, foreign transaction volume of ISE, Central Bank Money and current account deficit/GDP. Finally, it was also determined that there are mutual relationships between ISE National-100 Index and the variables of interbank overnight interest rate, treasury interest rate, M1, M2, M2Y and industrial production index.

Keywords: ISE, CORRELATION, CAUSALITY, MACROECONOMIC FACTORS

ÖZET

MAKRO EKONOMİK FAKTÖRLERİN İSTANBUL MENKUL KIYMETLER BORSASI ÜZERİNDEKİ ETKİLERİNİN ANALİZİ(2000-2010)

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Bu calisma, İstanbul Menkul Kıymetler Borsası Ulusal-100 Endeksi' nde gözlenen değişimlerin nedenini makro ekonomik faktörler açısından aylık verilerle analiz eder ve yine bu çalışmada ekonomi teorisinde yer bulan ' finansal piyasaların volatilitesi makro ekonomik etkilerinde oluşur' hipotezi İMKB açısından korelasyon testi ve Granger Nedensellik yöntemleri kullanılarak test edilmiştir. Çalışmanın sonunda, İMKB Ulusal-100 Endeksi ile diğer tüm değişkenler arasında anlamlı ikili korelasyonlar tespit edilmiştir. Dahası, çalışma sonucunda, IMKB işlem miktarı, TÜFE ve TEFE verilerinin İMKB Ulusal-100 Endeksi' nin Granger Nedeni olduğu tespit edilmiştir. Diğer taraftan, elde edilen sonuçlara gore İMKB Ulusal-100 Endeksi döviz sepeti, İMKB' de yabancıların işlem hacmi, Merkez Bankası Parası, cari açık/GSYİH verilerinin Granger Nedenidir. Son olarak ise İMKB Ulusal-100 Endeksi ile bankalararası gecelik faiz oranı, hazine faiz oranı, M1, M2, M2Y ve sanayi üretim endeksi verileri arasında ikili ilişkiler bulunduğu tespit edilmiştir.

Anahtar Kelimeler:İMKB, KORELASYON, NEDENSELLİK, MAKRO EKONOMİK FAKTÖRLER

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VITA

Onur Kaya was born in Kahramanmaraş on March 31, 1981. He received his B.S. degree in Economics from the Celal Bayar University in July 2003. He worked in Tamsa Fayans ve Seramik A.Ş. as a strategic planner from July 2005 to December 2006. He has been working as a senior financial analyst in Şekerbank T.A.Ş. since February 2007. He also has a credit rating surveyor certificate from Capital Markets Board of Turkey.

1. INTRODUCTION

Two of the crucial issues that are struggled by countries in the period of development are increasing savings and efficiently turning that savings into investments. Channelizing savings to feasible investments has vital importance especially for emerging countries in economic development perspective. Sustainable economic development can also be possible provided that raising savings that are directed to productive sectors. Thus, forming a financial infrastructure that channelizes savings to investments has a remarkable importance.

In economy, an efficiently working financial system is indispensably required in order to make funds be directed to economic units who needs them from economic units that has excess funds. In the period of economic development, the facts that increase the necessity of capital markets can be gathered in four points;

- Financial needs of the companies increase in the periods of economic development. Key factors that set the financial needs of the company are selected economic scale and manufacturing technology. Interferences as founding large scale companies and raising the scale head the companies that do not have sufficient internal finance opportunities use external funds. In this context, capital markets are critically important for the purpose of offsetting financial needs of the companies.
- With the economic development, increase in and becoming widespread of savings raise the necessity of capital markets where savings bear to.

- Achieving and sustainability of economic development requires not only growing savings but also efficient usage of savings by being transferred them to investments. In this context, capital markets channelize savings to investment without any attrition and avert dissipation of economic sources by directing funds to entrepreneurs who are well-qualified.
- Capital markets play an active role in improving wealth and income distribution by making ownership of instrumental capital becomes widespread and making derived profit be distributed to wide masses.

Consequently, efficiently operating capital markets as an alternative system in order to provide funds flow is separately important especially in emerging countries that have savings gap in terms of effective usage of savings. Effectively conversion of domestic savings to investments directly communicates with healthy operating capital markets.

Regulating and effectively operating of capital markets basically serve two purposes.

- Making more savers invest in these vehicles and in this way increasing the amount of savings by providing various investment alternatives that consist various return and risk combinations to savers.
- Making resource utilization rationale by making savings be transferred to most effective investments via market mechanism.

In summary, capital markets enable minor savings converted to big investments by being invested in securities, facilitate underdeveloped and emerging countries in

enclosing savings deficit, enable smallholders invest in effective areas and yield additional income.

On the other hand, capital markets can be used as an economic policy vehicle via open market transactions on providing monetary stability and struggling against inflation.

These functions of capital markets that are mentioned below are fulfilled not only by capital markets, but also by intermediation of banks in widen-ranging financial markets. However, capital markets instruments provide companies other options for finding capital.

On the other hand, with globalization, when investors divert their portfolio, foreign origin funds ascend to domestic financial markets. Both these processes increase transaction volumes of stock exchanges and make an affirmative contribution in development of them in emerging countries. It is expected that financial liberalization influences stock exchange for the good in two ways.

Firstly, financial liberalization increases stock exchange's depth by raising demand to stock exchange. In this way, it contributes economic growth by facitating companies to offset their financial needs.

Secondly, foreign origin funds inflow causes decrease in exchange rates by increasing foreign exchange supply and brings reel interest rates down by raising fund quantity that is used to finance government's deficit. Thus, financial

liberalization channelizes funds to stock exchange and increases earnings in stock exchange as a result of decrease in return of foreign exchange and interest rate investments.

According to International Finance Corporation (IFC), funds flow to emerging markets has continued or ascend since 1980 and this trend keep going also after a range of financial crisis. The most significant characteristic of these markets is that their returns offer high volatility.

Beside positive effects of financial liberalization, there are also negative effects of it. These negative effects can be summarized as follows.

- When any uncertainty is observed, rapid leaving the country of foreign origin funds causes sharply increases in reel interest rates and foreign exchange rates and rudely decreases in stock exchanges.
- Beginning of financial liberalization at the period when government's deficit is high causes sharply increase in reel interest rates. And this affects stock exchange negatively. The combination of high reel interest rate and uncertainty imposes stock exchange in a bad way.

As long as government's deficit is high, reel interest rates also rule high. Moreover, nominal interest rates that include inflationary expectations display a volatile structure because of observed uncertainties. This event makes also reel interest rates volatile. The volatility that comes into being in cost of fund demand causes that

short-term interest rates jump upwards of long-term interest rates. A volatile structure in interest rates brings out adverse effects in stock markets.

One of the other factors that affect the development of stock exchange is currency substitution. Currency substitution is that instead of domestic currency, a convertible foreign currency is used for formerly value saving, after that it is also used as numeraire and article of exchange. Especially in the countries that struggle with high inflation, foreign currencies become value saving vehicles and demand of them increase. Thus, a sharp increase in foreign exchange volatility affects stock exchange negatively. Furthermore, rapid leaving of foreign investors in stock markets as a result of foreign exchange volatility causes sharply decreases in stock exchange indexes.

Turkey, as an emerging country, has strived in order to develop its capital markets via stock exchange since 1986. However, one of the most important problems is that Istanbul Stock Exchange (ISE) still can not approach sufficient size and depth relative to country's economic size. The most considerable reason of this lack of scale is that there is not enough investors transact in this market. One of the most important reason of insufficient investors transact in market is excessive volatility of the market. Volatility is known as absenting stock exchange's rate of return from its mean value. By the way, high volatility can create positive effects like increasing liquidity by encouraging investors with its high earning opportunities. However, high volatility affects especially demands of risk-averse investors negatively. Negative point for investors is that rapid increases and decreases do not depend on any significant reason. This case makes investors retreat from stock market; stock

markets transaction volume decrease and stock market do not be able to have enough depth.

Another reason of stock exchange's lack of depth is intensive usage of internal barrowing in order to finance government's deficit. At the periods of borrowings relative to national income excessively increase, reel interest rates also rise. Moreover, as long as maturities lengthen, risk premiums also increase as a result of uncertainties about inflation. Government papers' high rate of returns has averted development of stock exchange's depth. In brief, internal barrowing policy with high interest rate has substantially blocked the development of ISE.

Insufficient quantity of publicly held companies and free floats is another bar in front of having depth of stock exchange.

Developed capital markets are pre-indicator of changes in real markets. In other words, stock exchange indexes are used as a macro economic indicator in developed countries. Regarding of stock exchange as an indicator of macro economic fluctuation completely depends on stock exchange' s integration with real economy. To accept stock exchange as a macro economic indicator, following two conditions have to be observed.

- Stock exchange has to have high transaction volume and be substantially liquid.
- Companies have to offset their capital needs mainly in stock exchange.

Beside, being adequately developed of capital markets enable some instabilities in the economy to be corrected in the length of time. For instance, increase in liquidity is blocked to cause inflation and/or making foreign exchange rates jump by absorbing liquidity gain by stock exchange.

There are argumentations about being sensitive of rate of returns in developed and emerging markets to news about macro economic facts and financial markets participants being in a wake of news about economic data or policy changes.

In the light of these argumentations, this paper considers cause of volatility that is observed in Istanbul Stock Exchange National-100 index in the period of 2000-2010 for the purposes of macro economic factors. Also the hypothesis of "volatility in financial markets consists of macro economic effects", valid in economy theory, is tested in terms of ISE. At the period that is considered, the effects of 2000 and 2001 financial crisis and 2007 Credit Default Swap Crisis are observed in Turkey. A new stability program with pegged exchange-rate system had been maintained until 2001. After February 2001, flexible exchange rate system was started to be implemented. As mentioned below, consequential recessions had been lived at the period of 2000-2010 in Turkey. Recession in Turkish Economy was 9,4% in 2001. In order to analyze systematic risk on stock exchange that is created by macro economic factors, ISE National-100 index was used on behalf of overall Istanbul Stock Exchange

2. POSSIBLE EFFECTS OF MACROECONOMIC FACTORS ON STOCK-EXCHANGE INDEX IN TERMS OF THE THEORY OF ECONOMICS AND FINANCE

Volatility is the measurement of observations' distribution around arithmetical mean at an observations set. It shows systematic and unavoidable risk. In stock exchanges, prices expose excessive volatility and volatility changes in process of time. Theory of finance said that variability on financial assets prices and their returns are explained with basic factors' expected values. Origin point of relationship between stock prices and macro economic variables is being significantly affected of dividends and discount rate that are loom large in stock price valuation from real economic variables.

It is possible to observe a common direction among stocks' price movements. In general, all the stock prices increase or decrease simultaneously, and this case reveals that there are some factors that affect market as a whole. The event of being dependant from each other of commodity market, money market, capital market and labor market build the paper's infrastructure. Law of Walras provides an opportunity to exclude one of these markets from the analysis. According to the Law of Walras, total value of demanded goods and services equals to total value of supplied goods and services in a constant price set. Thus, in the event of there is a demand deficit in a market, a demand surplus which is sufficient to balance this deficit will certainly be observed. In brief, according to the Law of Walras, because of if n-1 numbers of markets are balanced, n numbers of markets are also balanced; so it is possible to consider n-1 number of markets in analysis. In this direction, labor market is

excluded from this analysis. Industrial production index and inflation (WPI and CPI) on behalf of commodity market, money supply (central bank money, M1, M2, M2Y) and nominal interest rates (treasury interest rate, interbank overnight interest rate) on behalf of money market, ISE National-100 index and ISE traded volume on behalf of capital market, currency basket and current account deficit/GDP in terms of representing relationship with outside world variables are considered in this paper.

2.1. Relationship between Money Supply and Stock-Exchange Index

The concept which is called as Tobin's q in the economy literature states the ratio between investment value according to current stock prices and reproducing costs of investments. Hereunder, as long as stock prices increase in stock exchange, q raises and risen q motivate companies for next investments. Because, in this case, companies find an opportunity to sell their new investments at higher prices in capital markets. By this way, macroeconomic portfolio theory has established a new correlation line between quantity of money and real sector. This correlation works as follows. Money Supply↑→Stock Prices↑→Tobin's q↑→Investments↑→National Income↑. According to this correlation, increase in money supply causes increase in stock prices and afterwards it causes increase in investments and national income.

According to the theory of money portfolio, change in money supply alters monetary equilibrium position. This case affects composition and prices of assets in investors' portfolios in such a way that increase in money supply makes share of central bank money which offers no interest rate earnings increase relative to other assets in financial portfolio of private sector. As a result, return composition of financial

portfolio collapses. Later on, return composition collapse, which is a result of quantitive easing, makes investors review their portfolio and channelize funds to other assets in their portfolio. Hereby demand for stocks and stock prices increase after quantitive easing.

Further, change in money supply also has a lagged and indirect impact on stock returns by affecting real economic variables. High rate increase in money supply causes raise in quantity of money that is available as credit and consequently makes market interest rates, in other words barrowing costs of real sector reduce. Moreover, high rate increase in money supply also causes increase in companies' activities and growth in economy. Both of the mechanisms sign existing of relationship between stock returns and money supply.

Another concept is that as a result of unreliable monetary policy, quantitive easings affect stock returns negatively by creating inflation uncertainty. However, if increase in money supply is supported with reserves, a positive correlation between quantitive easing and stock returns is observed.

Finance literature emphasizes that liquidity has serious effects on stock exchange. Money that is created by central bank affects stock exchange in two ways.

Firstly, increasing quantity of money boosts the stock exchange in short-term. However, in long term, because of its effect on general level of prices, it affects stock exchange negatively. A non-stop money supply increase trend steams inflationary expectations in economy and causes negative reactions in stock exchange.

Secondly, if increase in money supply pours to foreign exchange market and causes volatility in foreign exchange rates, foreign investors who invest in stock exchange can decide to exit from the market. As a result of that, sudden exits drop stock exchange index.

Effects of fluctuations in central bank money on stock exchange are particularly examined in this paper. On the other hand, beside central bank, commercial banks contribute to growing quantity of money as a result of their credit placements. For this reason, in terms of considering the effects of volatility of deposit money that is created by commercial banks on stock exchange, relationship between M2Y and stock exchange is included to the analysis.

2.2. Relationship between Inflation and Stock-Exchange Index

According to Generalized Fisher Hypothesis, real interest rates and inflation move independently from each other. Because real and monetary sectors of the economy substantially independent from each other. However, Fisher implied that nominal interest rates and inflation are in a directly correlation with each other in economy. Therefore, stock returns and inflation are expected to move in the same direction. Eventually, because of stock returns compensate inflation changes, inflation do not affect purchasing power of the investors.

Another concept claims that there is a negative correlation between inflation and stock prices. Geske and Roll (1983) defend that stock prices indirectly cause fluctuations in inflation as a result of macroeconomic events' chain. Decrease in real

activities increases government deficits and accordingly causes money supply increasement. Decreases in stock prices prognosticate shortenings in real activities. Thereby, Geske and Roll state that negative correlation between inflation and stock prices or real activities unfold in reaction to intervention of central bank. However, having said that results that were revealed by Geske and Roll depend on bivariate causality tests and a multivariate model has probability to not give same results.

Fama (1981) argue that negative correlation between stock prices and inflation is illusive. According to him, inflation is a proxy which implies real activity variables in models that is created for indicating relationship between stock prices and inflation. This proxy said that two factors cause negative correlation between inflation and stock prices.

1. Positive correlation between stock prices and economic activities.
2. Negative correlation between inflation and economic activities.

Having a negative and significant coefficient of inflation at stock prices equation represents existence of these relations. Fama explains negative correlation between inflation and real sector with money demand theory.

According to another concept, in a competitive economy, inflation increases production costs of the companies and causes to decrease in future cash flows of them. Hence, there is a negative correlation between inflation and stock prices. Negative correlation appears as follows. Beginning of the period contracts that was signed relating to their activities by firms make difficult firms' reacting in the way

that simultaneous price adjustments against changes on within the period prices. In brief, because of inflation is reflected in input prices faster than output prices, inflation causes reduction in companies' future cash flows. Thus, inflation results in decrease in future cash flows of the companies and being negatively affected of stock prices.

In another concept, stock prices were thought as provisions against inflation. Underlying cause of that is providing some rights on company's assets of stocks. Value being earned on account of these rights will be revised at the inflationary periods. For this reason, comparative increase in stock prices against inflation will not affect real return level of stocks. However, nominal values that belong to the company will be independent from price fluctuations. Thus, only company's real facts (assets) will be protective against inflation. Empirical studies revealed that there is a negative correlation between stock returns and inflation.

Some researchers claim that negative correlation between inflation and stock returns is a result of that investors prefer interest-bearing assets instead of stocks. In this particular, Mascaro and Meltzer (1993) said that uncertainty of inflation correlate with inflation positively and increase in inflationary uncertainty reduces stocks demand through raising demand of money.

On the other hand, increase in inflation scales up reduction ratio at valuation model by increasing nominal risk-free interest rate. If cash inflows increase evenly, negative effect of the inflation will disappear. However, probability of this cash inflows

occurring in short-term is weak. Consequently, from this point of view it can be said that there is a negative correlation between inflation and stock prices.

Despite negative correlation discussions, Kessel (1956) claimed that increase in inflation raises stock price in case of the event that companies are net borrower.

2.3. Relationship between Economic Activity and Stock-Exchange Index

Stock returns are affected positively from future real activity level. In other words, there is a positive correlation between stock returns and future values of GDP and industrial production that present real activity level. Its cause is that current stock prices depend on future cash inflows. Real activity level determines future cash inflows.

2.4. Relationship between Exchange Rates and Stock-Exchange Index

Significant growths on world trade and capital movements make value of money the most important determinant of companies' profitability and stock prices. Relationship between exchange rates and stock returns is built on a simple and meaningful theory. Revaluation of domestic currency decreases price of import raw-materials which are essential for production. Revaluation of domestic currency increase reserves and money supply and decrease interest rates. Decrease in cost of capital and imported raw-material prices send domestic earnings and companies' future cash inflows up. So there is a negative correlation between foreign exchange rates and stock returns.

Another concept is that, in an exportation weighted country, devaluation of national currency causes becoming cheap of export goods in world market. If demand of export goods is elastic, this event results in increase in export volume and future cash inflows of companies. Increase in cash inflows affects stock prices positively. Another concept also said that as long as risk of national currency devaluation increases, foreign investors depart from the market in order to refuse currency risk. Hereby, Stock prices depreciate as a result of this event. Moreover, departing of foreign investors from the market makes press of domestic currency devaluation higher. Further, being high of current account deficit in an economy occasionally causes extra ordinate devaluation expectations; even if the country has great foreign currency reserves. This event results in being volatile of exchange rates. Thus, effects on stock exchange volatility of temporary demand-supply disequilibrium or current account problems can be monitored by overlooking foreign exchange market volatility.

It is seen that, especially at the high inflation periods, being article of exchange, standard of value and hoarding wealth tasks are committed by foreign currencies instead of domestic currency in the emerging countries. At this event that is called as currency substitution, generally US Dollar takes on the tasks of value saving and being investment vehicle in economy. In such a case increase in foreign currency demand causes flight from other investment vehicles. Thus, it is expected that changes in foreign exchange rates affects stock prices. Another reason of transition from stocks to foreign currencies at crisis periods is liquidity difference between these two instruments. At uncertainty cycles when it is not possible to make a long-

termed prediction in, investors prefer to invest in foreign currencies that are more liquid rather than stocks.

Another importance of foreign exchange rate on the basis of companies is the effect which occurs on balance-sheets of the corporations that create resources with foreign loans. Naturally balance-sheet sizes of these companies depend on foreign exchange rates. Therefore, the effects that are created by foreign exchange rates on balance-sheets reflect to stock prices.

2.5. Relationship between Interest Rates and Stock-Exchange Index

Correlation between interest rates and stock prices has a negative direction. Interest rate fluctuations affect stock prices in two ways. First, interest rates affect discount rate that is used for capitalization of cash flows by companies. Second, they change the future cash inflow expectations of the companies.

Basically, interest rate that is a part of net present value formula is the most followed macroeconomic variable that is the best indicator of views incident to whole economy. Stock exchange investors will expect return as much as minimum market interest rate without considering extra risk that is assumed by them.

Some studies claim that instead of interest rate, expected return and default risk premium are more determinative on stock returns. Increase in interest rates pushes desirable rate of return up and this event affects stock prices negatively. On the other hand, rate sensitive assets rises in portfolio in conjunction with increase in interest

rates. Thus, opportunity cost of keeping stocks in portfolio increases. After all, increase in interest rates causes being replaced of stocks to interest bearing assets in the portfolios. As it is known, when interest rates rose, demand of bills increases and demand of stock exchange decreases. Otherwise, increase in interest rates affects stock prices negatively by reason of reduction in future cash inflows through increasing financing costs.

Another concept submits two hypotheses about interest rates.

- Money markets and stock exchange move together.
- Interest rate volatility increases stock exchange's volume. In other words, uncertainty in money markets results in a new increase in demand of stock exchange.

In this study, overnight interest rates and yearly compounded interest rates of treasury discounted auctions were considered as interest rate and relationship between interest rates and stock exchange index was explicated.

3. PREVIOUS STUDIES ABOUT STOCK MARKET VOLATILITY

Determination of the facts that lead stock market volatility has a vital importance for market players. Because of being mitigated of financial risk amount by properly determination of the relationships, this subject is popular among market players. Therefore, a lot of studies where relationship between macroeconomic variables and stock market volatility was analyzed in had been detected in consequence of reviewing the literature about this subject. Some of these researches were done on developed markets whereas some of the others were done on emerging markets. Some of determined studies were summarized below as a result of literature review.

3.1. Studies For Developed Markets

Schwert (1989) analyzed the fluctuation of volatility in the course of time and relationship between macroeconomic variables and stock market for US markets. The study which researched 1857-1987 periods is regarded as a base article in respect to trying to explain volatility with changes in economy. In this study, short-term interest rates, inflation rates, monetary base, industrial production growth rates and bond yields were used. One of the most important results that were determined by Schwert in his study was showing similarity of short-term interest rates volatility and long-term bond yields volatility because of being common of the facts that are fiscal policies and inflation, but stock returns and long-term bond yields are similar because of being common of financial risks. In that study, it was determined that stock price volatility is five times higher than long-term bond yields, average interest

rate volatility is just 3% of average stock price volatility and average volatility of other variables is substantially lower than average stock prices volatility.

Schwert decomposited data to five subgroups and he used dummy variables in order to adapt seasonality to the model. He made vector autoregressive (VAR) analysis by admitting bond yield and purchasing power parity internal. According to the results of VAR analysis;

- It is determined that the most important variable at predicting against stock price volatility is it's own past values. Besides, bond yield volatility is also a variable that is mostly required to be added to the model. However, short-term interest rates have lower representation qualification.
- Stock exchange indexes are helpful at bond yield measurement. At the same time, model's consisting of bond yields' past data also brings to successful conclusions.
- Short-term interest rates are affected from its past data and occasionally from bond yields.
- Inflation volatility does not give significant results at predicting against stock prices volatility excluding 1953-1987 periods. (According to Schwert, an important fact at not being able to be correlated of inflation with stock prices is that occurring of huge volatility of inflation especially at war periods and disappearing of relationship between inflation and stock prices or bond yields at these periods.)

Because of having unsatisfactory effect of inflation on interest rates, bond yields and stock prices volatility, Schwert implemented VAR again after adding quantitive easing to the model instead of inflation. As a result, Schwert explored that volatility of quantitive easing frequently makes a contribution to predict against stock price volatility. It was seen that correlation between them sometimes worked inversely.

Schwert also researched correlation between economic growth and the other facts; interest rates, bond yields and stock prices. Moreover, he explored that industrial production's volatility has no effect on clarification of other variables. An interesting result that was reached is in two of four periods, stock price volatility clarified industrial production's volatility, despite industrial production was weak at clarification of stock price volatility.

One of the most important point of Schwert's study is that he researched volatility at recession period. In consequence of the study, it was determined that stock prices volatility and industrial production volatility increases at recession periods. In other words, these two variables are affected from economy's general condition. However, mounting evidences about that volatility of short-term interest rates, bond yields and quantitive easing ratio increases in recession periods was not able to be determined.

In that study, relationships between stock price volatility and variables of background information and transaction volume were researched. A certain result could not be reached about volatility at trading days in New York Stock Exchange (NYSE). However, it was observed that stock prices volatility had been sometimes

affected from transaction volume and there had been a positive correlation between volatility fluctuations and unexpected transaction volume fluctuations.

Schwert obtained different results about direction of causal relations between stock prices volatility and volatility of macroeconomic and financial variables. According to Schwert's study, inflation volatility could forecast stock prices volatility only in 1953-1987 periods. However, stock prices' volatility could never forecast inflation volatility. Money supply growth volatility had sometimes been able to predict stock prices volatility. Otherwise, stock prices volatility could predict money supply growth rate volatility at the period of 1920-1952. Moreover, industrial production volatility could predict stock prices' volatility leanly. Stock prices volatility could help to predict industrial production volatility at two sub periods. As a result, a positive correlation between stock prices' volatility and macroeconomic volatility was explored. It was realized in the study that causal relation from stock market volatility to macroeconomic volatility is stronger. Furthermore, according to the study, macroeconomic volatility level clarified less than half of stock prices' volatility and this ratio was even less at some periods.

Beltratti and Morana (2006) analyzed relationship between macroeconomic factors and stock prices volatility by using S&P 500 data for the period of 1970-2001. At the end of the study, a binary connection between macroeconomic factors and stock prices was explored. First, breaking process at stock prices volatility correlates with breaking process of federal funds rate and M1 growth rate volatility. Second, causal relations from macroeconomic factors to stock market volatility were found stronger, when stock prices volatility affected macroeconomic volatility simultaneously.

The study revealed that stock prices volatility is higher than other macroeconomic factors' volatility. Otherwise, it was explored that the most volatile macroeconomic variables respectively are inflation, M1 growth rate, federal funds rate and industrial production. Especially at the last part of researched period, being strong of relationship between M1 and stock prices volatility and increasement of both those variables' volatility were determined. Moreover, it was observed that there is no relationship between stock prices volatility and industrial production volatility. Otherwise, compromising of stock price volatility increasement with federal funds rate volatility increasement was fastened. At the same time, stock prices volatility and M1 growth rate volatility matching, solid relationship between stock prices volatility and cyclical fluctuations, significant increasement in stock prices volatility in recession periods were observed at late in the years of 1980 and 1990 in the study. Being the best candidate of monetary policy which affects money supply growth rate and interest rates for explaining breakings on stock prices volatility was one of the other important findings.

Morelli (2002) tried to determine relationship between conditional stock prices volatility and conditional macro economic volatility for England by using monthly data of 1967-1995 periods. In the study, conditional volatility was predicted by using ARCH and GARCH models. Industrial production, real retail trades, money supply (M1), inflation and foreign exchanges was applied as macroeconomic variables. ARCH model was managed in terms of it's allowing to change of conditional variance (measurement of volatility) in the course of time. No evidence about importance level of information that is reflected in markets affects stock market

volatility was reached in the research, which was cited at Morelli' s study, of Fraser and Power (1997) that was made for stock markets of England, USA and some Pacific Countries.

Main purpose of this study is trying to determine whether it is possible to explain changes in stock market volatility (measured as conditional variance) with conditional volatility of macroeconomic factors or not in England. All variables' logarithms were calculated and after that their first differences were calculated. Thus, stationarity of the variables that were used in the study were also enabled as being become of variables representing rate of changes.

In order to test stationarity of the variables, Augmented Dickey-Fuller test was implemented. As a result of test, being stationary of all variables whose logarithms and first differences were calculated were determined. As mentioned above, monthly conditional volatility of stock prices and macroeconomic variables were predicted by using ARCH and GARCH.

For the purpose of determining relationship between conditional volatility at stock market and macroeconomic factors' conditional volatility, before all else a VAR model of the 12th degree with two variables was used. Thus, it was analyzed that whether conditional volatility of stock market is predictable or not with the help of conditional volatility of macroeconomic variables.

Secondly, it was tried to be tested whether there is a correlation between the variables or not with the help of multiple regression in which conditional stock

market volatility is dependent variable when volatility of macroeconomic factors is independent.

Consequently, a significant correlation was found only between foreign exchange rates and stock prices volatility on the subject of predicting stock market volatility by macro economic volatility. On the other hand, no significant relationship was identified on the subject of predicting macroeconomic volatility by stock market volatility. Otherwise, any of macroeconomic factors could be found statically significant at regression analysis.

Only 4.4% of variability on volatility of stock markets was clarified by macroeconomic volatility. Significant relationships about explaining stock market volatility power of macroeconomic factors' volatility together and simultaneously could not found. In brief, in that study, it is researched that whether conditional stock prices volatility can be clarified by conditional macroeconomic variables' volatility or not and its results was negative. In other words, it was determined that macroeconomic variables that were chosen in study can not clarify stock market volatility.

Binder and Merges (2001) analyzed explaining stock market volatility capability of economic factors by using S&P data for the period of February 1929-April 1989.

In that research, four factors were featured as determinant of stock market volatility at an economy under uncertainty. 1) Uncertainty in regard to price level (CPI), 2) Interest rate (Treasury bill interest rate), 3) Stock risk premium, 4) Expected

Profit/Expected Income. It was determined that these variables have clarification power for 50% of variability on stock prices volatility for the period of 1929-1989. Furthermore, it was also determined that clarification power comes up to 90% when regression coefficient is enabled to change by using cluster regression technique. It was fastened that R^2 which was corrected according to results that were obtained from regression analysis is 0.512. According to this analysis, a major rate of stock market volatility can be explained by chosen economic factors. On the other hand, it was determined that chosen economic factors are statistically significant at α=0.005 significance level in regression analysis. When Spath (1987) cluster regression technique that allows parameters to change in the course of time at regression analysis were used, it was determined that those four economic factors clarify 95% of variability on stock market volatility at the period of 1929-1989.

At the end of the study, it was fastened that stock market volatility is connected with interest rates and stock risk premium. These results decrease the concern that stock market volatility results from behaviors of irrational investors instead of economic variables.

Flannery and Protopapadakis (2002) researched the facts that affect stock returns by using GARCH model for the period of 1980-1996. In the study, it was stated that stock market returns are in a significant correlation with inflation and monetary growth, effect of real macroeconomic factors on stock returns and being hard of determining this effect as a result of it is not only nonlinear but also no stationary. Three nominal (CPI, WPI and money supply-M1 or M2) and three real (employment data, balance of trade and construction data) variables were used in the study. It was

determined that only money supply affects stock return level and volatility. Otherwise, it was fastened that the other two nominal variables affect only stock return level, as three real economic factors affect conditional volatility. Moreover, correlation between these macroeconomic factors and transaction volume was examined and it was discovered that all six factors affect transaction volume in direct proportion. At the same time, it was anchored that industrial production, personal income and sales does not affect stock returns, conditional return volatility and transaction volume significantly. Serious evidences about being connected with low volatility instead of high volatility of real GDP were procured. Industrial production also shows similarity. Both of these factors have no effect on transaction volume.

Sættem and Gjerde (1999) tried to determine how much relationship which exists in developed countries between stock returns and macroeconomic factors exists in Norway (Norway's capital market has progressed slower than capital markets of USA, Japan and England) economy by using multivariate VAR method.

A lot of other studies were mentioned in this study. Results of these studies are mentioned below;

a) Fama and Schwert (1977) found statistically significant negative correlation between inflation and stock prices in their research
b) Kaul (1987) proved that negative correlation between stock returns and inflation results from negative cyclical effects of money demand and money supply.
c) Lee (1992), in his study, stated that stock returns clarify a small part of inflation's fluctuation. However, interest rates clarify significant part of it. Thus, according

to Lee, inflation reacts negatively to interest rate shocks. In this research, Lee found out a positive correlation between stock returns and lagged real activity level.

d) Fama (1981) found out a positive correlation between stock returns and lagged real activity level.

e) Kaneko and Lee (1995) examined the conditions at markets of Japan and USA by using VAR model with eight variant. In this study, it was found out that risk premium and growth rate of industrial production are influential at US stock market. On the other hand, oil prices, trade volume and exchange rates were determined as influential on Japanese stock market.

In the study which was done by Sættem and Gjerde, dynamic interaction between variables was tried to examine by using VAR model. Interest rate, inflation, production and consumption variables were used with stock returns in the study. Prices of oil and gas oil that have a 1/3 place in Norway economy's export volume and exchange rates was also included in the model. Moreover, international industrial production index was also added to the model in terms of representing reaction of Norway economy to the other economies real activity level.

In the study, monthly observations of 1974-1994 periods were used. On the other hand, stationarity of each variable was controlled by Dickey-Fuller test. In order to identify appropriate lag, Akaike Information Criterion Test was implemented.

In the study, real interest rates were used from expected inflation point of view instead of nominal interest rates when inflation, consumption and industrial production data subjects to seasonal adaptation.

At the end of the research, following results were obtained.

i. It was determined that Norwegian capital market reacts negatively to changes in interest rate and positively to changes in oil prices.
ii. It was found out that correlation between stock returns and real activity level is not clear. Thus, an obvious result about foreshowing real activity level of stock market could not be determined.
iii. It was determined that changes in real interest rates affect inflation negatively.
iv. It was fastened that industrial production is significantly affected from real activity level.

However, it was emphasized that real activity level has a significant effect on real stock returns but not the other way round. This event showed that Norwegian Stock Market does not react properly to the news that come from real sector. Whereas, stock markets of USA and Japan rationally prognosticated progressions of real activity level. Stock markets perform this event by reflecting expected progressions to the prices.

In the study, it was determined that changes in industrial production explain 8% of stock returns' variance. According to the study, this event exhibits that stock markets react to changes in real activity level tardily instead of prognosticate this changes. It was stated that real stock returns' fluctuation clarifies 1% of industrial production

variance fluctuation. Stock markets react to industrial production shocks positively in first four months. In brief, stock market reacts to industrial production fluctuations positively but tardily. According to the study, real stock returns are affected from fluctuations of oil prices and real interest rates. Stock returns react to interest rate fluctuations simultaneously and negatively. On the other hand, stock returns react to oil prices positively in a ten months period. However, negative reaction to real interest rate occurs in six months.

Solnik (1987) researched effects of a couple of variables like fluctuations of foreign exchange rates, interest rates and inflation expectations on stock prices. At this study, monthly data of nine markets (USA, Japan, Deutschland, England, France, Canada, Netherland, Switzerland and Belgium) were used. The result that exchange rate changes affect stock prices positively except USA was gotten in consequence of the study.

Kearney and Daly (1998) researched effects of macroeconomic factors' volatilities on stock price volatility on Australian Stock Market. At this study, volatility series of monthly interest rates, inflation, money supply, industrial production, current account balance and exchange rates were added to the model for July 1972-January 1994. In that research, observing that money supply has lowest average volatility was determined. According to the research, current account balance has ninefold volatility money supply. Moreover, interest rates and stock markets have respectively 5.3 times and 3.3 times volatility than money supply. Stationarity of the variables was tested with Dickey-Fuller and Phillips-Peron tests. Hereby, it was determined that the variables at the model are stationary. In the study, dummy variable was used

for 1987 crisis and it was determined that variable is statistically significant. When parameters of the model were analyzed it was determined that all variables except exchange rates were statistically significant. At the same time, increases in volatility of interest rates and inflation affect stock prices volatility positively. On the other hand, increases in volatility of industrial production, current account deficit and money supply affect stock prices volatility negatively. Furthermore, it was determined that the most significant variable is money supply in the study.

3.2. Studies For Emerging Markets

In the study which was made by Bilson, Brailsford and Hooper (2001), emerging markets (EM) were decoupled from developed markets. As is known, importance of local knowledge increases at decoupled markets. From this point of view, local factors are major sources of stock returns' fluctuations at emerging markets instead of global factors. At this study, it was researched that whether local macroeconomic factors have power of affecting stock returns' fluctuations at emerging markets or not. Aim of the study is not forecasting expected return, is clarifying derived return fluctuation.

This study determined that emerging capital markets does not have several characteristics in common in terms of factors that affect capital markets, but factors that affect capital markets show similarity locally. Thus, it is required that international investors spread their funds among capital markets of countries in different regions instead of capital markets of different countries in the same region

in order to increase the advantage of diversifying their funds among capital markets of different countries.

The most significant characteristic which is observed in emerging markets is being higher of risk and return than developed markets.

This research sought answers of following two questions.

- What macroeconomic factors do clarify stock returns' fluctuations at emerging markets and how much do they clarify these fluctuations?
- How much are the similarity levels of every each of emerging markets' stock returns?

Results of the research show that if emerging markets decouple to a certain extent, existing of some significant similarities among markets about stock returns' fluctuations are appeared. In consideration of markets as a whole, being not similar of factors that affect stock returns' fluctuations was determined. However, it was also determined that factors that affect stock returns are similar when considering markets locally.

Two different versions of multivariate models were used as research methods in the study.

At the first version, a perfect integration was assumed and a linear relationship was modeled between return and global risk sources. Harvey (1995) analyzed relationship between emerging markets' returns and world inflation, world GDP, world oil prices

and trade weighted world exchange rates on behalf of global factors. As a result being limited of this relationship was founded.

At the second version, existing of strict decouple among markets implicitly was provided. Only relationship between certain numbers of local variables and return was analyzed at the model.

Main difference between these two models is their assumptions about integration level.

Empirical studies found that emerging markets are partly integrated with other world markets. From this point of view, it must be considered that both perfect integration and perfect decoupling do not reflect the reality, both global and local factors can be functioning at determining of stock returns' fluctuations. Harvey and Bekaert (1995) stated that a country's integration level is important with respect to determining the significance levels of global and local factors.

In the study, money supply, prices, real activity level and exchange rates were chosen as macroeconomic factors. Besides, value weighted world market index was used as a representative for global factors.

In accordance with being known, news about macroeconomic factor does not always affect stock market simultaneously. There is a time difference between changes in macroeconomic factors and public announcement about these changes. For this

reason, at this study, observed lags about effecting stock market of news were considered by considering lagged values of the factors.

World market returns and exchange rates took place at the model with their immediate values, because of being able to obtain theses values daily. Money supply and prices with their 1 month lagged values and real activity level with its 2 months lagged values took place in the model as it was suggested by IMF (International Monetary Fund).

In the study of James et al. (1985) who was addressed by that study, lagged fluctuation at industrial production and S&P 500 index return researched by using monthly data (from 1962 to 1981). By this way, it was determined that certain stock returns correlate with 2 months lagged values of industrial production. Hence, a positive correlation between real activity and stock returns was found.

Model is vulnerable to criticism in consequence of its' unsatisfactoriness on determining common sensitivities of the markets. For this reason in the study, a new model in which those factors were used was revealed in terms of determining common sensitivities of the markets.

This study consists of three phases.

- A range of variables that express a major part of stock returns' fluctuations were determined for each of the markets.

- A range of factors were chosen from those variables by PCA (Principal Components Analysis).
- Common sensitivities of the markets were tried to determine by making a regression analysis between stock returns at each market and each of the factors.

In this model, besides variables that were mentioned before, country risk[1], commercial sector[2], interest rate[3] and regional market index were also considered. Furthermore, price-earning ratio and dividends were added to the model as microeconomic factors.

Study consists of 20 emerging markets. 6 Latin American Countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela), 8 Asian Countries (India, Indonesia, Malaysia, Pakistan, Philippines, South Korea, Taiwan and Thailand), 3 European Countries (Turkey, Portugal and Greece), one Middle East Country (Jordan), 2 African Countries (Nigeria and Zimbabwe).

January 1985-December 1997 period was chosen as period. All return data was calculated on a monthly basis and were expressed in such a way that being continuous compoundly. On the other hand, all returns were calculated on a US Dollar basis by this way local inflation effect was removed. M1 for money supply, CPI for inflation and industrial production for real activity were used.

[1] Country risk = 50% political risk + 25% financial risk + 25% economic risk
[2] Commercial sector was represented by (import + export) / GDP ratio.
[3] Deposit interest rate was used as interest rate at each of the markets.

In order to test stationarity of each series, Dickey-Fuller and Phillips-Perron Unit Root Tests were implemented and it was determined that both return data and rational fluctuations on macroeconomic variables were stationary.

Such a study includes existing potential of correlation among variables. However, in the study, using variability instead of variability level mitigated such a problem.

In the study, correlation matrix of macroeconomic variables indicated that there is not enough proof for multicollinearity. Total average correlation for macroeconomic factors dyadically at all markets was founded as follows.

- Exchange rate-real activity level (0,02)
- Exchange rate-money supply (0,04)
- Exchange rate-prices (0,1)
- Money supply-real activity (0,02)
- Money supply-prices (0,05)
- Real activity-prices (-0,02)

Following results were obtained as a result of this study.

a) There is a weak correlation between world market index return and emerging capital markets (It is viable with previous findings). Just ten markets' world market index parameter resulted significant at 5% significance level (Turkey is not in them). Meaning of being positive of

parameters at ten countries is being compatible of increase in emerging capital markets' return with increase in world market index return.

b) Exchange rate fronts as the most important macroeconomic factor. Exchange rate parameter resulted significant at 5% significance level at twelve countries (including Turkey). This parameter commonly resulted negatively as being consistent with analysis that was made from the perspective of international investors. In such a way that a devaluation in domestic currency causes increase in return in US Dollars

c) The effects of macroeconomic factors are relatively weak.

d) Money supply variable resulted at six countries (including Turkey). This parameter is commonly positive as expected.

e) Everyone of real activity and general level of prices variables resulted significantly only at a country.

f) It was tested that whether macroeconomic factors as a whole equals to zero or not with F test and H_0 hypothesis which said that all factors equals to zero was rejected for ten of twenty country (including Turkey).

g) R^2 value appeared in the space that has a barely exponent structure. (The highest value of R^2 that is 38% arisen in Indonesia.)

The results obtained in the study indicate that markets are not similar in terms of factors in which they are sensitive.

In brief, this study found that prices and real activity level can explain smidgen of stock returns' fluctuation, as well as importance of money supply is relatively high; the most significative factors are exchange rates and world market index return.

Accordingly, being neither global factors nor local factors nettably significative makes approaching differentially each of the markets essential.

For these results, following causes can be submitted.

i. Being inadequate of elements which represent macroeconomic factors.
ii. Being different of elapsed time between conveying information and transforming this information to investment decisions in each of the markets. (Market efficiency specifies shortness of elapsed time between conveying information and transforming this information to investment decisions)
iii. Modeling wrongly or excluding some important factors from that model (Being considerably low of R^2 can be a sign of it)

Model was enriched with other macro and microeconomic factors in order to determine whether fluctuation in return can be explained with similar factors or not. However, also in the new model that was used in the study it was determined that the most important significative element is exchange rate. Price-Earning Ratio parameter was sized up positively and statistically significant value at 16 countries. Dividend parameter was sized up negatively and significantly at 10 countries. Moreover, it was determined that this model has a considerable high explanatory power. (Corrected R^2 at 60% level)

In the study, it was researched that whether there is two types of similarity in the markets or not.

- Determination of whether stock prices' fluctuations are explained consistently at the markets or not.
- Determination of whether sensitivities against variables are similar or not.

R^2 existed relatively high at researches that were done within this scope. This case indicates that some factors that direct stock return levels show similarity. Nevertheless, despite the fact that factors that direct stock return levels show similarity at the markets, fluctuation level on stock returns against these factors are different every each of the markets.

When all markets are judged together, the result that there is no similarity in terms of sensitivity against main components is extrapolated. However, analyzed regionally, it was founded that sensitivities in the markets are similar.

In the study, it was determined that similarity level of market sensitivity is high in European Countries (Turkey, Portugal, and Greece) regionally. In other words, four main components' (real activity-commercial sector=economic activity, money supply-commercial sector=consumption, country risk, regional and world index) parameters are similar in all these there countries. In brief, it was fastened that the factors that direct stock returns' fluctuations are similar among regions, but sensitivities against similar factors are somewhat different.

These fastenings result that as international investors diversify their funds regionally, they benefit from the advantage of diversification better.

It was measured that whether each factor's sensitivity is regionally zero or not by F test and hereby, this hypothesis was substantially rejected at α=0.05 significance level. (For Europe, being zero of common sensitivity in terms of political risk was rejected. These results have showed that these factors are influential at directing stock returns' fluctuations in all of four regions.

Abugri (2006) researched that whether dynamic structure of key economic factors (exchange rates, interest rates, industrial production and money supply) significantly explain stock returns in four Latin American Countries (Mexico, Chile, Brazil and Argentina) or not. Moreover, MSCI[4] (Morgan Stanley Capital International) World Index and 3-month maturity US Treasury Bill yield was used in the model on behalf of global factors' effects.

In the study, answers of following two questions were sought.

- Is the reflection of a shock that exists in global or local factors to stock returns in a significant level?
- Are directing stock returns effects of global and local factors different at each these markets or not?

In the study which was done with six variables, it was found that global factors are significant and influential at explanation of stock returns' fluctuations. Besides, it was determined that level and significance of country variables' effects on markets differs from country to country. It was mentioned that existing of differences about

[4] It is an index that reflects developments at several stock exchanges that include ISE

macroeconomic factors' significance levels depends on being different of each countries economic infrastructures and each countries commercial-financial integration level to world economy. Furthermore, it was fastened that stock returns' volatility is directed by different levels and periods of these factors in each country. Therefore, international investors can increase their portfolio's performance by considering this finding. The results that were obtained at this study clue in how to formulate and implement monetary and fiscal policy in order to keep stability of financial markets.

In the study, it was stated that market capitalization and stock market transaction volume had rapidly increased in Argentina, Brazil, Mexico and Chile capital markets with liberalization, besides importance of these countries in international finance area also increased. At the same period, international investors increased their fund volume that had been channelized to these markets in order to benefit from advantage of financial investment diversification, thus capitalization and liquidity were increase at these markets.

The study was done with monthly data by considering periods of January 1986-August 2001, US Dollar-based index on behalf of stock returns and M1 on behalf of money supply were used.

In the study, it was stated that standard error of stock returns considerably high and this case shows that how high stock returns' volatility is.

As a result of researching stock returns' data, following findings was determined; data does not distribute normally, data distribution in Argentina and Mexico is

positive, but it is negative and irregular in Brazil and Chile, data shows a steeple head distribution, at the same time data has autocorrelation.

Because of significant US investors existence in Latin American markets, it was determined that also 3-month maturity US Treasury Bill interest rate changes affect these markets stock returns negatively.

In this study, VAR model was used as econometric methodology. Dynamic interaction between VAR model and variables was tried to be executed. VAR model enables incorporating of proper lag length to the model. This characteristic is important in terms of being lagged of information about macroeconomic factor. As is known, effect of information about macroeconomic factors to capital markets is not simultaneously. This case results from elapsed time between existence of macroeconomic factors' change and reflecting of this information to stock market.

In the study, it was procured that effect of shock about behaviors of the series was examined in terms of time with action-reaction functions (ARF). Akaike Information Criteria and Schwartz Criteria were used to find proper lag length. On the other hand, stationarity of the series was tested with ADF Test and precipitated to series' stationarity at I(0).

At the end of the study, it was determined that MSCI world index and 3-month maturity US Treasury Bill yield is invariably significant for these four markets. Being generally weak of the performance of money supply and industrial production were also fastened.

The results obtained in country-based in the study were summarized below.

Brazil

It was determined that effect of foreign exchange rates shock on stock returns is negative and significant at 3. month. This result coincides with the thesis that stock returns decrease as a result of devaluation. Stock returns' reaction against interest rates is negative and significant at 5.month. This finding emphasizes the reality that high nominal interest rates decrease stock returns. Negative reaction can be connected with discount rate effect or inflationary effect of high nominal interest rate. Creating a positive effect of increase in industrial production at stock returns was added up. This effect is positive and significant at 1. and 6. months. As mentioned at the literature, increase in industrial productivity effects stock returns positively, because of it comes to mean more cash inflow in the future. Because of securities enables to put in a claim for a value which is procured in the future, increase in expected economic activity level raises stock returns' level.

It was founded that reaction of stock returns against money supply is fast, negative and significant. Its cause was explained as increase in money supply creates high inflation and low returns.

It was determined that MSCI world index and 3-month maturity US Treasury Bill yield create respectively positive and negative significant effects. Negative effect of 3-month maturity US Treasury Bill yield shows integration level of the market with

other markets. In brief, increase in 3-month maturity US Treasury Bill yield make foreign funds move away from this country and decrease stock prices.

Mexico

Exchange rates, MSCI index and 3-month maturity US Treasury Bill yield were found as significant variables in this market. Effect of exchange rates is negative and significant at 2.month. <on the other hand, it was determined that directing effects on stock returns of interest rates, money supply and industrial production is not significant. Moreover, it was determined that MSCI's effect is positive and significant at 2. month, besides 3-month maturity US Treasury Bill yield's effect is negative.

Argentina

Money supply, MSCI world index and 3-month maturity US Treasury Bill yield were found significant at explaining stock returns. Effect of foreign exchange rate was not found significant at Argentina. Its cause was implied as fixed exchange rate regime which had implemented by the country. On the other hand, being negative and significant of interest rates' effect was founded. Besides, it was determined that industrial production has no effect on stock returns, further changes in money supply causes negative and significant reactions on stock returns at 6.month. It was stated that this case is a result of inflationary effect that created by increase in money supply. Increase in money supply causes decrease in stock returns as a result of investors' inflationary expectations for the future. Finally, it was fastened that MSCI

world index and 3-month maturity US Treasury Bill yield respectively cause positive and negative significant effects on stock returns.

Chile

At this market, interest rates, industrial production, MSCI world index and 3-month maturity US Treasury Bill yield were determined as the most important variables that explain stock returns. It was stated that exchange rates is not significant on stock returns at chosen periods and its probable cause is tight exchange rate policy that had been implemented by the country. Effect of interest rates was found negative and significant. This case was explained with Fisher Effect. According to Fisher Effect, expected nominal interest rates with regard to financial assets move together with expected inflation. It was stated that cause of negative effect is discount rate effect rather than inflationary effect, because of Chile has relatively low inflation. It was found that industrial production causes positive and significant effect, besides money supply has no effect on stock returns. Effects of MSCI world index and 3-month maturity US Treasury Bill yield are respectively positive and negative.

As a result the study, it was fastened that market volatility is high in these countries, besides shocks that arises from country variables transferred to the market in different level and different importance. It was also found that global factors are influential in all four countries and action-reaction functions show no difference in terms of effect degrees and their signs for global factors.

In summary, according to results of the study, reaction of stock returns against a shock at macroeconomic factors can not be formulated. As can be seen, these

reactions differ from each other in every country. On the other hand, global factors are more significant than local factors at explaining stock market returns. Consequently, differing from each other at every market of stock returns' reactions against local factors gives important clues to investors to shape their portfolios in terms of risk-return. In brief, investors can increase the performance of their portfolios from the difference of these reactions point of view.

Fifield, Power and Sinclair (2002) researched correlation of macroeconomic variables with stock markets at thirteen emerging markets (Turkey, Korea, Mexico, Portugal, Singapore, Greece, Thailand, India, Chile, Hong Kong, Malaysia, Philippines and South Africa) by considering 1987-1996 periods. Variables that were used in the study were chosen from both local and global economic factors. As a result, short-term interest rate, CPI, exchange rate, Gross National Product (GNP), monetary base and trade balance were chosen as national data. On the other hand, world market returns, OECD CPI, IMF CPI, world industrial production, oil prices and 3-month maturity US Treasury Bill yield were used as international data. Two models were considered in the study. First model accepted world industrial production and world inflation as first component, CPI and 3-month maturity US Treasury Bill yield as second component and world market returns as third component as a result of main components analyze. Besides, second model added local factors to them. Local factors differ inconsiderably from each other in each country, however inflation and monetary data is generally found significant at the models. Growth rate is an important data in emerging economies. For this reason, it is normal that growth rate was added to the model. Inflation and monetary data gave consistent results at other studies. Being added of interest rate as second component

is important in terms of showing effect of financial system to economy. In the study, for only Turkey, exchange rate became a main component with the effect of high inflation. Further, Foreign trade of Turkey was also added to the model as an important factor. At the end of the study, it was determined that highest decrease and highest increase in volatility had existed in Turkey with respectively the values of -0,467 and 0,530.Gap between maximum and minimum values of volatility that was observed in Turkey was 0,997, however this gap existed as 0,2545 in South Africa. Another considering point in the study is that in spite of Turkey has three times volatility than Chile, it's return is as much as half of Chile's return. Study revealed that volatility is higher in emerging markets. On the other hand, it was determined that explaining powers of the models differ from country to country, local factors is more important in Turkey and India and international factors have no explaining power. World industrial production and world inflation found revealing in other countries even if just a bit.

Al-Sharkas (2004) tried to determine the effect of chosen macroeconomic factors on Jordan stock market by using Vector Error Correction Model (VECM). Previous studies submitted the hypothesis that there is a long-term balance relation between stock prices and specific macro economic variables. Moreover, empirical researches also proved that result.

Real economic activity (industrial production index), money supply (M2), inflation (CPI) and interest rate (Treasury bill interest rate) were used as variables in the study.

Study analyzed long-term balance relation between Jordon stock market returns and macroeconomic variables by using co integration method.

VECM is a standard technique for analyzing co integration between financial variables. Advantage of co integration against VAR is able to analyze moving together speciality between analyzed variables capability. VAR technique remained incapable because it is unsuccessful in considering potential long-term relationships. Therefore, VAR technique gives false results. Co integration analyzes long-term balance relationships between time series. Most important approach techniques on analyze of nonstationary data are VAR and co integration.

Al-Sharkas cited following researches at his study.

- Chen Roll and Ross said that there is a long-term balance relationship between stock prices and relevant macroeconomic factors. On the other hand, they submitted that stock prices are sensitive against unexpected economic news
- Lee examined dynamic interaction and causality relationship between stock returns and interest rate, real activity or inflation with USA data by using multivariate VAR model and it was found that previous stock returns is Granger Cause of certain stock returns.
- Darrat, in his study that is done with multivariate Granger technique, found that Canada stock market prices completely reflect all existing information about monetary policy changes.

In the study, ADF and Phillips and Perron Tests were used at analyzing unit root. Also suitable lag length was chosen by using AIC.

At the end of the study, it was found that there is a negative and significant correlation between stock prices and inflation, real activity and M2 affect stock prices positively and interest rate affect stock prices negatively.

Wongbangpo and Sharma (2002) researched the effects of chosen macroeconomic factors (GDP, CPI, money supply, interest rate and exchange rate) on five ASEAN countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) in terms of short and long terms. Study consists of the periods of 1985-1996.

At this study, lots of other studies about this subject were mentioned. These studies are briefly mentioned below.

- Fama (1981) modeled relationship between stock prices and real economic activity in USA. Accordingly, strong positive correlations between stock returns and real variables such as; capital expenditures, industrial production, GDP, money supply, inflation and interest rate.
- Chen, Roll and Ross (1986) researched effects of macroeconomic factors on US stock returns with multivariate arbitrage pricing model. These variables fundamentally affect future cash inflows and discount rate. Stock price is described as net present value of future cash flows at standard stock price valuation model. Consequently, these variables affect stock prices because of affecting future cash inflows.

- Dhakal, Kandil and Sharma (1993) researched interaction between money supply and US stock prices under the condition that stability at money market. At the end of the study in which VAR technique was implemented, it was determined that changes in money supply affects directly or indirectly stock prices via real output, inflation and interest rate.
- Abdullah and Hayworth (1993) found that US stock returns in a positive correlation with inflation and money supply expansion but also in a negative correlation with budgetary deficit, current account deficit and short and long-term interest rates.
- Fung and Lie (1990) researched the reaction of Taiwan stock market against GDP and money supply and found that Taiwan stock market does not consider information about changes in these economic variables.
- Kwon, Shin and Bacon (1997) analyzed relationship between Korean stock market and fundamental macroeconomic factors by using regression analysis. At the end of the study, it was determined that Korean stock returns reacts against dividends, exchange rate, interest rate, oil prices and money supply.

Monthly data was used in the study. GDP as an indicator of economic activity, M1 for money supply, CPI for inflation, treasury bill interest rate form interest rate were used and all series subject to logarithmic transformation. Stationarity of the series was analyzed with Augmented Dickey Fuller and Phillips and Perron tests. Because of series that are subjected to logarithmic transformation are not stationary, first differences of the series were calculated and thus stationarity of the series was administered. In the study, all series were included to analysis by subjecting to logarithmic transformation and being calculated first difference of them.

In consequence of the study, according to likelihood ration test, parameters of GDP and CPI that symbolize goods market and money supply and interest rate that symbolize money market were found statistically significant. This result is compatible with the theory, which was submitted by Classical Economists and Keynesians, that goods and money markets are the main indicatives of stock prices. At the end of the study, signs of GDP and CPI respectively positive and negative as expected in every of these five countries. Effect of money supply existed positive in Malaysia, Thailand and Singapore, but also negative in Indonesia and Philippines. On the other hand, It was determined that money supply effect is positive in the countries and also effecting economy positively potential of money supply is stronger than inflationary effect. A negative correlation between interest rate and stock prices was fastened in Philippines, Singapore and Thailand. This event proceeds from moving away of investors from stock market and thus causing to decrease in stock prices of them as a result of increase in interest rates (as an alternative investment opportunity) in these countries. Being positive of interest rates' effect was determined for Indonesia and Malaysia. Probable cause of this event was implied as using long-term interest rate as discount rate is better than short-term interest rate. It was determined that exchange rate affects stock prices positively in Indonesia, Malaysia and Philippines. In brief, it was determined that in these countries, devaluation of local money increases competitive power of the countries at world export market, then increases future cash inflows of the companies and thus it affects stock market positively. Furthermore, correlation between exchange rate and stock prices were found negative in Singapore and Thailand. It was implied that it's cause correlates with local assets demand of foreign investors.

In the study, it was determined that macroeconomic variables are Granger-cause of stock prices in five ASEAN countries. In other words, as a result of Granger Causality Test, a causality relationship from macroeconomic variables to stock prices was found in each of the five countries. This result states that past values of macroeconomic variables can predict future fluctuations in stock market index. On the other hand, it was determined that stock prices are Granger-cause of GDP and CPI (goods market variables) in five ASEAN countries, are Granger-cause of Money supply and interest rate (money market variables) in Indonesia, Malaysia and Thailand and are Granger-cause of exchange rates in Singapore and Philippines. Determination of reverse causality relationship is a proof for having become an important macroeconomic variable of stock market.

Variables ranged as stock prices, GDP, CPI, money supply and interest rate at VAR analysis. Exchange rates were considered exteriorly on account of exchange rate regime in most of ASEAN five countries and exchange rate variable was located in last at collocation. Reaction of stock prices against shocks that exist in macroeconomic variables was examined for four years period with action-reaction analysis. As a result of the study, following results were obtained. Initially, stock prices had reacted intensively against resultant shock on its own. However, when this effect stood strong in Indonesia, Philippines and Malaysia, it felled off in Singapore and Thailand as considering four years period. It was also determined that stock prices react especially against interest rate and money supply, but it's reactions against GDP, CPI and exchange rate stand weak. Moreover, it was fastened that interest rates react against shocks in stock prices in all of these five countries. Further, causing changes in GDP of stock prices fluctuations was determined in

Malaysia and Singapore. In the study, variance decomposition method resulted collaterally with action-reaction method's results. It was fastened that in all of five countries, a substantial part of the stock prices variability is explained by its own. However, this effect declined as long as elapse. According to the study, after a four years period, countries in which stock prices variability are explained by its own were only Malaysia and Philippines and this ratio felled beneath of 25% in other countries. It was emphasized that farther than 50% of stock prices variability is explained by interest rate and even if just a bit by money supply in Indonesia, Singapore and Thailand. Besides, it was determined that stock prices variability is explained by 20% money supply and 20% GDP in Malaysia. 30% of stock prices variability in Philippines, 20% of it in Malaysia and Singapore, 10% of it in Thailand and 3% of it in Indonesia were explained by exchange rates. In brief, in the study, it was determined that a substantial part of stock prices variability explained by interest rate, money supply and GDP and the exact opposite situation is also notable.

Bekaert and Harvey (1995) researched volatility in twenty emerging markets for January 1976-December1992 periods. At this study, it was determined that risk is high in comparison with return in Turkey and instead of it has the fourth highest return after Argentina, Philippines and Colombia, Turkey is the market in which the second highest risk is observed. Another substantial result that was obtained in the study is that volatility goes down in liberal economies. In other words, increasing international trade and liberalization of market cause to decrease in volatility observed in stock markets.

3.3. Studies For Istanbul Stock Exchange

Güneş and Saltoğlu (1998) researched that how much volatility observed in ISE had been affected from volatility of other economic and financial variables in 1988-1996 periods. In other words they researched what macroeconomic factors had been influential in explaining volatility of ISE. In the study, manufacturing industry index to determine production and ISE relationship, M2Y to determine liquidity and ISE relationship, reserve money and central bank money and exchange rates variables were used. Variables consisted of monthly observations and volatility values of variables calculated with Schwert method. At this study, a periodical dummy variable was used in order to reflect structural alteration that was created by 1994 economic crisis. Variables were considered by calculating with the help of logarithmic return formula.

In the study, primarily, correlation between ISE return and macroeconomic factors was analyzed then it was tried to be explained that with what macroeconomic variables' volatility ISE volatility is explained.

In the study, it was determined that estimated (definitive) variance value of ISE's return had been higher than other variables excluding interbank interest rate. Besides, it was fastened that ISE's return and weighted exchange rates had been in a negative correlation after 1994 but this correlation had not been strong, correlation between interbank interest rate and ISE had come into focus especially after 1994 and it had been negative (close to 30% negative correlation between interbank interest rate and ISE's return was found.), correlation between treasury bill and ISE's return had increased after 1994 but it had stood weak, there had been a high correlation between

ISE's return and transaction volume, there had been no correlation between change in industrial production and ISE's return, correlation between money supply and ISE had been weak and correlation between ISE's return and inflation had been weak ,n terms of correlation between ISE returns and other considered variables.

In brief, in the study, it was determined that return correlation between alternative investment vehicles and ISE was weak, being negative of this correlation referred to existence of an erecter structure, the strongest negative correlation was between interbank money market and finally sensitivity of ISE against macroeconomic factors had increased after 1994.

On the other hand, it was determined that average of Schwert Volatility Index which consisted of ISE returns several times was higher than average values of other variables (excepting transaction volume variable), average volatility index in OECD countries was 4,5 at analyzed period but this average was 11,81 at ISE at the same period. In the study, correlation between two variables was analyzed by using VAR method. According to bilateral VAR system's results, it was fastened that variables excluding M2Y had failed in explaining ISE volatility. In other words, being formed of ISE volatility independently from a substantial parameter as production level was determined.

A statistically significant result between investment vehicles returns volatility and ISE was also not encountered. A correlation whose significance level is close to 90% was found only between overnight interest rate and treasury bill at volatility changes among overnight interest rate, treasury bill and ISE. Furthermore, it was determined

that M2Y, a money supply variable, could be added to the model as a variable which explains ISE volatility with 95% significance level. Similarly, it was fastened that M2Y volatility could be explained by ISE volatility. However, ISE volatility could not be explained by volatility of US Dollar and Deutsche Mark. Same analysis was also done with currency basket and no significant result was obtained. On the other hand, it was stated that lagged volatility value of ISE had been influential at explaining ISE volatility, this event is a proof of going on in due course of unexpected return changes at ISE and this data show that ISE's return volatility had been defined without the exception of main financial and macroeconomic effects. In the study, analyses were repeated by forecasting ISE's return volatility with GARCH (1.1) model and it was fastened that as ISE's volatility was calculated with this method, no significant change in results was observed. In brief, in the study, it was implied that ISE volatility could not be expressed by any parameter excluding money supply changes and inflation volatility (partially)[5], this event shows that ISE's return volatility has no financial or macroeconomic basis and this event had arisen from being open to speculative movements of market that has insufficient depth level.

In the study, besides, floating in due course volatility structure was predicted with standard GARCH with mono equation (1.1), asymmetric GARCH (EGARCH) and multi GARCH (It was tried on daily ISE and US Dollar returns) models for daily and

[5] In the study, for the purpose of determining the effect of monetary variables' volatility excluding M2Y on ISE volatility, as a result of VAR model that was done with central bank money and reserve money, it was determined that there is no statistical correlation between these variables and ISE volatility, but inflation variable was influential in explaining ISE volatility at VAR model that created like this.

weekly data of ISE. As a result of standard GARCH model, it was fastened that daily ISE return had high correlation to ISE return at the day before, this correlation had seriously decreased at more than one lag level, this event indicate that daily ISE returns was predictable at short-term period and this event shows that daily news was influential at identifying index return. It was also fastened that these findings was not notable for weekly index returns series. On the other hand, it was determined that one unit unexpected return fluctuation increased volatility 0,2 units in modeling daily TRY return, when previous volatility value increased one unit, next volatility increased 0,72 units, this event shows that volatility mostly proceeded from previous fluctuation, ISE volatility had changed in due course but volatility had moved prognosticatively. Besides, it was determined that ISE volatility had showed effect for relatively shorter period. In other words, it was determined that a sudden change in stock returns increased the volatility and this change had gone on part time but this shock had sloped down to normal levels in due course. Moreover, it was fastened that GARCH (1.1) method predicted observed high return fluctuations well enough, GARCH (1.1) predictions that was done with weekly index returns was somewhat successful, consequently standard GARCH (1.1) is a method which models daily and weekly returns fluctuations well enough.

In the study, EGARCH method was used for determination that was passed over in GARCH model of how negative and positive returns fluctuations contribute volatility. As a result of implementation of the method, it was determined that asymmetric volatility model in not acceptable for daily ISE data. In other words, it was determined that investors' reactions against negative and positive ISE returns fluctuations had not been different.

In the study, multi GARCH model was used for testing correlation between long-term return volatilities of ISE and US Dollar. As a result of method implementation, it was fastened that there is no clear correlation between risk structure of ISE returns and daily risk structure of US Dollar. In other words, floating volatility of ISE had been affected from risk of US Dollar return merely. In brief, ISE volatility had not changed against unexpected increases in US Dollar. Obtained findings at the end of this analysis strengthened previous argument of the study that ISE return volatility specifies with its internal dynamic and independent from other series.

In the study, it was determined that ISE return volatility had changed in due course, unexpected return fluctuations has followed unexpected return fluctuations with particular tardily in daily and weekly return data and the most important causes of ISE return volatility were substantially news and at the same time previous volatilities.

In the study, it was determined that return volatility that had been observed in ISE had not correlated with macroeconomic variables, it can be modeled with it's past values and the most influenced factor in directing volatility had been ISE's own internal dynamics. Market values (paid-in capital*free float rate) of stocks that are traded in ISE were subjected to ascent sort and first 15 and last 15 stocks added to the model in order to test whether speculative movements in ISE cause of return volatility that was extremely high and it' s cause was uncertain[6]. Return volatility of all stocks that were chosen with GARCH (1.1) method were predicted in daily level.

[6] Speculators prefer stocks whose public offering value is relatively low in order to affect it's price by short-term buying and selling easily.

Average mean of values was also accepted as a statistic which gives volatility level for all stocks. In the study, group averages of the groups that were classified as small and big were calculated and these two values were compared at last stage. It was determined that when analysis was done with denary groups, small stocks had been 39% more volatile than big stocks and when fifteen stocks were used one group, small stocks had been 34% more volatile than big stocks. On the other hand, it was also determined that this volatility difference had proceeded from return differences, and then there had been no clear difference between average of returns of stocks that were classified as small and short, therefore return volatility difference mostly proceeded from speculative movements.

Finally, in the study, it was tried to be determined that whether index had been affected by volatilities of certain stocks or not. In other words, a correlation between some stocks' volatilities and ISE index volatility was tried to be determined. In the study, stocks were ranged by their free float rate and first fifteen countries were added to analysis. According to basic correlation matrix, it was implied that there had been a correlation between free float rate and showing volatility parallelly to ISE of stocks, some stocks in same sector had moved together, but all stocks in same sector had not reflected this behavioral characteristic, hence when demand for some stocks occurred collectively, some stocks stayed out even they were in the same sector, this event indicates that speculative movements were influential in determining ISE volatility.

Kargı and Terzi (1997) tried to determine causality relationships among ISE, interest rates, inflation and real sector and their dynamic interactions with VAR method.

Accordingly, at this study, a quadrivariant (ISE National-100 Index, CPI, interest rates that had been implemented for one year maturity time deposit and industrial production index) VAR model was created. Lag length was determined as 8 with Akaike and Schwartz tests. In the study, logarithms of variables excluding interest rates were calculated and seasonal fluctuations were added to the model.

According to results of F test that were obtained from VAR model and were the most important vehicle used in determining Granger Causality relationships;

- There was a causality relationship between ISE Index and inflation. This relation was mutual. Further, all of these two variables were also affected by their own past values.
- Inflation also correlated with interest rate significantly beside ISE Index and this relation was mutual.
- There is no significant correlation between industrial production index and other variables and it had been affected only from its past values.

On the other hand, at the dynamic interactions part of the study, according to variance discrimination results it was determined that when effects of fluctuations in interest rate, inflation and industrial production index on ISE was considered, a significant part of ISE fluctuations proceeded from it's past values and also partially from CPI and interest rates

In the study about determining dynamic interactions among ISE, interest rates, inflation and real sector, following results were determined.

- Stock market was unsatisfactory in explaining fluctuations in real sector. In spite of real sector reacted against fluctuations in ISE positively, this reaction's level was not enough strong.
- A significant part of fluctuations in inflation was explained by interest rates and inflation reacted against inflation fluctuations positively.
- Real sector reacted against shocks in inflation negatively but somewhat weakly.
- ISE Index reacted against inflation fluctuations positively but weakly, but inflation explained a significant part of ISE Index fluctuations. Therefore, origin of ISE fluctuation was inflationary pressures instead of real sector's fluctuation.

Gökçe (2002) tested causality relationship between total transaction volume of ISE and ISE National -100 Index by using Granger Causality Test and researched correlation between price and volume for 01.04.1988-01.31.2001 periods. Variables that used in the study were subjected to logarithmic transformation and their first differences were calculated. Stationarities of series at different lag lengths were tested by implementing Augmented Dickey Fuller Unit Root Test. Granger Causality Test was tested in different lag lengths and 'price is not cause of volume' hypothesis was rejected with a very high significance level at all lag lengths. In brief, in the study, it was found that fluctuations in volume had proceeded from fluctuations in price. Accordingly, it was determined that price Granger caused transaction volume. This relationship had survived in both the events of increasing or decreasing prices.

Yılmaz, Güngör and Kaya (2004) researched that whether there had been a correlation between stock prices and variables of CPI, money supply, interest rate, exchange rate, trade balance and industrial production index or not for 1990-2003 periods. Least squares prediction method, Johansen-Juselius Co-Integration Test, Granger Causality Test and VEC Model were used in the study in order to research correlation between stock prices and macroeconomic variables. Augmented Dickey-Fuller Unit Root Test was used in order to test stationarities of the series and it was determined that trade balance, interest rate, industrial production index and M1 are stationary at their level values; exchange rate, ISE Index and CPI are stationary at their first difference values. Least squares method was implemented in order to determine correlation between ISE Index variable and chosen macroeconomic variables and it was determined that a fluctuation in exchange rate, CPI and M1 variables had affected ISE index positively and significantly, but a fluctuation in interest rate and trade balance had affected ISE index negatively and significantly, besides industrial production index variable had not affected ISE index.

It was tested that whether there had been a long-term correlation among variables or not by using Johansen-Juselius Co-Integration test. Because of being integrated in different levels of variables that were used at study, this method was preferred rather than Engle-Granger Two Stage Co-Integration Test. At co-integrations that were done, it was determined that co-integration correlations between ISE index and CPI and between interest rate and industrial production index were discovered, but no co-integration correlation between ISE Index and exchange rate and between trade balance and M1 were found. In this context, it was fastened that there had been a long-term correlation between ISE Index and variables of CPI, interest rate and

industrial production index. Furthermore, as a result of Granger Causality Test, it was found that there had been a mutual relationship between ISE Index and variables of exchange rate and M1. In brief, it was determined that a fluctuation in ISE index had affected exchange rate and M1, at the same time also fluctuations in these two variables had affected ISE Index. In addition to this, in the study, it was determined that CPI and interest rate Granger caused ISE Index. Shortly, it was found that a fluctuation in CPI and interest rate had affected ISE index but not the other way round. On the other hand, it was fastened that there had been no causality relationship between ISE Index and variables of industrial production index and trade balance.

According to variance discrimination result, it was determined that ISE Index had affected against mostly it's own shocks, and then it had been affected respectively against past shocks of interest rate, CPI, trade balance, M1, exchange rate and industrial production index. Established events as a result of variance discrimination in the study are mentioned as follows.

- As of the beginning of period ISE Index variable variance had completely been determined by its own shock but at the end of 24. Month this ratio regressed to 75%.
- Interest rate variable had showed it's effect after 4. Month and this ratio rose to approximately 13% at the end of the period.
- CPI affected ISE Index variance approximately 6% at 4. Month and this ratio increased to 9% at 24. Month.

- Trade balance had taken effect with increasing percentage but this ratio had never climbed over 2%.
- Effect of M1 had stood in 1%'s
- Effects of exchange rate and industrial production index had been almost non existing.

In the study that was done by Hacıhasanoğlu (2003), transitivity between observed volatility of ISE and volatility of macroeconomic variables (exchange rate of US Dollar, WPI, CPI, ISE transaction volume, treasury interest rate, reserve money, hot money, overnight interest rate, industrial production index) was researched. In the study, volatility analyses were done buy using VAR and BVAR (Bayesian VAR) models. On the other hand, volatility series were created in the study, by using Schwert volatility index. Because of hot money had had negative values and interest rates had already represented return, logarithms of these variables did not calculate but the other variables' logarithms were calculated.

In the study, when volatilities of variables reviewed, it was determined that volatility indexes of variables of industrial production index, transaction volume, reserve money, WPI, CPI, exchange rate, treasury interest rate reached highest level of the year at the period of April and May in 1992, volatility series of overnight interest rate variable in December, besides ISE volatility series in January reached highest level of the year, volatility series of hot money variable reached highest level of the year by increasing 375% in November as against October. On the other hand, it was determined that all macroeconomic variables' volatility increased in 1994 through the effect of crisis, volatility of exchange rate reached it's highest value in 1994,

similarly also volatilities of WPI and CPI variables reached their highest values in 1994, further volatilities of treasury interest rate and overnight interest rate variables reached their highest values in 1994 by showing substantial bound.

At analyzed period, it was determined that especially in Aprils volatility of most macroeconomic factors had reached their highest level in the year, hot money had showed big volatilities in Novembers, interest rates had climbed over it's average significantly in Decembers, ISE Index had showed high volatility in first two months of the years.

Following results was obtained in the study:

- It was determined that average volatility of exchange rate of UD Dollar was 0,038, but average volatility of ISE Index was four times(0,145) of it, US Dollar's volatility was higher than ISE Index volatility in 1994. On the other hand, dynamic interaction between variables was examined by means of Action-Reaction functions. However, in the study, interpretations about predicted action-reaction parameters was made without considering confidence levels that show whether action-reaction functions are statistically significant or not. In this context, in the study, it was determined that effect of a shock in US Dollar volatility series on ISE volatility was negative. However, when confidence levels were considered, this effect was not found significant.
- It was found that CPI volatility was just 11,5% of ISE volatility, CPI volatility had been high in beginnings of the years, this volatility had

progressively decreased towards end of years, a shock in CPI volatility had created a small and negative effect on ISE volatility. However, when confidence levels were considered, this effect was not found significant.

- It was determined that WPI variable had had somewhat low volatility as against ISE; a shock in WPI volatility has affected ISE volatility negatively. However, when confidence levels were considered, this effect was not found significant.
- It was determined that volatility of hot money had showed seasonality, volatility had increased in Novembers every year, standard deviation of series was somewhat higher than their average, a shock in hot money volatility had effected ISE volatility negatively for two or four months, after that this effect had floated around the average. However, when confidence levels were considered, this effect was not found significant.
- It was determined that volatility of reserve money had been lower than most of macroeconomic variables, a shock in reserve money variable had affected ISE volatility as long as six months, this effect had turned to negative in 6.month and it had turned to positive again in 8. Month. However, when confidence levels were considered, this effect was not found significant.
- It was fastened that transaction volume volatility had been 3,4 times of ISE volatility, but ISE Index volatility had floated in a wider corridor than transaction volume, volatility of transaction volume had reached it's highest value in Aprils, a shock in transaction volume volatility had created a floating effect on ISE volatility, this strong effect had made ISE volatility increase in short-term, decrease in medium term and turn to negative after 6.month. When confidence levels were considered, the result that being statistically

significant of the effects that had been negative in 2. and 3. months and positive in 5. and 6. months was obtained.

- It was determined that treasury interest rate volatility had been 30% higher than ISE volatility, standard deviation of treasury interest rate had been 90% higher than standard deviation of ISE, treasury interest rate reached it's highest values in 1994 and 1997, in general treasury interest rate volatility had increased in Mays, a shock in treasury interest rate volatility had affected ISE volatility neither positively and negatively. However, when confidence levels were considered, this effect was not found significant.
- It was fastened that overnight interest rate volatility had been high as a result of existing crises, in general volatility had increased at ends of the years, a shock in overnight interest rate had increased ISE volatility at a very low rate, but a strong negative effect had been observed in 3. and 4. months and this effect had lost it's power progressively. However, when confidence levels were considered, this effect was not found significant.
- It was determined that industrial production index had been lower than ISE volatility, a shock in industrial production index volatility had affected ISE volatility negatively for two or five months, this effect had turned to positive weakly after 5. month, but it had turned to negative again in 8. month. However, when confidence levels were considered, this effect was not found significant.

In the study, stationarities of the series was tested with Augmented Dickey Fuller Test and being stationary of all series was found. After stating stationarity, bilateral VAR analysis was implemented for researching correlation between ISE

volatility and each of macroeconomic variables. Final Prediction Error, Akaike Information Criterion, Hannan-Quinn, Schwartz and Likelihood Ratio tests were implemented for stating the number of lags that will be used in VAR analysis.

In the study, results of bilateral VAR and Granger Causality are as follows:

- The hypothesis that there had been no Granger Causality as a result of model with 4 lag levels was rejected at 5% significance level when ISE volatility was dependent variable at analysis of relationship between ISE transaction volume and ISE volatilities. This argument was rejected for also at 11 and 12 lag lengths. However, it was found that ISE volatility was cause of ISE transaction volume at 4, 11 and 12 lag lengths. In other words, it was determined that VTVOLUME Granger caused VISE.
- It was determined that fluctuations in overnight interest rate volatility had affected ISE volatility, in other words, overnight interest rate volatility Granger caused ISE volatility.
- A Mutual relationship whose lag length was eleven was determined between US Dollar volatility and ISE volatility.
- It was determined that at 4 and 11 lag lengths, the argument that submits that WPI volatility and ISE volatility had not been cause of each other could not be rejected and at 4 and 12 lag lengths, the argument that submits that CPI volatility and ISE volatility had not been cause of each other could not be rejected.

- It was determined that at 2, 5 and 12 lag lengths, the argument that submits that reserve money volatility and ISE volatility had not been cause of each other could not be rejected.
- It was determined that at 11 and 12 lag lengths, the argument that submits that hot money volatility and ISE volatility had not been cause of each other could not be rejected.
- At 4 lag lengths, the argument that submits that there is no causality relationship between treasury interest rate volatility and ISE volatility was rejected at 10% significance level. Treasury interest rate volatility Granger caused ISE volatility.
- The argument that submits that industrial production index volatility had not been Granger Cause of ISE volatility was rejected at 5% significance level for 12 lag lengths. In this context, industrial production index Granger caused ISE volatility.

In the study, firstly, a senary VAR model was made with volatility series whose Granger Causalities was relatively proper of transaction volume, overnight interest rate, hot money, CPI, industrial production index and ISE volatility series. Dummy variables were added to the model for considering seasonality. As a result of analyzing impulse-response functions that were obtained from senary VAR model, it was determined that shocks in industrial production index, overnight interest rate, ISE transaction volume and CPI had affected ISE volatility negatively but a shock in hot money had affected ISE volatility negatively. Effects on ISE volatility of shocks had been strong at industrial production index and overnight interest rate volatility

and reducing ISE volatility effect had been it's the highest level at 2 months lag levels.

On the other hand following results were obtained in the study. Reducing ISE volatility effect of transaction volume volatility reached substantial levels after one month and this effect went on also second month. In spite of reducing ISE volatility effect of a shock in CPI volatility had gone on as long as first eight months, this effect was unimportant. Besides, it was determined that a shock in hot money volatility had increased ISE volatility for 5-6 months. However, when confidence levels that was in impulse-response functions that were obtained from senary VAR model were considered, the result that none of these effects are significant was founded.

In the study, Cholesky method was used in order to decompose the variance. At the end of the study, when a ten months time horizon was considered, it was determined that almost 40% prediction error variance at ISE volatility was explained by it's own past shocks, 21,5% of it was explained by ISE transaction volume volatilities past shocks, 14% of it was explained by overnight interest rate, 11% of it by industrial production index and 10% of it by volatility of CPI. Cholesky arrangement was explained as VISE, VTVOLUME, VOVERNIGHT, VHOT, VCPI, and VINDUSTRY for ten months later at decomposition of variance. However, when next twelve months are considered, Cholesky arrangement becomes as VCPI, VHOT, VINDUSTRY, VISE, VOVERNIGHT and VTVOLUME and explaining with it's own past shocks ratio of ISE volatility decrease to 37%.

It was observed that VAR model that was used in the study does not give successful predictions about whole of all variables and Bayesian VAR model was tried to increase efficiency of the model. Hereat, it was determined that BVAR model in which overnight interest rate, ISE transaction volume and hot money variables were used was successful at explaining and predicting ISE volatility.

In brief, at this study, it was showed that there had been transitivity between ISE volatility and volatility of macroeconomic variables by trying VAR and BVAR models with four and six variables. BVAR model made better predictions than VAR model. On the other hand, it was determined that ISE volatility can significantly be explained by it's own past values, besides volatilities of hot money, CPI, overnight interest rate, industrial production index and ISE transaction volume is useful at determination of ISE volatility.

Mumcu (2005) tried to explain correlation between stocks and macroeconomic factors by using multilinear regression model and Granger Causality Test with monthly data for the periods of January 1990-December 2004. In the study, ISE National-100 Index as the dependent variable and treasury interest rate, US Dollar, money supply (M2), industrial production index, inflation (CPI) and cumhuriyet gold prices as independent variables were used. Stationarity of variables was analyzed with Augmented Dickey-Fuller Test and as a result of this analysis; being not stationary of variables excepting CPI was fastened. In order to provide stationarity, first differences of variables were calculated (excepting CPI) and values of all variables that were subjected to first difference were determined as stationary.

Data was analyzed in terms of that having normal distribution of variables is required for being able to be implemented of regression model and it was fastened that variables excepting industrial production index had not distributed normally. Therefore, variables excepting industrial production index were taken the square root in order to adapt them normal distribution. As a result of Multilinear Regression Model, it was determined that ISE-100 Index which is dependent variable is explained at the rate of 90.6% by US Dollar, M2, industrial production index, cumhuriyet gold and treasury interest rate that were independent variables. Furthermore, according to table which enables to test whether model as a whole is significant or not, being significant of analysis as a whole was determined. At the end of the model, it was determined that an increase in exchange rate of US Dollar had increased ISE Index at the rate of 0.08, an increase in treasury interest rate had decreased ISE Index at the rate of 1.640, an increase in M2 had increased ISE Index at the rate of 0.000049, an increase in industrial production index had decreased ISE index at the rate of 0.511 and gold and CPI variables had been insignificant in explaining ISE Index at 5% significance level. As a result of Granger Causality Test, it was determined that there had been a mutual between ISE Index and variables of gold prices and treasury interest rate, there had been no causality relationship between ISE Index and variables of CPI, M2 and industrial production index, ISE Index Granger cuased US Dollar. According to results that were obtained from the study and summarized above, it was determined that fluctuations in macroeconomic factors had not explained fluctuations in stock prices completely, but negative correlation between treasury interest rate and ISE Index and being the most important variable that had affected ISE Index of treasury interest rate make this implementation meaningful. Thus, it was determined that treasury interest rate which

is an investment vehicle that has fixed rate of return and is risk free is the most important investment vehicle against treasury bill.

Tuzcu (1999) analyzed correlation between high volatility of ISE and some financial and macroeconomic variables. In the study, standard deviation criteria was used at measuring variability of stock returns with the thought that it summarizes probability of observing positive or negative high volatilities. Moreover, stock prices' fluctuations were analyzed for the period of January, 01, 1986 when ISE came into operation and March, 31, 1999.

In the study, it was determined that a significant growth in economy had been instrumental in explaining high increases in stock prices. However it was added that excessive gains and loses could not be explained with only one indicator. According to the study, this high correlation between economic growth or deflation and stock prices could be explained by increases or decreases that existed on sales and hence profits of companies. In the study, it was also mentioned that talking about existence of a strong correlation between inflation and stock returns was not possible and that depressions in ISE at the years of 1988, 1989, 1991, 1993, and 1994 when deposit interest rate had increased and booms in ISE at the years when deposit interest rate had decreased was remarked. However, in the study, negative correlation between these two variables was not encountered in other years and a similar situation was notable for treasury interest rate. It was determined that a negative correlation between interest rate and stock returns had been encountered only in 1989, 1991, 1992, 1994 and 1998, but in other years this expected negative correlation was not observed. In this context, study states that talking about existence of a strong

correlation between interest rate and stock returns had not been possible and existence of a strong correlation between stock returns and investment vehicles in foreign currencies was not encountered. Consequently, it was determined that only increases or decreases in GNP could be revealing about explaining excessive gains and loses within limits in stocks. Otherwise, it was determined that fluctuations in inflation and different investment vehicles like foreign exchange rate, deposit interest rate and treasury bill interest rate fall short of excessive volatility in stocks.

Results that were obtained from the study revealed that macroeconomic and financial bases of ISE volatility had been somewhat weak. In this sense, it was determined that ISE had not integrated enough with other markets and its cause is being vulnerable against speculative and manipulative effects of market which had not had enough depth. In other words, it was emphasized that high volatility that was observed at prices that had increased or decreased without referring solid and consistent causes had been created by speculative and manipulative movements and this event indicates that market was monopolized by speculators and manipulators who tried to yield in short-term instead of earning long-term capital gains and dividends.

On the other hand, in the study, factors as political instability, instability in economic and financial markets, lack of demand, demand instability, low free float rates and homogeneous investor profile were arranged among probable causes of ISE volatility.

Kanalıcı (1997) analyzed determination of stock prices for the period of November 1987-September 1994 and factors that had affected it by using monthly data. In the

study, factors were divided. Expected company earnings and changes in financial structures of companies were described as endogens factors. Besides exogenous factors were identified as interest rates, foreign exchange rate, money supply, changes in corporate taxes, changes in government expenses, GNP and general level of prices. It was determined that in theory, increases in interest rates decrease stock values, a money supply extension increases stock prices, an increase in exchange rates decreases stock prices as a result of being an alternative investment vehicle of it, a short-term increase in general levels of prices increases stock values, a long-term increase in general levels of prices decreases stock values, an increase in GNP increases stock prices (if there is no supply elasticity, it causes inflation and increase in interest rates) and an increase in corporate taxes decreases stock prices.

In the econometric research which was done on ISE, regression method was used in order to analyze correlation between ISE Index and variables of foreign exchange rate, money supply and interest rate. Contrary to theoretically expectations, researcher found a positive correlation between foreign exchange rate and ISE index when one-to-one relation was analyzed. When correlation between money supply and ISE Index was analyzed, M1, M2 and M3 were examined and a positive correlation at high significance level was found. On the other hand, result that interest rates had not had enough power alone for explaining fluctuations in ISE Index was obtained. When short-term interest rate, M1 and foreign exchange rate were added to the model together, being significant of all parameters was found. In the analysis that was done with foreign exchange rate, M2 and 6 months maturity interest rates, signs of parameters excepting foreign exchange rate were found well-

matched with theoretical expectations. Besides, correlations of M3, foreign exchange rate and 12 months maturity interest rate were found statistically insignificant.

Durukan (1999) analyzed correlation between stock returns in Turkey and variables of inflation, economic activity, interest rate, foreign exchange rate and money supply for the period of 1986-1998. In the study, three series that are nominal, percentage change and logarithmic were created. At the end of the regression analysis that were done with these three models, it was determined that interest rate (one month maturity deposit interest rate) had had negative effect and had been statistically significant. Industrial production index that was chosen as economic activity variable resulted significantly alone but when it was reclaimed with foreign exchange rate, inflation and money supply, it gave better results, because of existing of multi linear integration. CPI that was used as inflation variable was not exponent in any of the models. Signs of parameters were also found uncertain for obtaining clear results. Similarly, foreign exchange rate variable also did not give positive result and it had had different signs in each of the models. M1, M2 and M2Y variables that were added to the model as money supply variable had different signs, but they had negative sign in the equations in which they were statistically significant. As a result of the study, it was determined that ISE had not been efficient in terms of semi strong efficient market and it had been a speculative and shallow exchange.

Özçam (1997) tried to explain ISE Index for the period of 1986-1995 by using industrial production index, CPI, treasury interest rate, money supply, budgetary equilibrium, foreign exchange rate and current account variables. In the study, it was determined that when all the period was considered, macroeconomic factors had not

explained stock returns, but in some periods, some factors had had the explanatory power. For instance, a statistically significant correlation between stock returns and variables of industrial production index and inflation was found in many periods. On the other hand money supply succeeded to be added to the model as an exponent variable, in spite of it had had different signs. I was also determined that similarly; budgetary balance could have negative or positive signs. In many periods, foreign exchange rate data had showed a strong and negative correlation. Moreover, it was fastened that R^2 which shows the macroeconomic variables' explanatory power for stock returns had been 0.14 for all periods. At the calculations that were made as a result of decomposition of periods, R was between 0.26 and 0.52.

Mutan and Çanakçı (2007) researched effects of macroeconomic events on Turkish Stock Market by using monthly data for the period of January 2000-April 2007. At the econometric model that was used in the study, ISE national-100 Index as dependent variable, industrial production index on behalf of real sector, money supply and inflation as macroeconomic factors were used. In the study, primarily necessary transformations were done on variables in order to make variables proper for linear modeling and stabilize variance, and then ADF test was implemented to test stationarity of the series and being not stationary of ISE-100 Index and M1 was fastened. Nonstationary series were made stationary by being subject to logarithmic transformation and calculating their first difference.

In the study, a statistically significant decrease on ISE-100 Index in December 2000 and a statistically significant increase in November 2002 were observed. It was stated that November 2000 crisis caused decrease in ISE-100 in December 2000 and

increasement in November 2002 proceeded from general election that was done in same period. Market's expectations about new government and opinions about ending of uncertainty atmosphere after election increased ISE Index.

In the study, it was determined that fluctuations in money supply had affected index return positively, but this effect was observed after 5 months, lagged value of inflation that is admitted as an indicator of macroeconomic stability had correlated with stock returns negatively and industrial production index has no statistical effect on stock prices. Accordingly, it was stated that being affected of stock returns from money supply and inflation that are representative of monetary factors in spite of being not effected of them from industrial production index, a representative of real sector, shows that stock returns are more sensitive against monetary uncertainty than real uncertainty.

4. IMPLEMANTATION

4.1. ISE as an Emerging Market

Istanbul Stock Exchange (ISE) was found in December, 26, 1985 for the purpose of enabling being traded of stocks, treasury bills, government bonds, private sector bonds, foreign securities, international securities, revenue sharing certificates and real estate certificates. ISE came into operation in January, 3, 1986. Exchange has made rapid progress since that data. Market value of ISE had increased from USD 938 million in 1986 to USD 307.501 million and number of companies traded in ISE had increased from 80 in 1986 to 339 after 24 years later in 2010. Similar developments had been observed in total traded value. It had increased from USD 13 million in 1986 to USD 441.469 million in 2010.

As it can be seen at the table that shows the development of the ISE below, market value and total traded value of the ISE had changed by years in the period of 2000-2010 that is subjected to this paper. Briefly, a significant stability on ISE growth rate had not been observed for this period. In any case, total traded value which was USD 178.998 million in 2000 reached to USD 441.469 million in 2010. Similarly, also market value increased from USD 69.507 million to USD 307.551 million. Total traded value and market value which had decrease especially in crisis year had increase again in ensuing years. Furthermore, companies traded in ISE had increased from 316 to 339 between the years of 2000-2010.

Table 4.1: Number of Companies Traded on the ISE Markets, Market Value of the ISE and Annually Trade Value

Year	Number of Companies Traded on the ISE Markets	Market Value of the ISE (US$ Million)	GDP (US$ Million)	Share of the ISE's Market Value in GDP (%)	Anually Traded Value of the ISE (US$ Million)
2000	316	69.507	266.568	0,26	178.998
2001	311	47.689	196.568	0,24	74.530
2002	289	34.402	232.535	0,15	69.937
2003	285	69.003	303.005	0,23	98.160
2004	297	98.073	392.166	0,25	146.605
2005	304	162.814	482.980	0,34	200.858
2006	316	163.775	530.900	0,31	222.724
2007	319	289.986	647.155	0,45	294.295
2008	317	119.698	730.338	0,16	247.893
2009	315	235.996	616.703	0,38	305.036
2010	339	307.551	735.828	0,42	411.469

(**Source**: ISE, TurkStat, Capital Markets Board of Turkey)

Share of the ISE's market value in GDP had showed fluctuation and had existed as minimum 16% and maximum 61%. This ratio is low by comparison with capital markets of developed countries as mentioned below. One reason of being low of share of the ISE's market value in GDP had been that companies had not met their financial needs by public offering.

The table below reflects shares of publicly traded companies' market capitalizations in GDP in Turkey and some developed and emerging markets. As can be seen from the table, shares of publicly traded companies' market capitalizations in GDP in Turkey had been 29% in average. This ration is low when it comparison with emerging and developed markets. When hidden economy of Turkey is considered, this ratio will decrease further. On the other hand, only in Argentina, shares of publicly traded companies' market capitalizations in GDP had been lower than Turkey. However, this ratio had been higher than one in USA and England. Being lower of shares of publicly traded companies' market capitalizations in GDP in

Turkey than developed and other emerging markets indicates that relative importance of exchange in economy is weak in Turkey.

Table 4.2: Shares of Publicly Traded Companies' Market Capitalizations in GDP in Some Countries

Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
Deutschland	0,67	0,57	0,34	0,44	0,43	0,44	0,56	0,63	0,30	0,39	0,43	**0,47**
USA	1,53	1,34	1,04	1,28	1,38	1,38	1,46	1,42	0,82	1,07	1,18	**1,26**
Argentina	0,16	0,12	0,16	0,27	0,27	0,26	0,24	0,22	0,12	0,15	0,17	**0,19**
Brazil	0,35	0,34	0,24	0,41	0,50	0,53	0,65	0,99	0,36	0,84	0,74	**0,54**
China	-	-	0,32	0,31	0,23	0,18	0,42	1,28	0,39	0,72	0,69	**0,50**
England	1,76	1,47	1,15	1,32	1,30	1,34	1,55	1,37	0,70	1,28	1,61	**1,35**
Japan	0,68	0,55	0,53	0,70	0,77	1,00	1,08	1,02	0,66	0,67	0,70	**0,76**
Turkey	0,26	0,24	0,15	0,23	0,25	0,33	0,31	0,44	0,16	0,38	0,41	**0,29**

(**Source**: Capital Markets Board of Turkey)

When number of companies traded on the ISE is compared with number of companies traded on developed and emerging markets, scarcity of ISE' s public offering level appears. For instance, averages of the number of companies traded on exchange are 6.134 in USA, 3.510 in Japan, 2.869 in England, 1339 in China, 850 in Deutschland, 398 in Brazil, 310 in Turkey and finally 111 in Argentina.

Table 4.3: Number of Companies Traded on the Exchange Market in Some Countries

Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Deutschland	983	983	934	866	819	764	760	866	832	783	765
USA	7.851	7.069	6.586	6.159	6.097	6.029	6.005	5.941	5.472	5.179	5.095
Argentina	125	119	114	110	107	104	106	111	112	106	106
Brazil	467	441	412	391	388	381	350	404	392	386	373
China	-	1.154	1.223	1.285	1.373	1.377	1.421	1.530	1.604	1.700	2.063
England	2.374	2.332	2.824	2.692	2.837	3.091	3.256	3.307	3.096	2.792	2.966
Japan	3.406	3.476	3.465	3.346	3.396	2.796	3.854	3.870	3.786	3.656	3.565
Turkey	316	311	289	285	297	304	316	319	317	315	339

(**Source**: Capital Markets Board of Turkey)

When total traded value of ISE is compared with developed and emerging markets, being somewhat shallow of ISE can be seen. As can be seen at the table below,

Turkey had been penultimate in average total traded value order in these eight countries.

Table 4.4: Annually Traded Value of Exchange Market in Some Countries (US$ Billion)

Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Deutschland	2.120	1.423	1.212	1.299	1.541	1.915	2.737	4.325	4.679	2.240	1.628
USA	31.804	22.241	18.207	17.323	20.976	24.820	34.198	57.900	70.647	46.736	30.455
Argentina	10	8	1	3	5	7	5	7	7	3	4
Brazil	102	63	46	66	104	165	276	598	724	645	869
China	-	494	352	396	517	393	1.159	6.075	3.849	7.836	8.069
England	4.559	4.520	4.001	3.610	5.169	5.678	7.572	10.334	6.272	3.402	2.741
Japan	2.641	1.834	1.688	2.221	3.352	4.680	6.259	6.766	5.888	4.158	3.967
Turkey	179	75	70	98	147	201	223	294	248	305	411

(**Source**: Capital Markets Board of Turkey)

On the other hand, when share of annually traded value of ISE in GDP is compared with developed and emerging countries, results that are in the table below was obtained.

Table 4.5: Shares of Annually Traded Values of Exchange Markets in GDP in Some Countries (%)

Countries	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Deutschland	1,11	0,75	0,60	0,53	0,56	0,69	0,94	1,30	1,28	0,67	0,49
USA	3,20	2,16	1,71	1,55	1,77	1,96	2,55	4,12	4,92	3,31	2,08
Argentina	0,03	0,03	0,01	0,02	0,03	0,04	0,02	0,03	0,02	0,01	0,01
Brazil	0,16	0,11	0,09	0,12	0,16	0,19	0,25	0,44	0,44	0,41	0,43
China	-	0,37	0,24	0,24	0,27	0,17	0,43	1,74	0,85	1,57	1,40
England	3,08	3,07	2,48	1,94	2,35	2,49	3,09	3,67	2,34	1,56	1,21
Japan	0,57	0,45	0,43	0,53	0,73	1,03	1,43	1,55	1,20	0,82	0,74
Turkey	0,67	0,38	0,30	0,32	0,37	0,42	0,42	0,45	0,34	0,50	0,56

(**Source**: Capital Markets Board of Turkey)

As can be seen at the table above, share of annually traded value of exchange market in GDP had been over 100% in USA, China and England. This ratio's highest value was 67% in 2000. Financial crisis that was observed in the later 2000 caused

decreased in this ratio. As a result of this period, share of annually traded value of ISE in GDP had decreased to 30%.

The table below reflects volume of outstanding securities in Turkey. As can be seen at the table, in spite of the fact that it had fluctuated in due course, share of stock in total outstanding securities' volume had kept almost same value. However, because of financial stability in analyzed period, share of private sector securities in total outstanding securities had been increased from 16% to 20%. On the other hand, share of stocks in total outstanding securities was still somewhat low at the end of 2010.

Table 4.6: Outstanding Securities (Million TRY)

	2000	2001	2002	2003	2004	2005
I.Priv. Sect. Securities	6.868	10.517	13.177	18.008	25.186	31.929
Shares	6.867	10.516	13.177	18.008	25.186	31.916
Corporate Bonds	1	1	0	0	0	0
Commercial Paper	0	0	0	0	0	13
BB-BGB	0	0	0	0	0	0
Warrant						
II.Publ. Sec. Securities	36.802	122.930	150.939	196.004	226.013	246.082
Govern.Bond	34.363	102.170	112.850	168.974	194.211	226.964
Treasury Bill	2.058	20.029	37.020	25.413	30.272	17.818
Privatisation Bond	382	731	1.069	1.617	1.530	1.300
Total:	43.670	133.447	164.115	214.012	251.199	278.011

(**Source**: CMB, ISE, UT, PA)

	2006	2007	2008	2009	2010
I.Priv. Sect. Securities	41.059	52.225	63.990	70.686	86.634
Shares	40.926	51.685	63.300	70.061	80.806
Corporate Bonds	120	270	370	491	3.404
Commercial Paper	13	270	320	100	105
BB-BGB	0	0	0	35	2.300
Warrant					20
II.Publ. Sec. Securities	252.370	255.310	274.827	330.005	352.841
Govern.Bond	241.876	249.176	260.849	315.969	343.317
Treasury Bill	9.594	6.134	13.978	14.036	9.525
Privatisation Bond	900	0	0	0	0
Total:	293.429	307.535	338.817	400.691	439.475

(**Source**: CMB, ISE, UT, PA)

As can be seen at the table that reflects annually real returns of investment vehicles below, ISE's rate of return had been the second highest rate of return at the period of

2000-2010. On the other hand, ISE's fluctuation had been substantially high. Because of that in spite of being high, ISE's rate of return had had a substantial fluctuation; share of savings directed to ISE in total savings had been low.

Table 4.7: The Rates of Profits Created by Means of Financial Investment (%)

Years	Deposit Interest	ISE	US Dollar	Gold (ingot)
2000	5	-46	-7	-13
2001	-20	-18	27	32
2002	22	-28	-15	3
2003	23	24	-24	-9
2004	14	28	-8	-4
2005	7	51	-10	3
2006	5	-8	-3	18
2007	8	31	-24	-2
2008	5	-58	19	22
2009	9	84	-8	25
2010	1	24	-5	17
Total	**79**	**84**	**-60**	**93**

(**Source**: TurkStat)

After Turkish Lira became completely convertible, all restrictions that had been imposed to corporate and individual foreign investors who want to transact on securities in the ISE was removed in August 1989. Turkish stock and bond market was opened to foreign investors without any restriction for taking capital or yields to abroad with this arrangement. Foreign investors' equities held at central depository and their share in total outstanding equities in ISE stock market for the period of 2000-2010 are shown at the table below.

As can be seen at the table, as a result of 2000-2001 financial crises, amount of foreign investors' investments in ISE had been somewhat at the period of 2000-2002. After that, investments of foreign investors had increased with the help of political and economic stability. However, 2007-2008 global financial crisis sharply decreased foreign investments. Subsequently, foreign investment level started to

increase again after economy became more stable than it's past condition and global economic condition.

Table 4.8: Foreign Investors' Equities Held at Central Depository (US$ Million) and Their Share in Total Outstanding Equities (%)

	Foreign Investors' Equities Held at Central Depository (US$ Million)	Foreign Investors' Share in Total Outstanding Equities (%)
2000	7.404,00	48
2001	5.635,00	50
2002	3.450,00	42
2003	8.954,00	52
2004	16.141,00	55
2005	33.388,00	66,3
2006	33.814,00	65,3
2007	61.832,00	72,4
2008	25.441,00	67,5
2009	56.246,00	67
2010	71.322,00	66

(**Source**: ISE)

As can be seen at the table that reflects profile of investors who transact in the ISE in 2009 below, individuals in local investors and funds in foreign investors stand out in terms of both the number of remaining in active accounts and amount of remaining in active accounts. On the other hand, it is considerable that when the number of active local investors is 99,30% of the number of active total investors, value of local remaining in active accounts is 32,66% of value of total remaining in active accounts. Besides, the number of active local investors (990.388) is insignificant relative to Turkey's population.

Table 4.9: Profile of Investors Who Transact in the ISE (2009)

Nationality of Investor	Identity Type of Investor	The Number of Investors (thousands)	Shares of Investors	The number of Active Investors (thousands)	Shares of Active Investors
LOCAL	FUND	0,6	0,0%	0,2	0,0%
LOCAL	CORP.	281,3	1,9%	2,4	0,2%
LOCAL	OTHER	38,5	0,3%	0,2	0,0%
LOCAL	INDIVIDUAL	14.448,0	97,2%	990,4	99,0%
LOCAL	MUT.FUNDS	0,1	0,0%	0,0	0,0%
LOCAL	**TOTAL**	**14.768,5**	**99,4%**	**993,3**	**99,3%**
FOREIGN	FUND	8,4	0,1%	2,1	0,2%
FOREIGN	CORP.	5,0	0,0%	0,9	0,1%
FOREIGN	OTHER	0,1	0,0%	0,0	0,0%
FOREIGN	INDIVIDUAL	80,0	0,5%	4,1	0,4%
FOREIGN	**TOTAL**	**93,6**	0,6%	**7,0**	**0,7%**
TOTAL		**14.862,0**	**100,0%**	**1000,3**	**100,0%**

(**Source**: CRA)

Nationality of Investor	Identity Type of Investor	The Number of Remaining in Active Accounts (thousands)	Shares of Remaining in Active Accounts	Value of Remaining in Active Accounts (thousands)	Shares of Remaining in Active Accounts
LOCAL	FUND	391.443	1,5%	1.717.151	1,4%
LOCAL	CORP.	3.184.394	11,8%	11.469.682	9,2%
LOCAL	OTHER	602.287	2,2%	2.640.819	2,1%
LOCAL	INDIVIDUAL	8.252.841	30,6%	24.504.644	19,7%
LOCAL	MUT.FUNDS	64.308	0,2%	259.100	0,2%
LOCAL	**TOTAL**	**12.495.274**	**46,3%**	**40.591.396**	**32,7%**
FOREIGN	FUND	10.082.564	37,4%	59.576.148	47,9%
FOREIGN	CORP.	4.304.343	16,0%	23.667.259	19,0%
FOREIGN	OTHER	2.487	0,0%	12.387	0,0%
FOREIGN	INDIVIDUAL	97.660	0,4%	440.568	0,4%
FOREIGN	**TOTAL**	**14.487.055**	**53,7%**	**83.696.363**	**67,3%**
TOTAL		**26.982.329**	**100,0%**	**124.287.758**	**100,0%**

(**Source**: CRA)

Not being significantly affected against macroeconomic fluctuations of ISE leaves question marks about how much exchange works healthy. The fact that especially foreign investors invest on the basis of high growth performance requires being directly influential on exchange of macroeconomic events. Therefore, it is required that a stock exchange that works efficiently reacts in a certain extent against

macroeconomic events. As mentioned above, foreign investors' share in ISE and corporate investors' share in foreign investors are high. Further, macroeconomic factors are substantially influential in corporate investors' investment decisions. For this reason, it is expected that ISE reacts against macroeconomic events. On the other hand, increase in share of corporate investors in the market brings stability to the market and increase in share of stocks in corporate investors' portfolio mitigates market volatility. In brief, increasing share of corporate investors raises liquidity and depth of the market and mitigates its volatility.

At this study, ISE volatility was analyzed in terms of how much exchange reflects macroeconomic events. In this context, reasons of ISE volatility were examined in terms of macroeconomic factors. As is known volatility has positive and negative sides. High volatility can make market's liquidity increase as a result of high rate of return opportunities. However, at the same time, high volatility suspends risk averse investors from the market as a result of its high loss probability. Thus, as mentioned above, in spite of it' s rate of return had been the second highest one in the period of 2000-2010, high volatility of ISE had made stock investments be low in total investments.

On the other hand, it is expected that stock exchange grows with economic growth. However, it is clear that a stock exchange that moves independently from macroeconomic fluctuations is not sufficiently integrated to economic system. A stock exchange that floats independently from macroeconomic factors is subjected to speculative transactions. In this context, at this study, reasons of the ISE's volatility

will be examined in terms of macroeconomic factors and an answer will be looked for about the question that how much ISE reflects whole of the economy.

In the study, some real and financial factors that is guessed as in an interaction with ISE was considered.

Determinations of factors that explain fluctuation in capital market's rate of return bring subjective structure which is hard to avoid with it. However, a result about which factors are more significant in explaining fluctuations in rate of return can be obtained by analyzing previous studies of the researchers. Extant literature states that a lot of factors can be correlative. Some of these factors are prices, money supply, real activity level, exchange rates, interest rates, political risk, oil prices, commerce sector and regional capital market index.

From this point of view, industrial production index which reflects real production level monthly, WPI and CPI as indicators of inflation, central bank money as an indicator of money supply, M1, M2 and M2Y as money demand variables, treasury interest rate and interbank overnight interest rate as nominal interest rate indicators, current account deficit in terms of reflecting economy's interaction with external world, currency basket which consists of US Dollar and Deutsche Mark (Euro was considered for after January 2002) in order to limit parity effect and foreign capital input variables were used. The variables that were chosen in the study can be criticized subjectively. Fama determined that it is not possible to avoid subjective critics in choosing data in this type of studies. For this reason, as mentioned above, previous studies was based for choosing data.

Data that has been used in the study was analyzed via Eviews 3.0 program.

4.2. Variables that Were Employed in the Study and Their Statistical Characteristics

At this part of the study, reasons of ISE National-100 Index's high volatility and how much this volatility was affected by macroeconomic factors are examined by considering the period of 2000-2010. Macroeconomic factors were added to the analysis in monthly bases and by being subjected to logarithmic transformation.

Table 4.10: Descriptive Statistics of the Variables

	National-100	Traded Volume	Currency Basket	Overnight Interest Rate	Treasury Interest Rate	M1
Mean	29.282	73.047.801	2,6047	30,89	32,90	35.481.904
Median	25.850	64.697.077	2,7350	17,50	20,98	33.718.247
Maximum	68.760	210.760.823	3,4182	315,92	193,71	93.558.595
Minimum	7.626	6.616.036	0,9802	1,50	7,53	4.550.049
Std. Dev.	16.912	51.503.107	0,5892	33,95	28,69	23.115.676
Skewness	0,4419	0,7981	-1,6044	4,8702	2,3040	0,4603
Kurtosis	1,9919	2,9609	4,8342	39,0585	10,4888	2,2308
Jarque-Bera	9,8859	14,0204	75,1320	7.673,0080	425,2381	7,9166

	M2	M2Y	Industrial Production Index	Foreign Transaction Volume	CPI	WPI
Mean	153.086.767	237.407.721	126,71	6.003	9.874	8.277
Median	128.333.058	200.715.700	129,10	5.101	10.073	8.676
Maximum	399.254.848	544.044.852	178,26	18.803	15.884	12.948
Minimum	22.007.176	41.061.929	85,80	424	2.576	2.094
Std. Dev.	106.065.480	140.774.066	22,13	4.614	3.855	3.139
Skewness	0,5393	0,4399	-0,0257	0,6480	-0,3081	-0,4877
Kurtosis	2,0843	2,0005	1,9391	2,5842	2,0622	2,1927
Jarque-Bera	11,0106	9,7513	6,2052	10,1880	6,9259	8,8163

	Central Bank Money	Current Account Deficit/GDP
Mean	33.161	-0,2989
Median	29.929	-0,3434
Maximum	70.617	0,4406
Minimum	763	-1,0242
Std. Dev.	19.070	0,2944
Skewness	-0,1686	0,3325
Kurtosis	1,8379	2,8149
Jarque-Bera	8,0533	2,6206

Some surveys for statistical summaries about variables that are submitted in the table above can be mentioned as follows. ISE National-100 Indexes' highest value was 68,760 and lowest value was 7,626 in the periods of 2000-2010. In this period, index had showed a standard deviation as 58% of its mean. On the other hand, maximum value of ISE traded volume was 2.8 times of its mean at the same period. Standard deviation of traded volume variable had been 71% of its average. Similarly, maximum value of foreign transactions was 3.1 times of its mean and its standard deviation had been 77% of its mean. Another considerable factor is that standard deviation of central bank money had been 98% of its mean. Otherwise, maximum value of overnight interest rates was 10.2 times of its mean and its standard deviation had been 110% of its average. Moreover, maximum value was 5.9 times of and its standard deviation had been 87% of its mean. In brief, in mentioned variables, standard deviation that is the indicator of variability had been high. On the other hand, standard deviation of industrial production index had been 17% of its mean. Further, according to Jarque Bera Normality Test[7], H_0 Hypothesis which submits that residuals distribute normally was rejected for all variables excluding current account deficit/GDP.

[7] Jarque Bera showed that under the H_0 hypothesis that submits that remainings distribute normally JB statistic fits a chi-square distribution whose degrees of freedom is 2. Is p value of calculated chi-square statistic is sufficiently low in an implementation, H_0 hypothesis that submits that remainings distribute normally can be rejected.

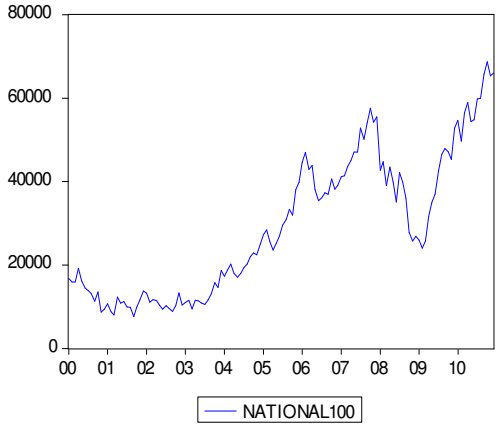
Each of the variables was individually analyzed by being considered graphically as follows.

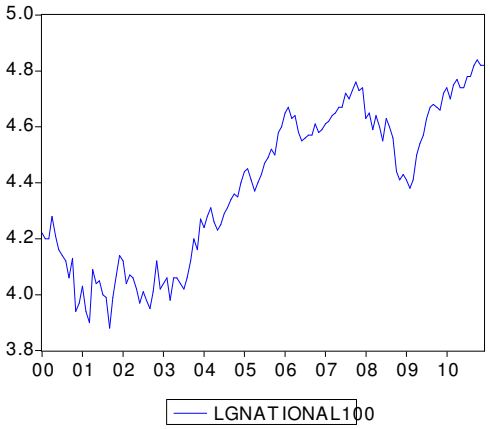
4.2.1. ISE National-100 Index

ISE National-100 index is the continuation of composite index which was started with 40 companies' stocks at 1986 and bounded with 100 companies stocks in the course of time. This index consists of stocks, excepting mutual funds, that are selected up to some standards and automatically encloses ISE National-30 stocks and ISE National-50 stocks.

ISE National-100 Index data was obtained from Istanbul Stock Exchange's web site on monthly basis. The value of index is accepted as equals to 1 at January,1 1986, and data shows us every month' s last business day close value of the index.

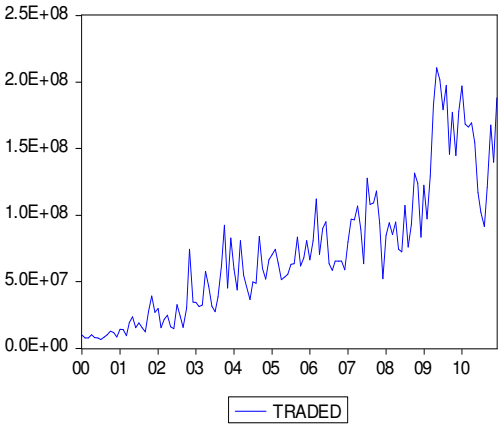
As can be seen at the chart below, as a result of national liquidity crisis at November'2000, index had shown a rapid drop. Furthermore, it had maintained its downfall with February'2001 crisis. After November'2002 elections, derived relative political and economic stability had pushed the index to prime values. Subsequently index had shown a new sharp decrease in 2008 at the period of global finance crisis whose effects had gained after the bankruptcy of Lehman Brothers. After that, in conjunction with global economy's revival, index has incurred to raise trend since 2009. Another noteworthy fact is that the volatility of the index is high. On the other hand, it was determined that ISE National-100 Index data had showed a positively skewed and thick short-tailed distribution.

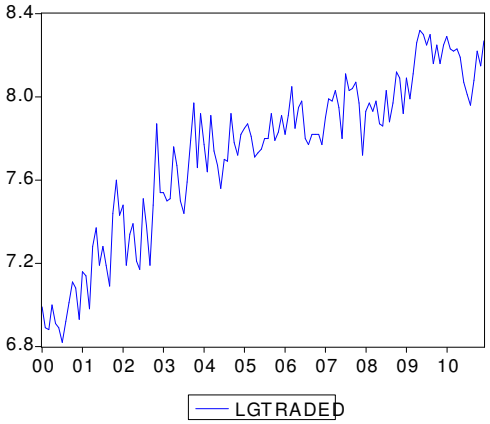




4.2.2. ISE Traded Volume

ISE Traded Volume Data was obtained from Istanbul Stock Exchange's web site. When the chart which reflects ISE traded volume data is analyzed, it is determined that traded volume of ISE had shown a continued upward trend in analyzed period but at the same time it had had somewhat high volatility. On the other hand, it was determined that ISE traded volume data had showed a positively skewed and thick short-tailed distribution.

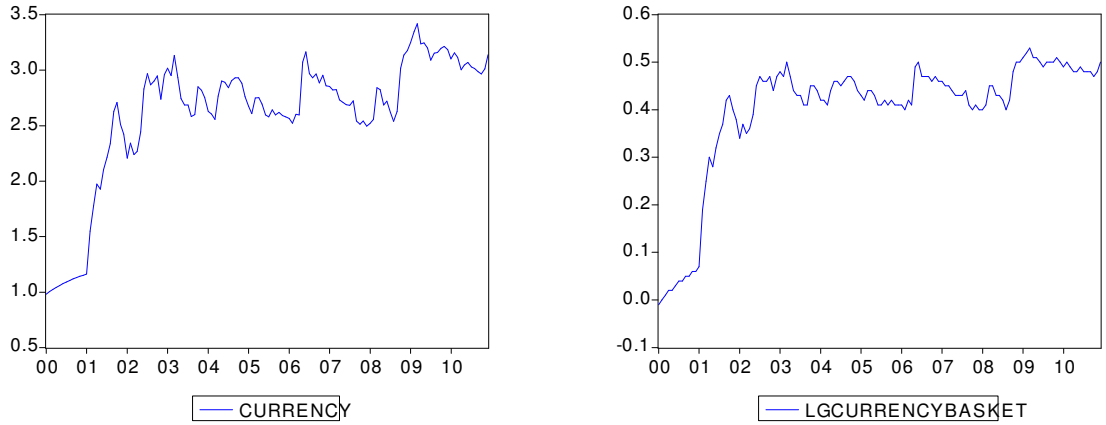




4.2.3. Currency Basket

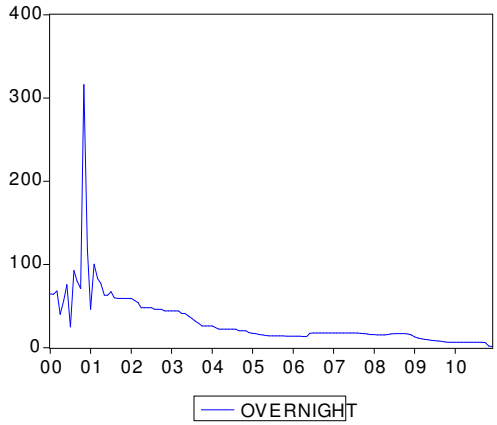
It' s seen that exchange, value and most importantly amassing fortune tasks of the national currency had been committed by foreign currencies in the high inflation period of Turkey. In general, US Dollar also becomes investment vehicle beside the task of saving value at this case that is named as currency substitution. In this case, increase in foreign currency demand causes evasion from other investment vehicles. Thus, it is expected that a fluctuation in foreign currencies affects the stock values.

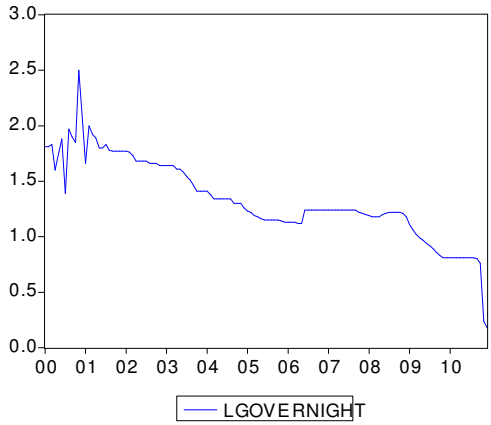
However, in order to bound parity effect which is caused by ascents and descents that has been sometimes performed by US Dollar, Deutsche Mark until 2002 and Euro since 2002, instead of foreign exchange rates, currency basket was considered. In this context, cash asked rates of US Dollar, Deutsche Mark and Euro that were collected from Central Bank of The Republic of Turkey' s data distributive system were considered when currency basket was being formed. Until January2002 1 US Dollar + 1,5 Deutsche Mark, after that date 1 US Dollar + 0,77 Euro were considered at forming currency basket. As can be seen at chart below, currency basket had shown volatility after floating exchange rate regime was started to be implemented in February2001. On the other hand, it was determined that currency basket data had showed a negatively skewed and thick short-tailed distribution.



4.2.4. Overnight Interest Rate (Simple Interest Rate Weighted Average) (%)

Interbank simple interest rate weighted average data was obtained from Central Bank of The Republic of Turkey' s data distributive system. As can be seen at the chart below, liquidity crunch that proceeded from tight monetary policy transformed into crisis in November2000 and Repo Market Overnight Interest Rate increased as far as 1.257,2% in December,4,2000. After that as a result of February2001 financial crisis that was observed in economy, overnight interest rates shown a historical increase with the rate of 7.500%. However, after that date, overnight interest rates had shown a continued downward tendency as a result of economic and political stability and increasing global risk appetite of Turkey. On the other hand, it was determined that overnight interest rate data had showed a positively skewed and thin, long-tailed distribution.

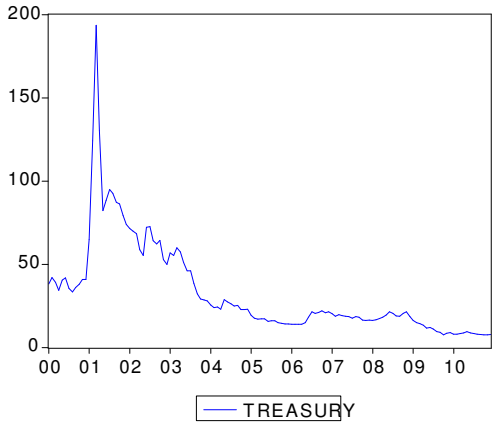


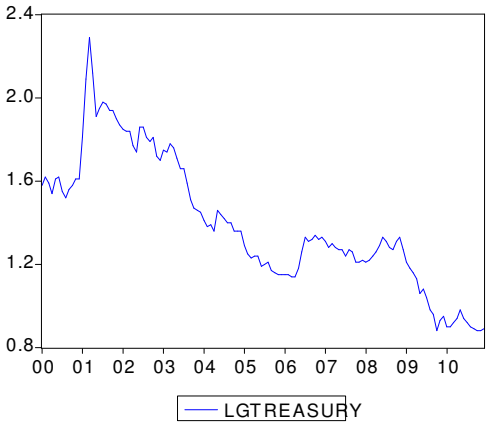


4.2.5. Yearly Compounded Interest Rates of Treasury Discounted Auctions

Yearly Compounded Interest Rates of Treasury Discounted Auctions data was collected from Undersecretariat of Treasury' s web page as monthly based. As can be seen at the chart below, as a result of two economic crises that were observed successively, treasury interest rate showed a rapid increase and reached to 193% level in March2002. After that, in consequence of decreasing risk premium through political and economic stability, treasury interest rate had shown downward tendency and decreased to 7% level in 2010.

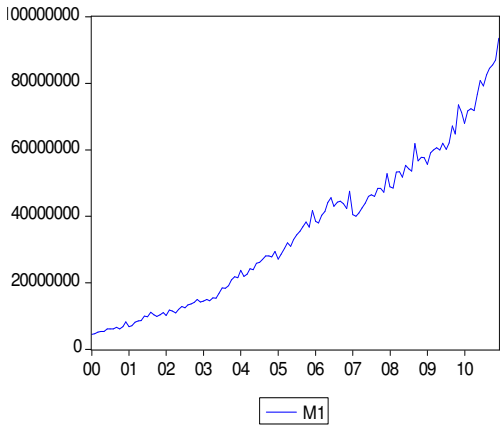
Treasury interest rate data had showed a positively skewed and thin, long-tailed distribution.

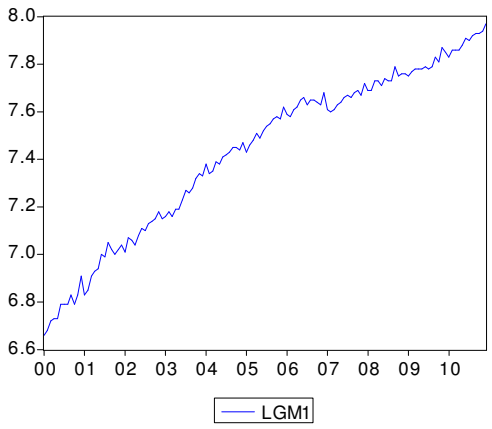




4.2.6. M1

In theory, it is expected that in an economy, when increasing money supply raises inflation, it also decreases stock prices. However, the concept of increasing money supply can create the direct contrary effect also takes place in literature. M1 series that is money supply in the strict sense consist of money in circulation, call deposits and cheques for Turkey. M1 data was collected from Central Bank of The Republic of Turkey's data distributive system as monthly based. As can be seen at the chart below, M1 data had been in a continued upward trend. This event can be explained with both economic growth and increase in money demand as a result of inflation that had been observed in the economy. On the other hand, it was determined that M1 data had showed a positively skewed and thick short-tailed distribution.

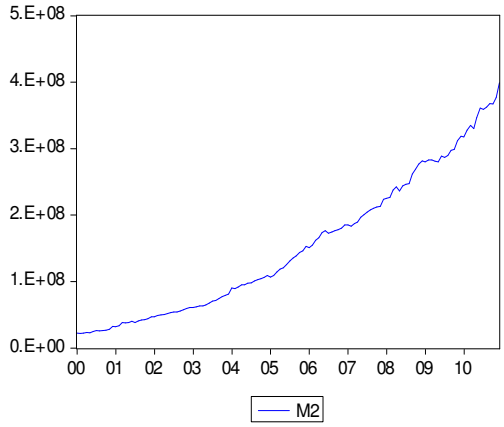


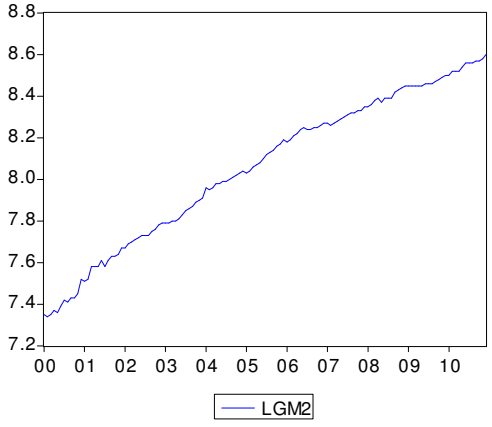


4.2.7. M2

M2 consists of M1 + YTL Time Deposits. M2 data was collected from Central Bank of The Republic of Turkey's data distributive system as monthly based. Like M1, also M2 data had been in a continued upward trend. This event can be explained with both economic growth and increase in money demand as a result of inflation that had been observed in the economy.

M2 data had showed a positively skewed and thick short-tailed distribution.

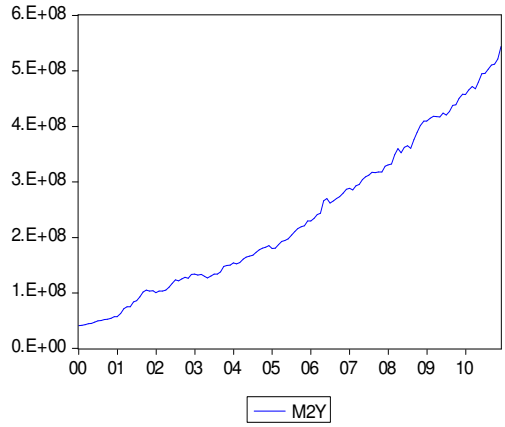


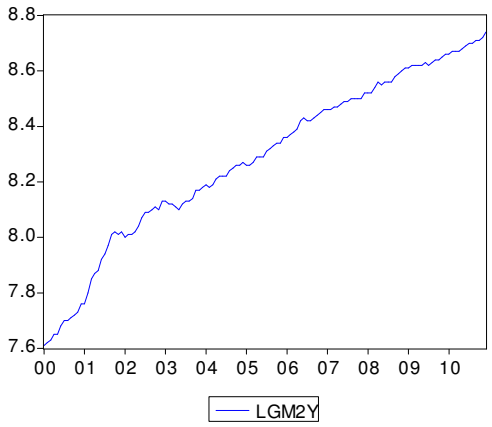


4.2.8. M2Y

M2Y consists of M2 + call and time deposits in foreign currencies. M2Y data was collected from Central Bank of The Republic of Turkey's data distributive system as

monthly based. As can be seen at the chart below, like M1 and M2 that is called as money demand, also M2Y data had been in a continued upward trend. This upward trend can be explained with both increase in money demand as a result of inflation that had been observed in the economy and increase in foreign currency demand as a result of inflation. It was determined that M2Y data had showed a positively skewed and thick short-tailed distribution.



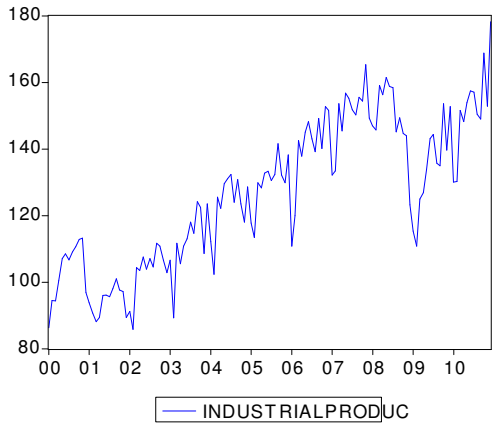


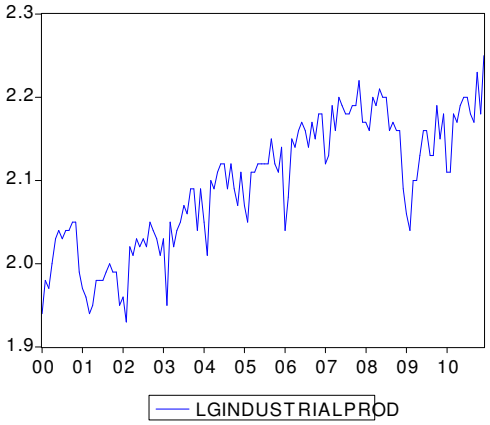
4.2.9. Industrial Production Index

Industrial Production Index is a macroeconomic variable which is frequently considered by markets in order to monitor the course of manufacturing industry, aware differences among periods and follow cyclical economic tendencies. Moreover, Index of Industrial Production has striking likeliness with GNP that is calculated via production method.

Index of Industrial Production data was collected from Central Bank of The Republic of Turkey' s data distributive system as monthly based. As can be seen at the chart below, industrial production index data had sharply decreased in every Januaries and

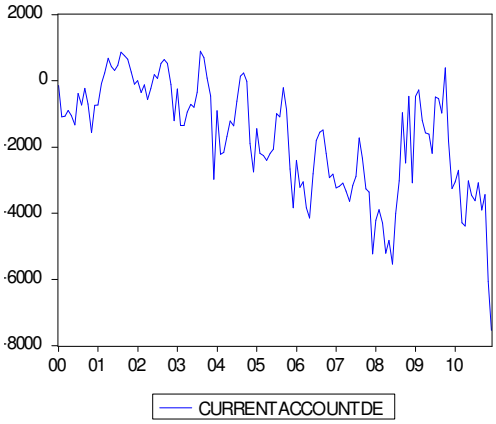
Februaries. It was determined that industrial production index data had showed a negatively skewed and thick short-tailed distribution.

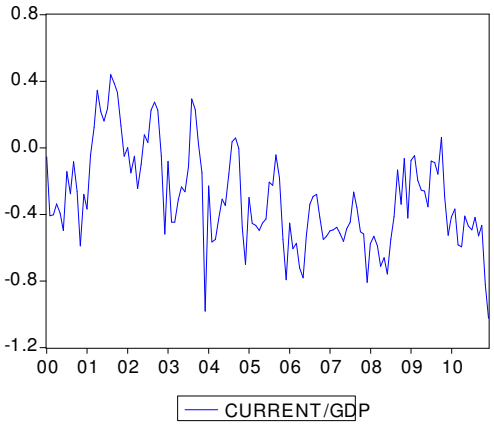




4.2.10. Current Account Deficit

Current Account Deficit data was collected from Central Bank of The Republic of Turkey' s data distributive system as monthly based. Because of Current Account Deficit variable that has negative value cannot be subjected to logarithmic transformation, current account deficit variables were used by being divided by GDP. As can be seen at the chart below, share of monthly current account deficit in GDP came up to 1% level in 2010. On the other hand, according to Jarque Bera Normality Test that tests normality of the data it was determined that because of H_0 hypothesis which submits that residuals distribute normally can not be rejected for current account deficit/GDP variable, this data distributes normally.

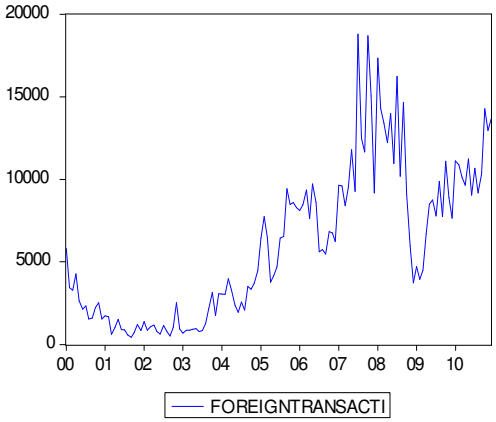


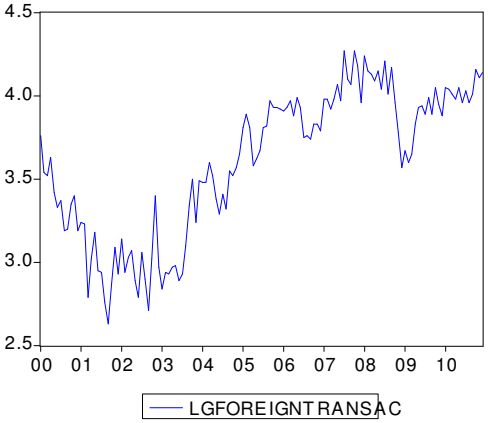


4.2.11. Stock Transactions Realized on Behalf and Account of Foreign Banks/Brokerage Houses or Individuals (US$ Million)

This data was obtained from the web page of the ISE. As can be seen at the chart below, stock transactions realized on behalf and account of foreign banks/brokerage houses or individuals came up to US$ 5 billion in monthly bases in 2000. However, after liquidity crisis that was observed in November2000 and financial crisis that was observed in February2001, transaction volume of foreigners dropped below US$ 450 million in monthly bases. Similarly, before 2007-2008 crisis, transaction volume of foreigners came up to US$ 18 billion and then it had sharply decreased after the crisis. After that, transaction volume of foreigners had started to increase again with economy's stability gain.

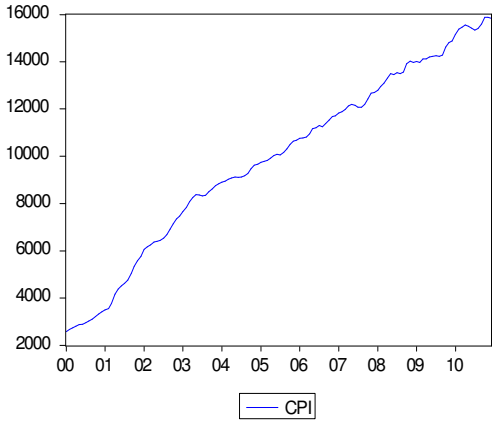
On the other hand, as can be seen at the chart below, transaction volume of foreigners had shown seriously fluctuation. On the other hand, it was determined that this data had showed a positively skewed and thick short-tailed distribution.

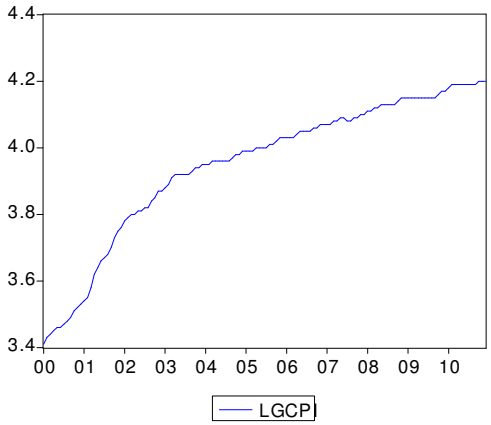


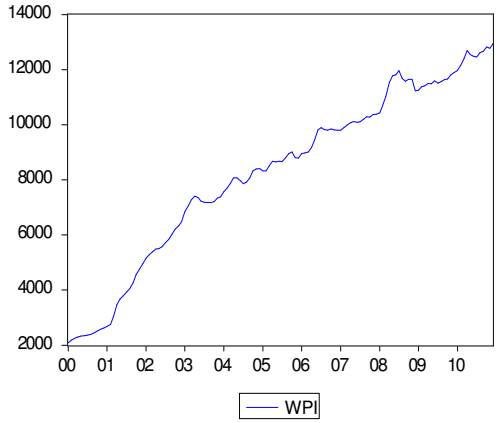


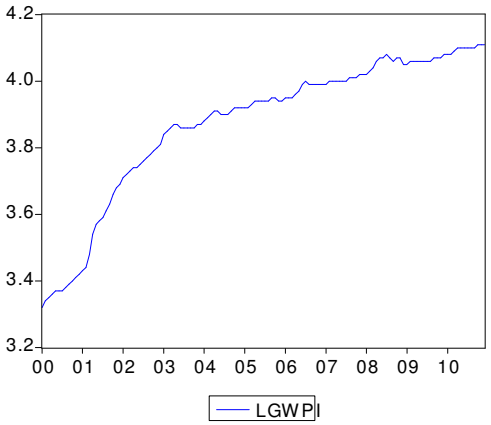
4.2.12. Inflation

Rise and fluctuation of inflation play an important role on investment decisions because they create a substantial uncertainty factor about future. Inflation data was collected from web page of Turkish Statistical Institute. WPI data whose base year is 1994 was progressed with monthly change rate of PPI whose base year is 2003=100, after 2006. Similarly, CPI data whose base year is 1994 was progressed with monthly change rate of CPI whose base year is 2003=100, after 2006. As can be seen at the charts below, as a result of anti-inflationary economy policies that have been implemented in recent years, general level of prices' rate of increase had slowed down. On the other hand, it was determined that both CPI and WPI data had showed a negatively skewed and thick short-tailed distribution.







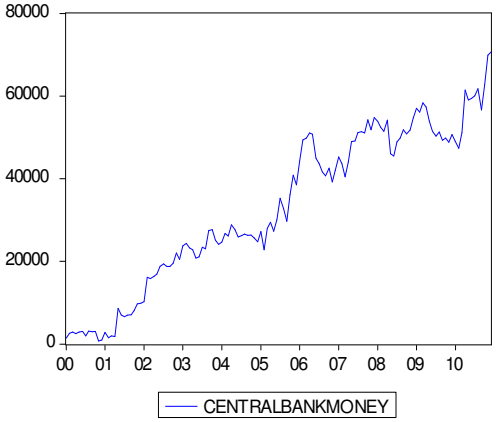


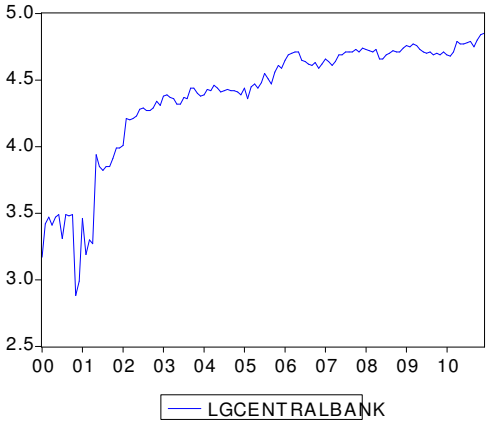
4.2.13. Central Bank Money

An increase in money supply causes to both increase in profits of companies and being preferred of stocks as an alternative investment vehicle rather interest bearing investment vehicles, because of its decreasing interest rate potential. It is expected that liquidity changes which exist in consequence of increases in money supply affects stocks rapidly. Central bank money consists of currency issued, deposits of banking sector, extrabudgetary funds, deposits of non-bank sector, open market operations and deposits of public sector. Central bank money data was collected from Central Bank of The Republic of Turkey' s data distributive system as monthly based. As can be seen at the chart below, especially after liquidity crisis that existed

in November2000 and financial crisis that existed in February2001, Central Bank had substantially funded the market and thus central bank money variable that is liability of Central Bank to the market became somewhat low in 2001.[8]

On the other hand, it was determined that central bank money data had showed a negatively skewed and thick short-tailed distribution.





4.3. Time Series Characteristics of the Data

In this part of the study, time series characteristic of the variables that were analyzed in detail above were examined.

4.3.1. Stationarity Analysis

When studying with time series, nonstationarity of series is highly likely. Further, in the models that are created with nonstationary variables, the probability of meeting with spurious regression is high. Therefore, it can be possible that an interference result reflects a spurious correlation. In brief, in order to obtain statistically

[8] Because of open market transactions in in liability side of the balance-sheet, in case of market is funded with OMT, OMT account in balance-sheet growth in negatively. This event causes increase in Net Domestic Assets.

confidential results, used series are required to be stationary, in the time series analysis. Series whose statistical qualifications remain stable called as stationary series. In other words, being same of sample mean, variance and covariance in series for two different timeframe, is an indicator of stationarity of the series.

In case of determination of that series is not stationary, it can be made stationary by being differenced. Thus, it can be possible to obtain healthier results by removing spurious regression problem. In this context, primarily, stationarity of the variables were analyzed in the study.

'Augmented Dickey-Fuller' (ADF) Unit Root Test was used in testing whether variables that were subjected to logarithmic transformation (Because of Current Account Deficit variable that has negative value cannot be subjected to logarithmic transformation, current account deficit variables were used by being divided by GDP) are stationary or not and obtained results were summarized the table below.

ADF test tests whether $\rho=0$ or not in following regression equation.

$$Yt= \alpha + Trend + \rho YT\text{-}1 + \Sigma\delta \quad Yt\text{-}1 + \varepsilon t \qquad (4.1)$$

Y variable is stationary at its original value, if H_0 hypothesis ($\rho=0$) is rejected. However, if H_0 hypothesis ($\rho=0$) can not be rejected, the result that Y variable is not stationary is obtained. Variables that are not stationary in their original values are cyclically differenced as far as providing their stationarity.

Table 4.11: Unit Root Test of the Variables That Were Subjected to Logarithmic Transformation and the Variables That Were Subjected to Logarithmic Transformation and First Differenced

Augmented Dickey-Fuller Test

Series That Were Subjected To Logarithmic Transformation	**t-Statistic**	**Prob.**
Lg ISE National-100 Index	0.96	0.3377
Lg ISE Traded Volume	0.68	0.4977
Lg Currency Basket	0.84	0.4015
Lg Overnight Interest Rate	-1.35	0.1801
Lg Tresuary Interest Rate	-1.16	0.2487
Lg M1	**-4.10**	**0.0001**
Lg M2	**-8.24**	**0.0000**
Lg M2Y	**-8.35**	**0.0000**
Lg Industrial Production Index	0.71	0.4818
Lg Foreign Transactions in ISE	0.01	0.9898
Lg Cpi	**-8.39**	**0.0000**
Lg Wpi	**-6.66**	**0.0000**
Lg Centralbank Money	1.14	0.2583
Current Account Deficit/GDP	**-2.48**	**0.0143**
Series That Were First Differenced		
Lg ISE National-100 Index	-13.07	0.0000
Lg ISE Traded Volume	-15.02	0.0000
Lg Currency Basket	-8.96	0.0000
Lg Overnight Interest Rate	-16.11	0.0000
Lg Tresuary Interest Rate	-8.13	0.0000
Lg M1	-17.27	0.0000
Lg M2	-14.18	0.0000
Lg M2Y	-9.77	0.0000
Lg Industrial Production Index	-16.48	0.0000
Lg Foreign Transactions in ISE	-14.38	0.0000
Lg Cpi	-7.22	0.0000
Lg Wpi	-6.18	0.0000
Lg Centralbank Money	-14.44	0.0000
Current Account Deficit/GDP	-14.46	0.0000

The biggest error that can be made by rejecting H_0 hypothesis which submits that the variables subjected to logarithmic transformation have a unit root (in other words, it submits that the variables are not stationary) is shown at the table above. As can be seen at the table, the biggest errors that can be made by rejecting H_0 hypotheses that submit that current account deficit/GDP, LgWPI, LgCPI, LgM1, LgM2 and LgM2Y variables are not stationary are respectively 0,014, 0, 0, 0, 0 and 0. Therefore, there

are substantial statistical proofs in order to reject H_0 hypotheses that submit that current account deficit/GDP, LgWPI, LgCPI, LgM1, LgM2 and LgM2Y variables are not stationary at α=0,05 significance level. However, substaintial statistical proofs about that the other variables do not have unit roots could not be reached. Consequently, all of the series excepting current account deficit/GDP, LgWPI, LgCPI, LgM1, LgM2 and LgM2Y had not been stationary.

In order to make series stationary, series that were subjected to logarithmic transformation were first differenced. When stationarity test about series that were subjected to logarithmic transformation and first differenced was implemented the results that are in subpart of the table above were obtained. As can be seen at this table, the biggest errors that can be made by rejecting H_0 hypotheses which submit that variables have unit root are less than 0.0001. Under such circumstance, it can be said that the variables that were subjected to logarithmic transformation and first differenced becomes stationary. In other words, H_0 hypotheses which submit that variables that were subjected to logarithmic transformation and first differenced have unit root can be rejected readily at α=0.05 significance level.

Second column of the table below reflects results of following hypothesis at α=0.05 significance level.

H_0: Variables that were subjected to logarithmic transformation and the rational variable have unit root,

H_1: Variables that were subjected to logarithmic transformation and the rational variable do not have unit root.

On the other hand, third column of the table below reflects results of following hypothesis at α=0.05 significance level.

H_0: Variables that were subjected to logarithmic transformation and first differenced have unit root,

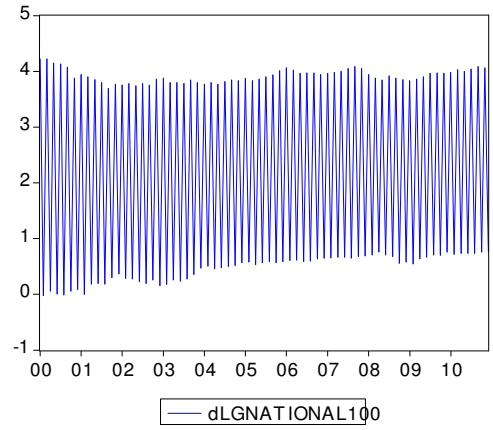
H_1: Variables that were subjected to logarithmic transformation and first differenced do not have unit root.

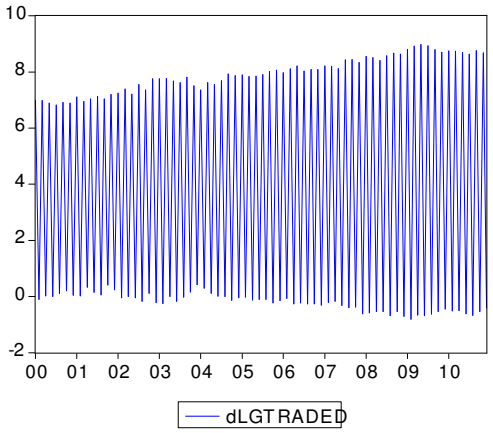
Table 4.12: Unit Root Hypothesis Results about Variables

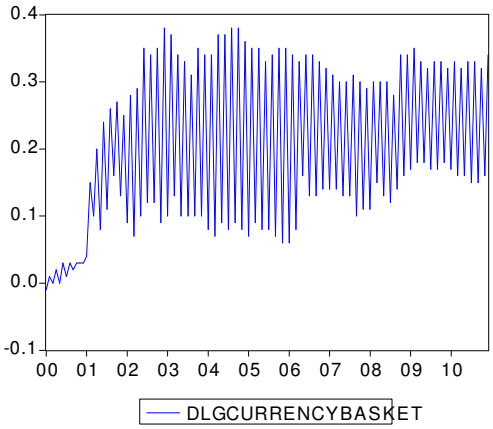
α=0,05, t=2,88	**H0 I(0)**	**H0 I(1)**
Lg ISE National-100 Index	Not Rejected	Rejected
Lg ISE Traded Volume	Not Rejected	Rejected
Lg Currency Basket	Not Rejected	Rejected
Lg Overnight Interest Rate	Not Rejected	Rejected
Lg Tresuary Interest Rate	Not Rejected	Rejected
Lg M1	Rejected	Rejected
Lg M2	Rejected	Rejected
Lg M2Y	Rejected	Rejected
Lg Industrial Production Index	Not Rejected	Rejected
Lg Foreign Transactions in ISE	Not Rejected	Rejected
Lg Cpi	Rejected	Rejected
Lg Wpi	Rejected	Rejected
Lg Centralbank Money	Not Rejected	Rejected
Current Account Deficit/GDP	Rejected	Rejected

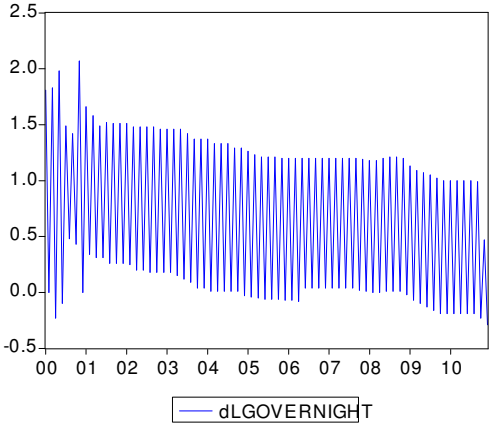
As can be seen at the table above, all variables' being subjected to logarithmic transformation and first differenced values are stationary. Previously the results that current account deficit/GDP, LgWPI, LgCPI, LgM1, LgM2 and LgM2Y variables were stationary were obtained. However, because of there are some values that drop out and in case of there are some values that drop out, unit root test can be colorable, account deficit/GDP, LgWPI, LgCPI, LgM1, LgM2 and LgM2Y variables were considered with their first differenced values.

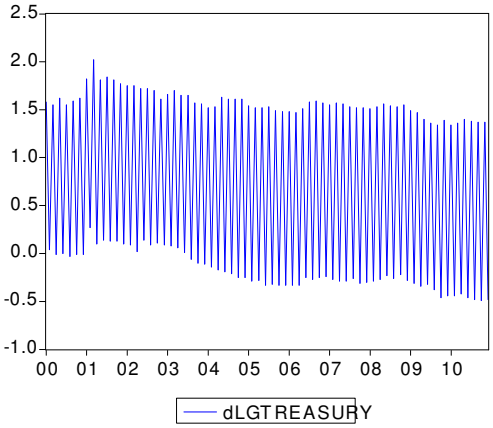
Following charts reflects values that were subjected to logarithmic transformation and first differenced of variables.

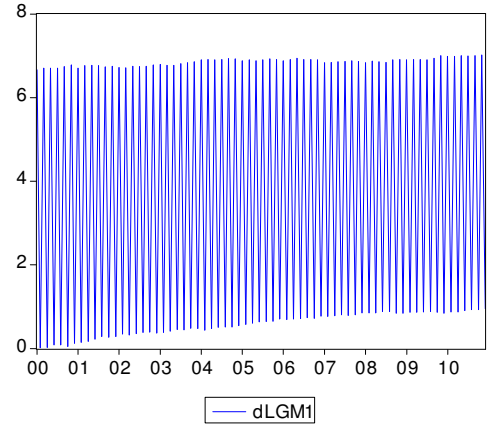


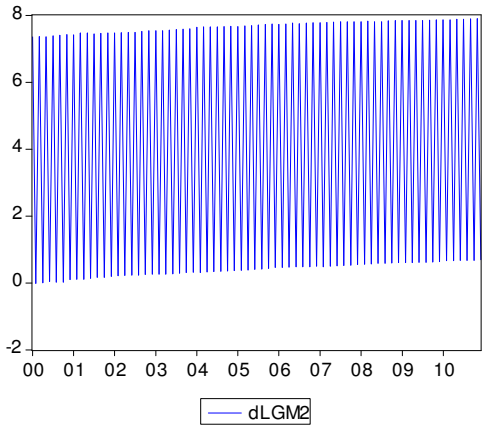








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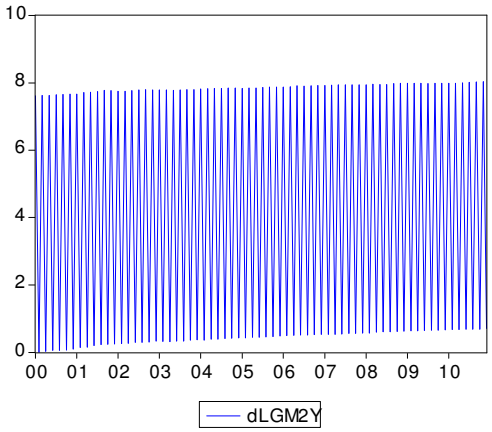
dLGM2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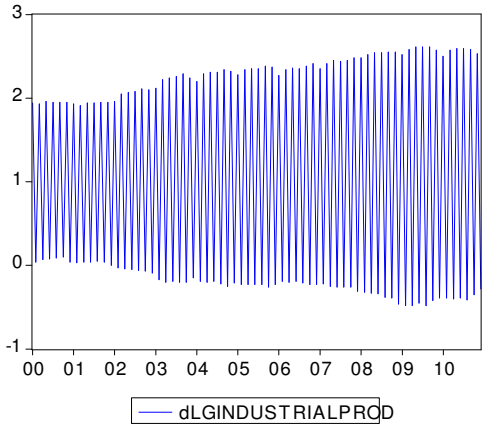
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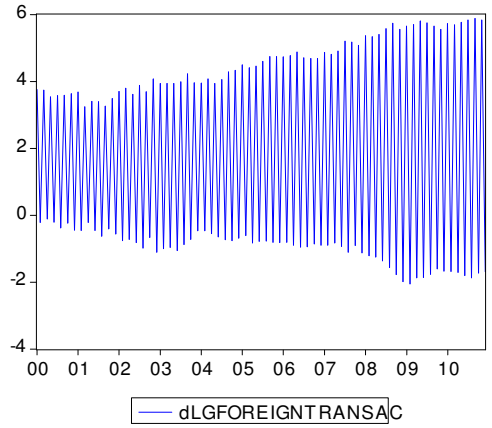
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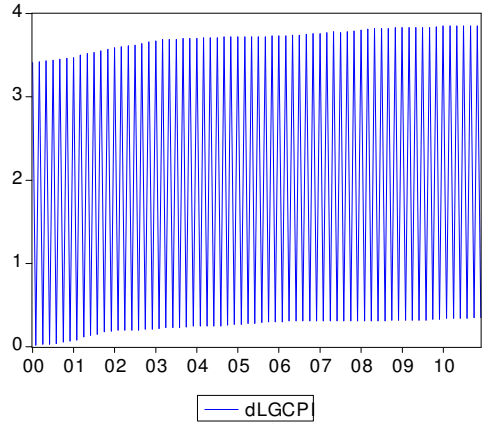
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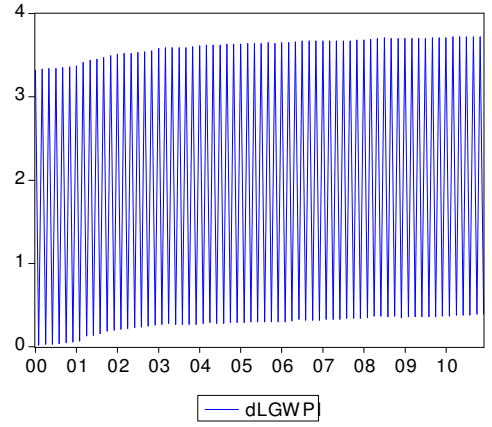
dLGCPI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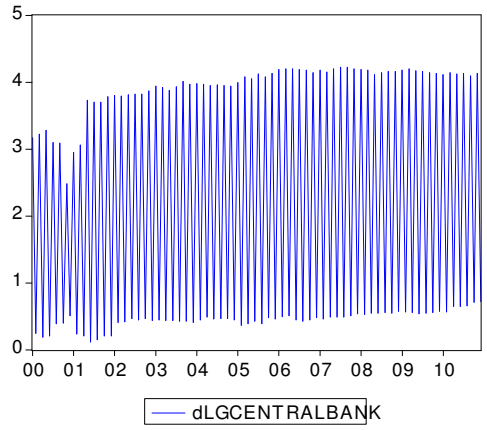
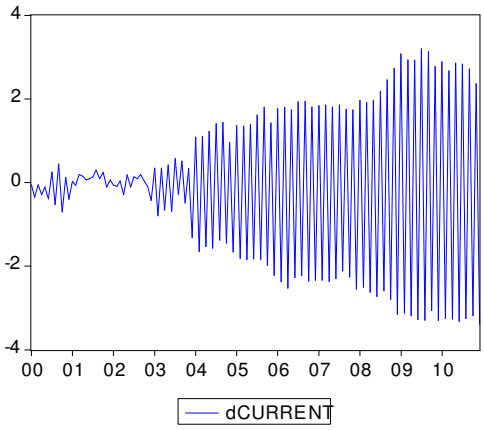
00 01 02 03 04 05 06 07 08 09 10
dLGWPI





4.4. Analysis of Binary Relations between Variables

At this part of the study, bilateral correlations between macroeconomic factors and ISE National-100 Index were analyzed in terms of correlation analysis and Granger Causality Analysis.

4.4.1. Correlations of Variables that Were Subjected to Logarithmic Transformation with ISE National-100 Index

In correlation analysis, it is tried to be determined that whether there is a relation between or among two or more variables or not and this relation's degree and functional qualifications. In brief, correlation coefficient is a scale-neutral measure that presents power and side of the relation between or among random variables. If in case of a variable's value increases, the other variable's value regularly increases or decreases, correlation between these two variables is linear.

Correlation coefficient value fluctuates between -1 and +1.+1 result shows a strong positive correlation between variables, when -1 result shows a strong negative

correlation between them. As long as correlation coefficient approaches to zero, power of correlation weakens and zero result shows that there is no correlation between variables. However, it should not be forgotten that correlation is a measure of linear togetherness or linear dependence between two variables. In other words, 0 correlation does not show necessarily independence of these two variables.

As can be seen at the table that reflects correlation relations that measure powers (bilaterally) and degrees of relations between ISE National-100 Index and other variables in t period below, there are negative correlations between National-100 index and the variables of current account deficit/GDP, LgOvernight interest rate and LgTreasury interest rate. The fact that being strong and negative of correlation between alternative investment vehicles and National-100 index is an indicator of that ISE is in an erecter relation with other investment vehicles (Interbank Money Market and Treasury Bill).

Another considerable qualification in relations between ISE return and other variables is that there is a strong and positive correlation between foreign transaction volume in ISE and National-100. This event reflects an expected price-demand relation as a result of weight of foreign investments in ISE.

Table 4.13 Binary Correlations and Correlation Test Results of Variables That Were Subjected to Logarithmic Transformation

	Correlation Lg ISE National-100 Index	**Calculated t Value**	**H_0 Hypothesis**
Lg Centralbank Money	0,7360	12,40	H_0 Rejected
Lg Cpi	0,7882	14,60	H_0 Rejected
Lg Currency Basket	0,4302	5,43	H_0 Rejected
Current Account Deficit/GDP	-0,6177	-8,96	H_0 Rejected
Lg Foreign Transactions in ISE	0,9429	32,28	H_0 Rejected
Lg Industrial Production Index	0,8676	19,89	H_0 Rejected
Lg M2	0,8823	21,37	H_0 Rejected
Lg M1	0,8782	20,94	H_0 Rejected
Lg M2Y	0,8435	17,91	H_0 Rejected
Lg Overnight Interest Rate	-0,8691	-20,03	H_0 Rejected
Lg ISE Traded Volume	0,8043	15,43	H_0 Rejected
Lg Tresuary Interest Rate	-0,9106	-25,12	H_0 Rejected
Lg Wpi	0,7613	13,39	H_0 Rejected

There are positive and significant correlations between National-100 and both CPI and WPI. This event, as mentioned above, can be explained with Fisher's hypothesis that nominal rates are in an one-to-one relation with inflation in economy and thereby stock returns and inflation are required to move in the same direction. On the other hand, these positive correlations can also be explained with the concept that stocks are inviting investment vehicles in terms of inflation protection and in long-term period, profitability of the companies that get used to work in inflationary environment substantially increase.

Correlations between National-100 and the variables that Central Bank Money that is used as money supply indicator and M1, M2, M2Y used as money demand indicators had been expectedly positive and significant. These correlations can be explained with the concept that increase in money supply decreases interest rates and therefore it causes both increase in companies' profitability and to increase in preferability of

stock market rather than interest bearing assets as an alternative investment vehicle. Accordingly, ISE National-100 index rises with increase in money supply.

Similarly, also correlation between National-100 and Industrial Production Index had been positive. This event can be explained like that increase in production naturally causes to increase in cash inflows of the companies and thus companies' balance sheets get stronger and their profitability rises.

The strongest positive correlation had been between ISE-100 and foreign transactions in ISE. This event can explained with price-demand relations and weight of foreign investments in ISE. Increase in foreign transactions in ISE reflects increasing demand in stock-exchange, thus increase in index is expected with rising demand level.

On the other hand, a positive but relatively weak correlation between ISE-100 and currency basket was determined. This event can be explained basically with two factors. Firstly, it makes ISE cheaper relative to other international markets in more convertible currencies bases and thus it causes increase in foreign investments in ISE. Secondly, increasing foreign exchange rates raise export activities of the companies.

Correlation coefficients that were calculated above are required to be controlled in order to determine whether these coefficients are contingent or not. Accordingly, results that were obtained as a result of t-test implementation for test of correlation coefficients' significance are in 3. and 4. columns of the table.

Correlation coefficients between ISE National-100 index and each of the macroeconomic factors were tested at α=0.05 significance level.

$t = r \cdot [(n-2) / (1-r2)]1/2$ Degrees of Freedom = n-2 =130

H_0 : r = 0 There is no correlation between two variables.

H_1 : r ≠ 0 There is a correlation between two variables.

If t table > t calculated, H_0 can not be rejected.

As can be seen at the 3. and 4. columns of the table above, H0 hypotheses that submit that there is no correlation between ISE index and other variables were rejected for each variables at α=0.05 significance level. Hence, in the light of this data, it was determined that there are correlations between National-100 index and all other variables.

4.4.2. Correlations of Variables that Were Subjected to Logarithmic Transformation and First Differenced with ISE National-100 Index

Variables that were subjected to logarithmic transformation and used in the study had increased or decreased in long-term period even if they had showed shorm-term volatilities as a result of cyclical and seasonal movements. In case of such a trends' existence, spurious correlation between variables can be observed. Hence, in order to analyze correlations between variables healthfully, analyses that were done above repeated on variables' subjected to logarithmic transformation and first differenced values and result in the table below was reached.

As can be seen at the table below, H0 hypotheses that submit that there is no correlation between macroeconomic variables that were subjected to logarithmic transformation and first differenced and ISE National-100 Index were rejected for each of the variables at both α=0,05 and α=0,10 significance levels. Following interpretations can be made for the analyses.

There are somewhat strong and positive correlations between dlgNational-100 index and the variables of dlgCentral Bank Money, dlM1, dlM2 and dlM2Y. These results are almost same with the results that were obtained from correlation analysis of variables that were subjected to logarithmic transformation above.

There are also substantially strong and positive correlations between dlgNational-100 index and the variables of dlgCPI and dlgWPI. Similarly these results are almost same with the results that were obtained from correlation analysis of variables that were subjected to logarithmic transformation above.

At the same time, correlations of dlgForeign transaction in ISE, dlgIndustrial production index and dlgISE traded volume with dlgNational-100 is strong and positive as are in correlation analysis of variables that were subjected to logarithmic transformation above.

Beside, correlations of dlgOvernight interest rate and DlgTreasury interest rate with dlgISE National-100 index were determined as strong and positive, in spite of correlations between lgNational-100 and the variables of lgOvernight interest rate and lgTreasury interest rate were estimated as negative naturally.

Similarly, correlation between dCurrent account deficit/GDP and dlgNational-100 index was determined as significant and positive. However, correlation between lgNational-100 and current account deficit/GDP was significant and negative.

Conversely, correlation between dlgNationa-100 index and dlgCurrency basket was estimated as relatively weak and negative, in spite of correlation between lgNational-100 and lgCurrency basket was relatively weak and positive.

Table 4.14: Binary Correlations and Correlation Test Results Between ISE National-100 Index and Variables That Were Subjected to Logarithmic Transformation and First Differenced

	Correlation DLg ISE National-100 Index	**Calculated t Value**	**H_0 Hypothesis α=0,05**	**H_0 Hypothesis α=0,10**
DCurrent Account Deficit/GDP	0,7689	13,71	H_0 Rejected	H_0 Rejected
DLg Centralbank Money	0,9848	64,68	H_0 Rejected	H_0 Rejected
DLg Cpi	0,9954	118,96	H_0 Rejected	H_0 Rejected
DLg Currency Basket	-0,7488	-12,88	H_0 Rejected	H_0 Rejected
DLg Foreign Transactions in ISE	0,9606	39,43	H_0 Rejected	H_0 Rejected
DLg Industrial Production Index	0,9758	50,85	H_0 Rejected	H_0 Rejected
DLg M1	0,9979	173,76	H_0 Rejected	H_0 Rejected
DLg M2	0,9967	139,47	H_0 Rejected	H_0 Rejected
DLg M2Y	0,9967	139,43	H_0 Rejected	H_0 Rejected
DLg Overnight Interest Rate	0,9320	29,31	H_0 Rejected	H_0 Rejected
DLg ISE Traded Volume	0,9846	64,24	H_0 Rejected	H_0 Rejected
DLg Tresuary Interest Rate	0,9608	39,53	H_0 Rejected	H_0 Rejected
DLg Wpi	0,9957	122,12	H_0 Rejected	H_0 Rejected

4.4.3. Comparison of Variability of the Variables that Were Subjected to Logarithmic Transformation with Variability of ISE National-100 Index Data that that Were Subjected to Logarithmic Transformation

At this part of the study, statistical qualifications of the variables that were subjected to logarithmic transformation and first differenced were examined and variability of National-100 index and other variables were analyzed comparatively.

Table 4.15: Descriptive Statistics of the Variables That Were Subjected to Logarithmic Transformation and First Differenced

	DLGNational-100	DLGTraded Volume	DLG Currency Basket	DLG Overnight Interest Rate	DLG Treasury Interest Rate
Mean	2,1952	3,8611	0,2010	0,6655	0,6952
Median	2,2250	3,6200	0,1650	0,4750	0,8050
Maximum	4,2200	8,9800	0,3800	2,0700	2,0200
Minimum	-0,0200	-0,8100	-0,0100	-0,2900	-0,4900
Std. Dev.	1,7369	4,1074	0,1198	0,6728	0,8928
Skewness	-0,0213	0,0264	0,0154	0,1262	-0,0349
Kurtosis	1,0497	1,0563	1,4910	1,4164	1,1337
Jarque-Bera	20,9298	20,7941	12,5293	14,1428	19,1832
Probability	0,0000	0,0000	0,0019	0,0008	0,0001

	DLGM1	DLGM2	DLGM2Y	DLGIndustrial Production Index	DLGForeign Transaction Volume
Mean	3,7188	4,0306	4,1444	1,0467	1,7945
Median	3,8100	4,0250	4,1600	1,0050	1,5650
Maximum	7,0100	7,9000	8,0300	2,6100	5,8800
Minimum	0,0200	-0,0100	0,0100	-0,4800	-2,0500
Std. Dev.	3,1508	3,6528	3,7265	1,2704	2,8623
Skewness	-0,0103	-0,0014	-0,0026	0,0223	0,0744
Kurtosis	1,0173	1,0099	1,0071	1,0885	1,2296
Jarque-Bera	21,6233	21,7824	21,8433	20,1079	17,3612
Probability	0,0000	0,0000	0,0000	0,0000	0,0002

	DLGCPI	DLGWPI	DLGCentral Bank Money	DLGCurrent Account Deficit/GDP
Mean	1,9763	1,9383	2,1896	-0,1623
Median	1,8800	1,8550	1,6000	0,0348
Maximum	3,8500	3,7200	4,2200	3,1984
Minimum	0,0200	0,0200	0,1200	-3,3877
Std. Dev.	1,7352	1,6724	1,7616	1,8886
Skewness	0,0037	0,0015	0,0474	-0,0801
Kurtosis	1,0153	1,0165	1,0656	1,9405
Jarque-Bera	21,6647	21,6396	20,6307	6,3155
Probability	0,0000	0,0000	0,0000	0,0425

As can be seen at the table above, National-100 had had a somewhat nonstable structure in the analyzed period. Its standard deviation had been 79% of its mean. Further, its maximum value was 1,92 times of its mean. However, traded volume of ISE had showed a further volatility. Its standard deviation had been 106% of and its maximum value was 2.32 times of its mean. On the other hand correlation coefficient which is 0.98 was found significant at both α=0.05 and α=0.10 significance levels.

Currency baskets variability had been relatively lower than National-100's. Its standard deviation had been 60% of its mean and its maximum value was 1.89 times of its mean. These ratios is lower than National-100's. Beside, as mentioned before, H0 hypotheses that submit that there is no correlation between these two variables at both α=0.05 and α=0.10 significance levels were rejected.

As can be seen at the table above, interbank overnight interest rate had been more variable than National-100 index. Its standard deviation had been 101% of its mean. As mentioned above, this ratio is 0.79 for National-100 index. Moreover, Overnight interest rate's maximum value for the analyzed period was 3.11 times of its mean. This ratio is 1.92 for the National-100 index. On the other hand, correlation

coefficient which is 0.93 in the analyzed period was found significant at both α=0.05 and α=0.10 significance levels.

When treasury interest rate and National-100 index were compared in terms of their standard deviations and maximum values, it was determined that treasury interest rate had had further volatility than ISE National-100. Treasury interest rate's standard deviation had been 128% of and its maximum value was 2.91 times of its mean. On the other hand, correlation between treasury interest rate and ISE National-100 index had been strong, positive and also significant at both α=0.05 and α=0.10 significance levels.

Otherwise, volatilities of CPI, WPI, Central Bank Money, M1, M2 and M2Y had been close-range with National-100's volatility. Standard deviation of CPI, WPI, Central Bank Money, M1, M2 and M2Y had been respectively 87%, 86%, 80%, 85%, 91% and 90% of their means, when National-100's standard deviation had been 79% of its mean. Moreover, Maximum values of M1, M2 and M2Y were respectively 1.95, 1.92, 1.93, 1.89, 1.96 and 1.94 times of their means, when National-100's maximum value was 1.92 times of its mean. Correlation between National-100 and each of these six variables had been strong, positive and significant at both α=0.05 and α=0.10 significance levels.

Industrial production index's standard deviation had been 121% of its mean and its maximum value was 2.49 times of its mean. In this context, industrial production index had had further variability than National-100 index. Additionally, as mentioned above, correlation between industrial production index and National-100

index had been strong, positive and significant at both α=0.05 and α=0.10 significance levels.

Foreign transaction volume in ISE had been in a substantially nonstable structure. Its standard deviation had been 159% of and its maximum value was 3.28 times of its mean. In this context, it can be said that foreign transaction volume in ISE had had a further variability than National-100 in analyzed period. H0 hypotheses that submit that there is no correlation between these two variables at both α=0.05 and α=0.10 significance levels were rejected.

4.4.4. Granger Causality Analyses between Variables that Were Subjected to Logarithmic Transformation and First Differenced and DlgNational-100 Index

Granger (1969) Causality is described as; 'if Y's forecast is more successful as past values of X are used than the case that past values of X are not used, X is Granger Cause of Y'. After testing this statement's truth, relation is showed as X→Y.

Regression analysis deals with a variable's dependence to another one, but it is clear that this does not mean causality. In Granger Analysis, it is researched that whether variables affects each other as lagged or not, is X the cause of Y (X→Y) or is Y the cause of X (Y→X) or is there a feedback between variables (both X→Y and Y→X).

Granger Test assumes that information about forecasting X and Y variables is only in time series data of these variables. Test requires following regressions' forecasting;

$$X = \sum^{n} \alpha_i Y_{t-i} + \sum^{n} \beta_j X_{t-j} + U1t \qquad (4.2)$$

$$Y = \sum_{i=1}^{m} \lambda_i Y_{t-i} + \sum_{j=1}^{m} \delta_j X_{t-j} + U_{2t} \qquad (4.3)$$

Here, it is assumed that U_{1t} and U_{2t} disturbance terms are independent. (4.2) equation foresees that present X correlates with past X and Y values and (4.3) equation foreseen a similar behavior for Y. Four events can be separated from each other as follows;

- If lagged Y's forecasted coefficients that are in (4.2) are statistically different from zero as a mass (i.e. $\Sigma\alpha_i \neq 0$) and X's forecasted coefficients that are in (4.3) are not statistically different from zero as a mass (i.e. $\Sigma\,\delta_j = 0$), this event shows a one way causality relationship which is from Y to X.
- Inversely, if lagged Y's forecasted coefficients that are in (4.2) are not statistically different from zero as a mass (i.e. $\Sigma\alpha_i = 0$) and X's forecasted coefficients that are in (4.3) are statistically different from zero as a mass (i.e. $\Sigma\,\delta_j \neq 0$), there is an one way causality relationship which is from X to Y.
- If X and Y coefficient masses are different from zero in significant level in both regressions, this event shows feedback or mutual causality.
- Finally, X and Y coefficient masses are not statistically significant in both regressions; this event indicates independence between these two variables.

More generally, because of future can not foresee past, if X variable is Granger Cause of Y variable, fluctuation in X must comes into existence before fluctuations in Y. Therefore, if Y's foresee significantly does better when X's past and lagged variables are added to Y's regression to other variables, it can be said that X is

Granger Cause of Y. A similar definition can be done, if Y is the Granger Cause of X.

Model of Granger Causality Test is not a structural econometric model. This model purposes not to forecast of future but to make causality test of it. For that reason, variables in the model should be previously made stationary.

In this direction, at 4.3.1 part of the study, stationarity test was implemented to determine whether variables are stationary or not and the result that variables that were subjected to logarithmic transformation and first differenced are stationary was reached.

In this context, stationary values that were subjected to logarithmic transformation and first differenced of the variables were added to the analysis.

Having said that, when Granger Method is used, being somewhat careful should not be ignored. Because, as mentioned below, method is very sensitive against lag length that is used in the model. In case of 'Granger Causality' approach is chosen, initially the question that 'how many are lag periods used in test regressions?' is appears. With reference to the thesis that all past information affects present condition, using a big number of lag periods is truer. In this direction, in the study, Granger Causality Test was done at the 1, 3, 6, 9 and 12 months lag levels and obtained results were summarized below.

First of all, the question that 'Do macroeconomic factors that were added to the model affect ISE National-100 Index?', in other words 'Are these variables the causes of index variability?' was looked for an answer. At the tables below, fourth columns reflects results of following hypotheses.

H_0: Macroeconomic factors do not cause National-100 index variability.

H_1: Macroeconomic factors cause National-100 index variability.

If $F_{table} > F_{calculated}$, H_0 can not be rejected.

On the other hand, in following part of the study the question that 'Does ISE National-100 Index affect macroeconomic?', in other words 'Is ISE National-100 Index Granger Cause of other variables?' was also looked for an answer. At the tables below, seventh columns reflects results of following hypotheses.

H_0: National-100 index does not cause macroeconomic factors' variability.

H_1: National-100 index causes macroeconomic factors' variability.

If $F_{table} > F_{calculated}$, H_0 can not be rejected.

At the tables below, Granger Causality Test results were reflected at 1, 3, 6, 9 and 12 lag levels.

Table 4.16: The Results of Granger Causality Tests between ISE National-100 and ISE Traded Volume Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGTraded Volume→DLGNational100			DLGNational100→DLGTraded Volume		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**7,6556**	**0,0065**	**H_0 Rejected**	0,8676	0,3534	H_0 Not Rejected
3	**4,0020**	**0,0093**	**H_0 Rejected**	0,8296	0,4800	H_0 Not Rejected
6	2,6144	0,0207	H_0 Not Rejected	0,4337	0,8550	H_0 Not Rejected
9	1,6700	0,1056	H_0 Not Rejected	0,7818	0,6335	H_0 Not Rejected
12	1,3730	0,1925	H_0 Not Rejected	1,1546	0,3271	H_0 Not Rejected

As can be seen at the table above, statistically significant proofs could not be reached about that ISE National-100 index had explained traded volume of ISE. However, according to obtained results, ISE traded volume had explained National-100 index at 1 and 3 months lag levels. Eventually, it was determined that traded volume of ISE Granger causes ISE National-100 index.

Table 4.17: The Results of Granger Causality Tests between ISE National-100 and Currency Basket Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGCurrency Basket→DLGNational100			DLGNational100→DLGCurrency Basket		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	2,6170	0,0770	H_0 Not Rejected	**183,1010**	**0,0000**	**H_0 Rejected**
3	1,9855	0,1197	H_0 Not Rejected	1,6051	0,1917	H_0 Not Rejected
6	1,2376	0,2925	H_0 Not Rejected	1,4555	0,1999	H_0 Not Rejected
9	0,8057	0,6119	H_0 Not Rejected	1,5025	0,1567	H_0 Not Rejected
12	0,7332	0,7158	H_0 Not Rejected	3,2948	0,0005	H_0 Not Rejected

As can bee seen at the table above, statistically significant proofs were reached about that ISE National-100 index had explained currency basket at 1 month lag level, therefore National-100 index had affected currency basket at this lag level. However, statistically significant proofs could not be reached about that currency basket had explained ISE National-100 index. Hence, it was determined that ISE National-100 Index Granger causes currency basket.

Table 4.18: The Results of Granger Causality Tests between ISE National-100 and Interbank Overnight Interest Rate Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGOvernight Interest Rate→DLGNational100			DLGNational100→DLGOvernight Interest Rate		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**396,8380**	**0,0000**	**H_0 Rejected**	**778,5730**	**0.00000**	**H_0 Rejected**
3	**7,8993**	**0,0001**	**H_0 Rejected**	**22,9241**	**0,0000**	**H_0 Rejected**
6	**6,4353**	**0,0000**	**H_0 Rejected**	**7,3033**	**0,0000**	**H_0 Rejected**
9	**4,3390**	**0,0001**	**H_0 Rejected**	1,1221	0,3540	H_0 Not Rejected
12	3,2048	0,0007	H_0 Not Rejected	0,4660	0,9298	H_0 Not Rejected

As can be seen at the table above, statistically significant proofs were reached about that ISE National-100 index had explained interbank overnight interest rate at 1, 3 and 6 months lag levels. However, at the same time, statistically significant proofs were reached about that interbank overnight interest rate had explained ISE National-100 index at 1, 3, 6 and 9 months lag levels. Hence, there had been a mutual causal relationship between National-100 and overnight interest rate.

Table 4.19: The Results of Granger Causality Tests between ISE National-100 and Treasury Interest Rate Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGTreasury Interest Rate→DLGNational100			DLGNational100→DLGTreasury Interest Rate		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**396,1650**	**0,0000**	**H_0 Rejected**	**519,5980**	**0,0000**	**H_0 Rejected**
3	**4,1543**	**0,0077**	**H_0 Rejected**	**4,8753**	**0,0031**	**H_0 Rejected**
6	2,9258	0,0109	H_0 Not Rejected	3,4096	0,0040	H_0 Not Rejected
9	2,9393	0,0038	H_0 Not Rejected	3,0283	0,0030	H_0 Not Rejected
12	2,9406	0,0016	H_0 Not Rejected	2,3894	0,0096	H_0 Not Rejected

As can be seen at the table above, according to the obtained results, National-100 index had explained treasury interest rate at 1 and 3 months lag levels. At the same time, treasury interest rate had explained National-100 index at 1 and 3 months lag levels. Therefore, there had been a mutual causal relationship between National-100 and treasury interest rate.

Table 4.20: The Results of Granger Causality Tests between ISE National-100 and M1 Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGM1→DLGNational100			DLGNational100→DLGM1		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**35,3538**	**0,0000**	**H_0 Rejected**	**5,4403**	**0,0212**	**H_0 Rejected**
3	**10,0959**	**0,0000**	**H_0 Rejected**	1,8982	0,1335	H_0 Not Rejected
6	**5,1337**	**0,0001**	**H_0 Rejected**	1,6342	0,1441	H_0 Not Rejected
9	**3,9818**	**0,0002**	**H_0 Rejected**	1,4245	0,1871	H_0 Not Rejected
12	2,2355	0,0156	H_0 Not Rejected	1,1165	0,3562	H_0 Not Rejected

As can be seen at the table above, statistically significant result about that M1 had been explained by National-100 index in 1 month lag level were obtained. At the same time, M1 had explained National-100 index in 1, 3, 6 and 9 months lag levels. Accordingly, it can be said that there had been a mutual causal relationship between National-100 and M1.

Table 4.21: The Results of Granger Causality Tests between ISE National-100 and M2 Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGM2→DLGNational100			DLGNational100→DLGM2		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**31,4688**	**0,0000**	**H_0 Rejected**	**7,8430**	**0,0059**	**H_0 Rejected**
3	**10,2550**	**0,0000**	**H_0 Rejected**	3,5448	0,0167	H_0 Not Rejected
6	**4,4868**	**0,0004**	**H_0 Rejected**	2,1291	0,0553	H_0 Not Rejected
9	3,1673	0,0020	H_0 Not Rejected	1,8240	0,0724	H_0 Not Rejected
12	1,6532	0,0900	H_0 Not Rejected	0,8723	0,5773	H_0 Not Rejected

As can be seen at the table above, statistically significant result about that M2 had been explained by National-100 index in 1 month lag level were obtained. At the same time, M2 had explained National-100 index in 1, 3 and 6 months lag levels. Accordingly, it can be said that there had been a mutual causal relationship between National-100 and M2.

Table 4.22: The Results of Granger Causality Tests between ISE National-100 and M2Y Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGM2Y→DLGNational100			DLGNational100→DLGM2Y		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**58,2205**	**0,0000**	**H_0 Rejected**	**13,7430**	**0,0003**	**H_0 Rejected**
3	**8,6837**	**0,0000**	**H_0 Rejected**	2,0941	0,1045	H_0 Not Rejected
6	**5,2145**	**0,0001**	**H_0 Rejected**	2,3373	0,0364	H_0 Not Rejected
9	**4,3360**	**0,0001**	**H_0 Rejected**	2,1572	0,0310	H_0 Not Rejected
12	3,0096	0,0013	H_0 Not Rejected	2,8586	0,0021	H_0 Not Rejected

As can be seen at the table above, statistically significant result about that M2Y had been explained by National-100 index in 1 month lag level were obtained. At the same time, M2Y had explained National-100 index in 1, 3, 6 and 9 months lag levels. Accordingly, it can be said that there had been a mutual causal relationship between National-100 and M2Y.

Table 4.23: The Results of Granger Causality Tests between ISE National-100 and Industrial Production Index Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGIndustrial Production Index→DLGNational100			DLGNational100→DLGIndustrial Production Index		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**7,9542**	**0,0056**	**H_0 Rejected**	2,9439	0,0886	H_0 Not Rejected
3	2,6794	0,0500	H_0 Not Rejected	**9,0592**	**0,0000**	**H_0 Rejected**
6	1,6986	0,1277	H_0 Not Rejected	**4,0869**	**0,0010**	**H_0 Rejected**
9	0,9055	0,5235	H_0 Not Rejected	2,6633	0,0080	H_0 Not Rejected
12	0,6715	0,7746	H_0 Not Rejected	2,0260	0,0299	H_0 Not Rejected

As can be seen at the table above, statistically significant results were obtained about that ISE National-100 index had affected industrial production index at 3 and 6 months lag levels. On the other hand, statistically significant results were obtained about that industrial production index had explained ISE National-100 Index at 1 month lag level. Accordingly, there had been a mutual causal relationship between National-100 and industrial production index.

Table 4.24: The Results of Granger Causality Tests between ISE National-100 and Foreign Transaction Volume in ISE Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGForeign Transaction Volume→DLGNational100			DLGNational100→DLGForeign Transaction Volume		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	0,0516	0,8207	H_0 Not Rejected	0,0023	0,9619	H_0 Not Rejected
3	3,1928	0,0261	H_0 Not Rejected	**10,7945**	**0,0000**	**H_0 Rejected**
6	1,8349	0,0985	H_0 Not Rejected	**4,1275**	**0,0009**	**H_0 Rejected**
9	1,9485	0,0530	H_0 Not Rejected	2,8562	0,0048	H_0 Not Rejected
12	1,8408	0,0522	H_0 Not Rejected	2,3383	0,0113	H_0 Not Rejected

As can be seen at the table above, statistically significant proofs were reached about that ISE National-100 index had affected foreign transaction volume in ISE at 3 and 6 months lag levels. However, statistically significant proofs could not be reached about that foreign transaction volume in ISE had explained ISE National-100 index. Hence, it was determined that ISE National-100 Index Granger causes foreign transaction volume in ISE.

Table 4.25: The Results of Granger Causality Tests between ISE National-100 and CPI Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGCPI→DLGNational100			DLGNational100→DLGCPI		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**15,0130**	**0,0002**	**H_0 Rejected**	0,0041	0,9493	H_0 Not Rejected
3	**6,5645**	**0,0004**	**H_0 Rejected**	1,1873	0,3175	H_0 Not Rejected
6	**5,4512**	**0,0001**	**H_0 Rejected**	0,9938	0,4330	H_0 Not Rejected
9	3,7028	0,0005	H_0 Not Rejected	1,2880	0,2522	H_0 Not Rejected
12	2,0501	0,0278	H_0 Not Rejected	1,4333	0,1645	H_0 Not Rejected

As can be seen at the table above, statistically significant proofs could not be reached about that ISE National-100 index had explained CPI. However, according to obtained results, CPI had explained National-100 index at 1, 3 and 6 months lag levels. Accordingly, it was determined that CPI Granger causes ISE National-100 Index.

Table 4.26: The Results of Granger Causality Tests between ISE National-100 and WPI Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGWPI→DLGNational100			DLGNational100→DLGWPI		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	**15,1560**	**0,0002**	**H_0 Rejected**	0,4723	0,4932	H_0 Not Rejected
3	**6,4407**	**0,0004**	**H_0 Rejected**	1,2109	0,3088	H_0 Not Rejected
6	**4,0619**	**0,0010**	**H_0 Rejected**	0,8943	0,5018	H_0 Not Rejected
9	3,0304	0,0030	H_0 Not Rejected	1,0333	0,4188	H_0 Not Rejected
12	1,7640	0,0655	H_0 Not Rejected	1,1882	0,3028	H_0 Not Rejected

As can be seen at the table above, statistically significant proofs could not be reached about that ISE National-100 index had explained WPI. However, according to obtained results, WPI had explained National-100 index at 1, 3 and 6 months lag levels. Accordingly, it was determined that WPI Granger causes ISE National-100 Index.

Table 4.27: The Results of Granger Causality Tests between ISE National-100 and Central Bank Money Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGCentral Bank Money→DLGNational100			DLGNational100→DLGCentral Bank Money		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	0,9978	0,3197	H_0 Not Rejected	**25,3194**	**0,0000**	**H_0 Rejected**
3	2,7538	0,0455	H_0 Not Rejected	1,4968	0,2188	H_0 Not Rejected
6	3,4797	0,0034	H_0 Not Rejected	0,7753	0,5910	H_0 Not Rejected
9	2,2400	0,0249	H_0 Not Rejected	1,1162	0,3581	H_0 Not Rejected
12	1,7864	0,0613	H_0 Not Rejected	**5,6720**	**0,0000**	**H_0 Rejected**

As can be seen at the table above, statistically significant proofs were reached about that ISE National-100 index had affected Central Bank Money at 1 and 12 months lag levels. However, any statistically significant proofs could not be reached about that Central Bank Money had affected National-100. Accordingly, it was determined that ISE National-100 Index Granger causes Central Bank Money.

Table 4.28: The Results of Granger Causality Tests between ISE National-100 and Current Account Deficit/GDP Variables That Were Subjected to Logarithmic Transformation and First Differenced

Lags Length	DLGCurrent Account Deficit/GDP→DLGNational100			DLGNational100→DLGCurrent Account Deficit/GDP		
	F-Statistic	Prob.	α=0,05	F-Statistic	Prob.	α=0,05
1	2,6170	0,0770	H_0 Not Rejected	**10,3513**	**0,0001**	**H_0 Rejected**
3	1,9855	0,1197	H_0 Not Rejected	**6,6140**	**0,0004**	**H_0 Rejected**
6	1,2376	0,2925	H_0 Not Rejected	3,6551	0,0024	H_0 Not Rejected
9	0,8057	0,6119	H_0 Not Rejected	2,3301	0,0197	H_0 Not Rejected
12	0,7332	0,7158	H_0 Not Rejected	2,1565	0,0200	H_0 Not Rejected

Finally, as can be seen at the table above, statistically significant proofs were reached about that ISE National-100 index had affected Current Account Deficit/GDP at 1 and 3 months lag levels. However, any statistically significant proofs could not be reached about that Current Account Deficit/GDP had affected National-100. Accordingly, it was determined that ISE National-100 Index Granger causes Current Account Deficit/GDP.

In sum, adding values of National-100 index at the lag levels that were mentioned above to regressions of variables to other variables enhance foreseeing of these variables significantly.

Determination of stock markets' reverse causality is a sign of that stock market has acquired an important macroeconomic indicator qualification. In other words, past values of ISE National-100 can forecast future fluctuations of many macroeconomic

variables (currency basket, interbank overnight interest rate, treasury interest rate, M1, M2, M2Y, industrial production index, foreign transaction volume, Central Bank Money and current account deficit/GDP). In brief, according to the results of Granger Causality Test, ISE National-100 index has a characteristic of previously indicating developments that will exist in economy.

5. CONCLUSION

Developed capital markets have a characteristic of a real economy's leading indicator. In other words, in developed countries, stock exchange index is used as a macroeconomic indicator. Being a macroeconomic indicator of stock exchange index signifies that stock exchange integrates with real economy. However, the event is different in emerging capital markets. The most significant qualification of these markets is that their rate of returns shows higher volatility than developed capital markets.

Determination of factors that direct stock market's volatility is substantially important for especially stock market players. In general, it is observed that stock prices increase and decrease simultaneously and this event shows that there are some factors affect stock market as a whole.

In this study, reasons of observed fluctuations at Istanbul Stock Exchange National-100 Index in the period of 2000-2010 were examined in terms of macroeconomic factors by using monthly data and hypothesis 'volatility of financial markets consists of macroeconomic effects' that is suggested in economy theory tested in terms of ISE. In brief, in this study, it was examined that how sensitive is ISE volatility against developments in Turkish Economy and it was looked for an answer about that how much ISE reflects developments in Turkish Economy.

In analyzed period, 2000-2010, ISE's average total transaction volume had been US$ 73,048 billion; share of market capitalization of companies traded in ISE in GDP had been 0.29 in average. In this period, ISE National-100 Index had yielded 295% in

total, nevertheless only 19.7% of outstanding securities had been stock investments. On the other hand, number of companies traded on ISE and free-float rate of companies traded on ISE had been somewhat low. In spite of the fact that it had showed a significant development in terms of transaction volume, number of companies traded on ISE and market value of them from 1986, when ISE went into action, to 2010, ISE does still not reach sufficient growth and depth relative to developed capital markets.

In this study, ISE National-100 Index is used by proxy of whole security exchange and it was determined that volatility of ISE National-100 Index had been considerably high. These high volatilities existed in stock market had caused that despite ISE had yielded highest rate of return in analyzed period, a low part of outstanding securities had been stock investments.

In this study, in order to determine relationship between stock market and macroeconomic factors, industrial production index and inflation (CPI and WPI) on behalf of goods market, money supply (Central Bank Money, M1, M2 and M2Y) and nominal interest rate (treasury interest rate and interbank overnight interest rate) on behalf of money market, ISE National-100 Index and ISE traded volume on behalf of capital market, currency basket and current account deficit/GDP in terms of reflecting relation of economy with external world variables were considered.

Correlation and Granger Causality Analyses were implemented on analyzing binary relationships between ISE National-100 Index and other variables used in the study.

As a result of correlation analysis in time-t, following results were obtained.

- There are statistically significant positive correlations between ISE National-100 Index and both CPI and WPI.
- There are statistically significant positive and strong correlations that result from price-demand relationship between ISE National-100 Index and variables of ISE traded volume and foreign transactions in ISE.
- There are statistically significant correlations between ISE National-100 Index and variables of interbank overnight interest rate and treasury interest rate.
- There is a statistically significant but relatively weak positive correlation between ISE National-100 Index and current account deficit/GDP.
- There are statistically significant positive correlations between ISE National-100 Index and variables of Central Bank Money, M1, M2 and M2Y.
- There is a statistically significant but weak positive correlation between ISE National-100 Index and currency basket.
- There is a statistically significant and positive correlation between ISE National-100 Index and industrial production index.

Beside, as a result of Granger Causality Analysis used on determination of binary relationships between ISE National-100 Index and other variables, following results were obtained. Firstly, it was determined that traded volume of ISE, CPI and WPI Granger cause ISE National-100 index. On the other hand, ISE National-100 Index Granger causes the variables of currency basket, foreign transactions in ISE, Central Bank Money and current account deficit/GDP. Otherwise, there are mutual

relationships between ISE National-100 Index and variables of interbank overnight interest rate, treasury interest rate, M1, M2, M2Y and industrial production index.

Determination of Granger Causality relationships from ISE National-100 Index to macroeconomic factors is a sign of that stock market becomes a substantial macroeconomic indicator. In other words, according to Granger Causality Test results, past values of ISE National-100 Index can forecast future fluctuations of a lot of macroeconomic variables (currency basket, foreign transactions in ISE, Central Bank Money, current account deficit/GDP, interbank overnight interest rate, treasury interest rate, M1, M2, M2Y and industrial production index.)

In brief, the most general result obtained in the study is that value of ISE National-100 is substantially affected from macroeconomic factors, thus stock market sufficiently reflects whole economy. Consequently, high volatility observed in ISE significantly result from macroeconomic developments. However, at the same time, ISE also affects macro economic developments significantly.

Finally, it should be indicated that because of lots of macroeconomic variables are published on a monthly basis, this study made with reference to monthly data. However, as is known, capital markets have somewhat dynamic structure. Consequently, in the study made with reference to monthly data, possibility of missing lots of short-term movements is high. If fast and short-term movements of market players on the market are considered, confidingness of the results obtained in the study come in sight better. It is highly likely that macroeconomic developments affect ISE National-100 Index in short-term further and this effect decreases in

course of time. Hence, in the study made with reference to low-frequency data, probable short-term interactions between National-100 Index and other macroeconomic factors are missed.

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