Thesis

Research Question: What is the relationship between Turkish macroeconomic variables and stock returns on the Istanbul Stock Exchange?

Data & Variables

- XU100 National Index as the dependent variable

Following the review of literature as well as expert interviews with specific knowl- edge about Turkey (see Appendix 1), **five macroeconomic variables were chosen**, namely:

1. **Turkish Real Effective Exchange Rate (LEX)**
2. **USD to Turkish Lira Nominal Exchange Rate (LUSD)**
3. **Turkish Industrial Production (LIND)**
4. **Inflation (LCPI)**
5. **Turkish Interbank Lending Rate (LINT)**

- Most of the data was sources from Bloomberg, as well as the Turkish Central Bank and the OECD's statistical websites. All data points were found in monthly frequency. Except for the interbank lending rate which is quoted as a percentage change, all the variables are transformed into natural logs to reduce multicollinearity and assume linearity.

The financial relationship between macroeconomic variables and the equity market

- Firstly, inflation can be seen to impact stock prices through the impact on future earnings and the manner that investors discount these future earnings. Partic- ipants in the stock market anticipate the changes in real activity, so that stock prices appear to move inversely with inflation.
- Secondly, the models predict that an increase in interest rates would increase the discount rate and thus negatively affect the value of stocks. As nominal interest rates increase, it also encourages the investor to change the structure of his port- folio in favor of bonds and vice versa. As a result of the drop in demand, stock prices are expected to decrease.

Table 3: Predicted effect on stock prices of increase in variables

	Real Exchange Rate	USD/TRY*	Industrial Production	Inflation	Interbank lending rate
Portfolio	+	+	0	-	-
Keynesian	-	-	+	+	-
Monetarist	+	+	+	-/0	0

*Notes: *Increase in USD/TRY is the same as appreciation of the TRY*

Result:

- Here we firstly identified that the relationship between macroeconomic variables and stock prices tend to change over time. This was surprising in light of the theoretical models we had studied, which all seemed to suggest a static relationship. We furthermore found that the relationship differs depending on the sector index analyzed. This was perhaps less surprising, as it is to be expected that variables such as exchange rate changes might affect export-oriented industries more than those who sell to the internal Turkish market. What is interesting to note is that many of the macroeconomic variables did not have a significant effect on any sector.

Article: Macroeconomic Determinates Of Stock Price for Industrial Companies Listed In Istanbul Stock Exchange

- The main objective of the study is to analyze the linkage between the Industrial Index in Turkey and **five macroeconomic specific variables namely, Interest rate (INR), Consumer price index as a proxy of Inflation (INF), aggregate money supply (M2) and Exchange rate (EXR).** The study seeks to investigate the impact of these variables on the Turkish stock market. The study was examine the relationship between Turkish stock market activities by identifying variables that affect particularly the Industrial Index of the market. Considering that the Industrial Index represents the performance of all 401 listed companies in the Turkish stock market.
- **Effects of announcing discount rate on interest rate and stock prices** were the main focus of Waud (1970) [38], He used the data for discount rate and the Standard &Poor's 500 for the period from 1952:6 to 1967:6. He assumed that what is meant by the notion of an announcement effect, associated with Federal Reserve's discount rate changes, is an effect that alters the expectations of businessmen, financial institutions, and other economic factors about the future course of the economy.
- The macroeconomic variables regressed on the USA stock market returns index were namely **Exchange rate, money supply, long/short interest rate and the industrial production index.**
- Hardouvelis (1987) [19] tested the response of stock prices to the announcement **of 15 representative macroeconomic variables (Ml, discount rate, surcharge rate, free reserves, inflation rate proxied by both CPI and PPI, consumer credit, , personal income,industrial production index, unemployment rate, durable goods order, index of leading indicators, , retail sales, housing starts, and trade deficit).**
- Ahmet and Abdioglu (2010) [2] empirically examined the linkage between the stock price of (ISE100) and some macroeconomic factors particularly: **consumer price index as a proxy of inflation (CPI), the Foreign Exchange rate, aggregate money supply (M1), Industrial production index and gold prices.** The study was applied From March 2001 to June 2010 on a monthly basis. By using long run Granger non-causality techniques, the result showed that there is long run causality from (ISE-100) to all macroeconomic variables selected in one direction.
- Kandir (2008) [21], studied the interrelationamong changes in the Turkish stock marketand a group of macroeconomic factors such as **the foreign Exchange rate, money market interest rate (IR), money supply (M2), the consumer price index (CPI), industrial production index also gold and oil prices on the Turkish stock market represented by the (ISE-100) index** for the period spans from Jan 2003 to Mar 2010 via applying a multiple regression model. The findings revealed that all the macroeconomic factors had a negative effect on the Istanbul stock Exchange (ISE-100) index returns
- Ozbay (2009) [25], investigated the casual relationship between stock price (Index 30) and macroeconomic factors as; **interest rate, inflation, and Exchange rate, money supply and the real economy spanning between January 1998 - December 2008 of ISE.** The findings revealed that overnight interest rate, consumer price index, current deficit as percentage of GDP and foreign sales do granger-cause stock prices. Moreover, it indicated that stock prices do granger-cause money supply, overnight interest rate, and Exchange rate.

- Gu¨ler and Nalın (2014) [16], investigated the association between the stock price (ISE-100) Index and **consumption expenditure, industrial production, employment level, fixed investment and consumer price index, covering the period from January 1989 to February 2006.** The findings revealed a negative association between the inflation and stock price.
- Wongbangpo and Sharma (2002) examine **the role of GNP, the consumer price index, the money supply, the interest rate, and the exchange rate on the stock prices in Indonesia**, Malaysia, the Philippines, Singapore and Thailand and find causal relationships from the macroeconomic variables to stock prices.
- Cheng (1995) examines the relationships between **security returns and economic indicators and finds a positive relationship between stock price and money supply, government securities price index and unemployment.**
- Apergis and Eleftheriou (2002) investigate the rela- tionship between stock prices, inflation and interest rates in Greece and find that the stock prices in ASE follow inflation rather than interest rate movements
- **Fama (1981) investigates the relationships between stock prices and real activity, inflation, and money. He finds a strong positive correlation between com- mon stock returns and real variables, such as indus- trial production, GNP, the money supply, lagged inflation and the interest rate.**

Macroeconomic Variables, Firm Characteristics and Stock Returns: Evidence from Turkey

- This paper investigates the role of macroeconomic factors in explaining Turkish stock returns. A macroeconomic factor model is employed for the period that spans from July 1997 to June 2005. **Macroeconomic variables used in this study are, growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MSCI World Equity Index.**
- Seven macroeconomic variables, that are hypothysized to influence stock returns, are selected. They are real economic activity (proxied in this study by the growth rate of industrial production index (IP), change in consumer price index as a proxy for inflation (INF), growth rate of narrowly defined money supply (M1), growth rate of international crude oil price (OIL), change in exchange rate (ER), interest rate (IR) proxied in this study by 1-month time deposit rates and World market index return (WMR). With the exception of WMR and OIL, all macroeoconomic series are domestic, while these two series proxy international risk factors. All of the series are transformed into natural logarithm prior to the empirical analysis and all return data are calculated on a monthly basis. The IP variable is a measure of overall economic activity and is chosen over GNP since figures on GNP are only available on quarterly basis. Four of these series, namely IP, OIL, INF and IR are obtained from IMF (international financial statistics).
- The analysis is based on stock portfolios rather than single stocks. In portfolio construction, four criteria are used: market equity, the book-to-market equity, the earnings-to-price equity and the leverage ratio.

Testing Long-Run Relationship between Stock Market and Macroeconomic Variables in the Presence of Structural Breaks: The Turkish Case.

- **C□ag˘li and Halas□ (2010), investigate the relationship between stock price index (ISE-100) and a groupof related factors namely: Exchange rate, GDP, industrial production index, inflation rate, 17 money supply (M2), interest rate and oil price. By applying Gregory-Hansen test for the period span from January 1998 to December 2008.** The result revealed a long run relationship, between deployed the variables and ISE100 for the tested period with a presence of structured break
- **The aim of this paper is to determine the relationship between the Istanbul Stock Exchange 100 (ISE- 100) index level and seven macroeconomic variables including exchange rate, gross domestic product, industrial production, inflation rate, money supply, interest rate, and oil price. The data are monthly for the period from January 1998 to December 2008. All variables are seasonally adjusted by using moving average methods and natural logarithm transformation is applied to appropriate variables (gross domestic product, money supply and oil price) for stabilizing variance of data**. Because of the different crisis (1999 economic crisis, in the late 2000 banking crisis, and finally global financial crisis which has started at the end of 2007), this period is very suitable to check out the effects of the crisis on the economic variables.
- Producer price index based real effective exchange rate index (EXC) is used as a measure of exchange rate in the analysis. Gross domestic product (L(GDP)) is measured as Gross domestic product in constant prices by kind of economic activity at constant prices at 1998. Real economic activity is determined based on industrial production index (IP). Producer price index is used as a measure of inflation rate (IR). Producer price index shows the movements on real economic activity to governmental policies. So it plays very important role on the investment decisions of the entrepreneurs. Meanwhile money supply is represented by M2 (L(M2)) monetary aggregate. Interest rate (INT) is measured as 10-year benchmark interest rate covers the period from 1998 to 2008. Oil price changes have significant effects on the real economic activity and are very important to explain stock price changes.