

ISTANBUL BILGI UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
FINANCIAL ECONOMICS MASTER'S DEGREE PROGRAM

EXPLANATORY POWERS OF SOFT MACRO ECONOMIC INDICATORS

GİZEM UZUNER GENÇTÜRK

117620004

Prof. Dr. Ege Yazgan

ISTANBUL

2020

Gizem UZUNER GENÇTÜRK

117620004

Tez Danışmanı : Prof. Dr. Ege YAZGAN

(İmza) 


İstanbul Bilgi Üniversitesi..... Üniversitesi

Jüri Üyeleri Faculty Member, PhD Barış SOYBİLEN

(İmza) 

İstanbul Bilgi Üniversitesi..... Üniversitesi

Jüri Üyesi: Prof. Dr. Erhan ASLANOĞLU

(İmza) 

Piri Reis Üniversitesi..... Üniversitesi

Tezin Onaylandığı Tarih : 17.01.2020

Toplam Sayfa Sayısı: 108

Anahtar Kelimeler (Türkçe)

- 1) Öncü Göstergeler
- 2) Anket Bazlı Göstergeler
- 3) Ekonomik Aktivite
- 4) Fiyat İstikrarı
- 5) Finansal İstikrar

Anahtar Kelimeler (İngilizce)

- 1) Soft Indicators
- 2) Survey Based Indicators
- 3) Economic Activity
- 4) Price Stability
- 5) Financial Stability

TABLE OF CONTENTS

TABLE OF CONTENTS.....	iii
ABBREVIATIONS	vii
LIST OF SYMBOLS	ix
LIST OF FIGURES	x
LIST OF TABLES	xi
ABSTRACT.....	xii
ÖZET.....	xiii
INTRODUCTION.....	1
CHAPTER I : GENERAL INFORMATION ABOUT SURVEYS OF EXPECTATIONS OF STATISTICS BY CENTRAL BANK OF TURKEY..	3
1.1. EXPECTATION OF CONSUMER INFLATION.....	3
1.2. EXPECTATION OF THE US DOLLAR RATE IN THE INTERBANK FOREIGN EXCHANGE MARKET	6
1.3. EXPECTATION OF THE CURRENT ACCOUNT BALANCE.....	7
1.4. EXPECTATION OF THE GDP GROWTH RATE	8
CHAPTER II : GENERAL INFORMATION ABOUT TENDENCY SURVEY OF TURKSTAT	9
2.1. CONSUMER CONFIDENCE INDEX.....	9
2.1.1. Sub-Indices of Consumer Confidence Index	11
2.1.1.1. Each Tendency Questions.....	12
2.2. SECTORAL CONFIDENCE	13
2.2.1. Sub-Indices of Sectoral Confidence Index	15
2.2.1.1. Each Tendency Questions.....	16
2.3. ECONOMIC CONFIDENCE	17

2.3.1. Sub-Indices of Economic Confidence Index	19
2.3.1.1. Each Tendency Questions.....	20
CHAPTER III : METHODOLOGY AND GUIDANCE.....	22
3.1. TABLE PARAMETERS/VARIABLES.....	22
3.2. CALCULATIONS	24
3.2.1. Variables	24
3.2.2. MAE Calculation.....	24
3.2.3. Standard Deviation	24
3.2.4. Normalized Result.....	25
3.2.5. Confusion Matrix	25
3.2.5.1. Accuracy.....	26
3.2.5.2. Misclassification Rate	26
3.2.5.3. UP Positive Rate	26
3.2.5.4. DOWN Positive Rate	27
3.2.5.5. UP Negative Rate	27
3.2.5.6. Down Negative Rate.....	27
3.2.5.7. Precision	28
3.2.5.8. Prevalence	28
3.2.6. Kuipers Score	28
3.2.6.1. Kuipers Score (Up Event).....	29
3.2.6.2. Kuipers Score (Down Event).....	29
CHAPTER IV: COMPARISON OF PREDICTIONS AND REALIZATIONS ON TENDENCY SURVEYS OF CENTRAL BANK OF TURKEY	30
4.1. EXPECTATION OF CONSUMER INFLATION AND REALIZATION	30

4.2. EXPECTATION OF THE US DOLLAR RATE IN THE INTERBANK FOREIGN EXCHANGE MARKET AND REALIZATION	32
4.3. EXPECTATION OF THE CURRENT ACCOUNT BALANCE AND REALIZATION	33
4.4. EXPECTATION OF GDP GROWTH RATE	34
4.5. EXPORT EXPECTATIONS OF REAL SECTOR AND EXPORTS OF TURKEY	35
4.6. THE EMPLOYMENT EXPECTATIONS OF REAL SECTOR AND EMPLOYMENT OF INDUSTRY	40
4.7. REAL SECTOR CONFIDENCE INDEX AND CHANGE ON FOREIGN CURRENCY DEPOSIT ACCOUNTS	44
CHAPTER V : COMPARISON OF PREDICTIONS AND REALIZATIONS ON TENDENCY SURVEYS OF TURKSTAT	48
5.1. THE PROBABILITY OF BUYING OR BUILDING A HOME AND HOME SALES	48
5.2. THE PROBABILITY OF BUYING AUTOMOTIVE	52
5.3. ASSESSMENT ON SPENDING MONEY ON DURABLE GOODS AND SALES OF DURABLE GOODS	56
5.4. NUMBER OF PEOPLE UNEMPLOYED EXPECTATION AND UNEMPLOYMENT	62
5.5. CONSUMER CONFIDENCE INDEX AND CHANGE ON FOREIGN CURRENCY DEPOSIT ACCOUNTS.....	67
5.6. CONSTRUCTION SECTOR CONFIDENCE INDEX AND CHANGE ON EMPLOYMENT OF CONSTRUCTION	70
5.7. REAL SECTOR CONFIDENCE INDEX AND FIXED CAPITAL FORMATION	73
5.8. RETAIL TRADE TENDENCY SURVEY AND RETAIL SALES	77

CONCLUSION	82
REFERENCES	85
APPENDICES	91
Appendix A : Sample of Data Set and Calculations-I	91
Appendix B : Sample of Data Set and Calculations-II	92
Appendix C : Sample Calculation of Confusion Matrix and Kuipers Score-I	93
Appendix D : Sample Calculation of Confusion Matrix and Kuipers Score-II	94

ABBREVIATIONS

- CBRT: Central Bank of the Republic of Turkey
TURKSTAT: Turkish Statistical Institute
EUROSTAT: Statistical Office of the European Communities
CPI: Consumer Price Index
BTS: Business Tendency Survey
GDP: Gross Domestic Product
CA: Current Account
COICOP: Classification of Individual Consumption by Purpose
USD/TRY: US Dollar to equivalent value in Turkish Lira
IMF: International Monetary Fund
CCI: Consumer Confidence Index
GNP: Gross National Product
US: United States
EU: European Union
ISCO: The International Standard Classification of Occupations
NACE: Nomenclature statistique des activités économiques dans la Communauté européenne (numbers used for all industries and service activities in the European Union)
MAE: Means Absolute Error
TRY: Turkish Lira
BTS: Business Tendency Survey
WTO: World Trade Organization
FOB: Free on Board
CIF: Cost, Insurance and Freight
SQRT: Square Root
TAKBIS: General Directorate of Land Registry and Cadastre, Land Registry and Cadastre Information System of Republic of Turkey
TURKBESD: White Goods Industrialists Association of Turkey
APPLIA: Home Appliance Europe

PEEIs: European Principal Economic Indicators

VAT: Value Added Tax

ODD: Automotive Distributers' Association

RBA: Central Bank of Australia

ECB: European Central Bank

FED: Federal Reserve

LIST OF SYMBOLS

I: Index

w: weight

P_i : current price

P_o : base year price

t: time

x_e : Expectation

x_r : Realization

x_d : Difference between expectations and realization

n: Total Samples

\bar{x} : Average of x_d values

σ : Standard Deviation of x_d values

Σ : Sum

j: Number of samples

LIST OF FIGURES

Figure 4.1 Year-End CPI Expectations	31
Figure 4.2 Expectation of Foreign Exchange Rate	32
Figure 4.3 Expectation of Current Account Balance	33
Figure 4.4 Year-End GDP Growth Rate	34
Figure 5.1 Probability of Buying Home.....	48
Figure 5.2 Turkey Home Sales.....	49
Figure 5.3 Distribution of Home Sales Probability Confusion Matrix	51
Figure 5.4 The Probability of Buying Automotive	53
Figure 5.5 Turkey Auto Sales	53
Figure 5.6 Distribution of Automotive Sales Probability Confusion Matrix.....	54
Figure 5.7 Probability of Buying Durable Goods	56
Figure 5.8 Domestic Sales of Durable Goods	57
Figure 5.9 Distribution of Durable Goods Sale Probability Confusion Matrix	60
Figure 5.10 Number of Unemployed Expectation	63
Figure 5.11 The Number of Unemployment.....	63
Figure 5.12 Distribution of Unemployment Expectation Probability Confusion Matrix.....	65
Figure 5.13 Dollarization of Households	67
Figure 5.14 Distribution of Dollarizations Confusion Matrix	68
Figure 5.15 Expectation of Employment in Construction Sector	70
Figure 5.16 Employment in Construction Sector.....	71
Figure 5.17 Distribution of Employment in Construction Confusion Matrix.....	72
Figure 5.18 Distribution of Investment Probability Confusion Matrix	75
Figure 5.19 Real Sector's Fixed Capital Formation Expectation	76
Figure 5.20 Turkey's GDP/Fixed Capital Formation Index	77
Figure 5.21 Retail Sales Volume Index	78
Figure 5.22 Distribution of Retail Sales Probability Confusion Matrix	80

LIST OF TABLES

Table 1.1 Profile of Participants/Central Bank of Turkey Survey of Expectations	3
Table 3.1 Confusion Matrix	25
Table 4.1 Confusion Matrix of Export Expectations	37
Table 4.2 Confusion Matrix of Employment Expectations	41
Table 4.3 Confusion Matrix of Real Sector Confidence.....	45
Table 5.1 Confusion Matrix of Probability of Buying Home	50
Table 5.2 Confusion Matrix of Probability of Buying Automotive.....	54
Table 5.3 Confusion Matrix of Probability of Buying Durable Goods.....	60
Table 5.4 Confusion Matrix of Probability of Unemployment.....	64
Table 5.5 Confusion Matrix of Households' Dollarization	68
Table 5.6 Confusion Matrix of Employment in Construction	71
Table 5.7 Confusion Matrix of Real Sector Confidence Index and Investments..	74
Table 5.8 Confusion Matrix of Expectation of Retail Sales	79

ABSTRACT

The aim of this study; expectations survey conducted for Turkey's economy, by comparison with actual data; the aim of the study is to reveal the explanatory power of survey based indicators with econometric calculations.

Since the 1990s, central banks in the world have strengthened the language of communication in order to predict economic activity and manage expectations in order to ensure price stability. In this context, many central banks and national statistical institutions conduct surveys to measure expectations and use these expectations in economic policies. The purpose of the central banks is to take measures through these leading indicators to eliminate financial and economic uncertainties.

The Central Bank of the Republic of Turkey in Turkey; it conducts many surveys such as Expectation Survey, Bank Loans Tendency Survey, Financial Services Statistics and Financial Services Confidence Index. In this thesis, Expectation Survey Statistics which includes point estimates and reflects macroeconomic expectations are used.

The Turkey Statistics Institute Consumer Confidence, Economic Confidence and sub-indices that form under the name Sectoral Confidence Index made through survey-based indicators. These pioneering indicators have been addressed on a question-based basis and the extent to which they have been successful in predicting the trend by looking at the nature of the problem.

Keywords: Leading Indicators, Survey Based Indicators, Economic Activity, Price Stability, Financial Stability

ÖZET

Bu çalışmanın amacı; Türkiye ekonomisine yönelik yapılan beklenti anketlerini, gerçekleşen verilerle kıyaslayarak; anket bazlı göstergelerin açıklayıcı gücünü ekonometrik hesaplamalarla ortaya koymaktır.

Dünyada 1990'lerden bu yana merkez bankaları ekonomik aktiviteyi öngörebilmek ve fiyat istikrarını sağlamak amacıyla beklentileri yönetmek için iletişim dilini kuvvetlendirme yoluna gitmiştir. Bu bağlamda bir çok merkez bankası ve ulusal istatistik kurumları beklentileri ölçmek ve ekonomi politikalarında bu beklentileri kullanabilmek adına anketler yapmaktadır. Merkez bankalarının buradaki amacı finansal ve ekonomik belirsizlikleri gidermek için bu öncü göstergeler aracılığıyla önlem almaktır.

Türkiye'de ise Türkiye Cumhuriyet Merkez Bankası; Beklenti Anketi, Banka Kredileri Eğilim Anketi, Finansal Hizmetler İstatistikleri ve Finansal Hizmetler Güven Endeksi gibi birçok anket yapmaktadır. Bu tez içerisinde nokta tahminler içeren ve makro ekonomik beklentileri yansıtan Beklenti Anketi İstatistikleri kullanılmıştır.

Türkiye İstatistik Kurumu ise Tüketici Güven Endeksi, Ekonomik Güven ve Sektörel Güven Endeksi adı altında oluşturduğu alt endeksleri anket bazlı göstergeler sayesinde yapmıştır. Bu öncü göstergeler bu çalışma içerisinde soru bazlı olarak ele alınmış ve sorunun niteliğine bakarak trendi tahmin etmekte ne ölçüde başarılı oldukları incelenmiştir.

Anahtar Kelimeler: Öncü Göstergeler, Anket Bazlı Göstergeler, Ekonomik Aktivite, Fiyat İstikrarı, Finansal İstikrar

INTRODUCTION

Every country in the world has concerns to keep economic activity alive. Therefore, it is a great advantage for decision makers to predict the future. Although it is very important for decisions; it provides space for maneuver by preventing them from making mistakes in terms of managing both monetary, fiscal and trade policies. Countries have therefore increasingly developed pioneering indicator systems over time, and are both governments, policy-makers and the private sector; they try to collect signals thanks to leading indicators such as surveys.

Survey-based indicators, like other countries in the Republic of Turkey is formed through official institutions. These surveys are a leading indicator and help decision makers to plan. These surveys have been prepared in accordance with international standards and are suitable for comparison with the rest of the world. The surveys included in the study is being prepared by the Central Bank of the Republic of Turkey and Turkish Statistical Institute. The expectations survey statistics prepared by the Central Bank of the Republic of Turkey (CBRT) request the point estimates of the participants regarding macroeconomic indicators. However, the surveys prepared by TURKSTAT asked the participants to respond to their expectations and in this study and was tried to explain their ability to predict the trend. Monthly and year-on-year forecasts of the participants for the selected questions from the CBRT's expectations survey were compared with the end-of-year realization of the predicted indicator. In the questionnaires used in the study of TURKSTAT, selected questions were analyzed on the nature of the problem and the extent to which the expectations were realized on a monthly and yearly basis. The study has two purposes; first, whether point estimates or direction estimates are more successful in survey-based indicators; the second objective is to understand how successful these surveys are in predicting economic realizations. There are some studies carried out in this field surveys in different qualities in Turkey.

The first study on the confidence index was conducted by Candemir and Karabudak in 1994. BTS in Turkey using monthly and quarterly business confidence index and a compound tried to create a separate investment confidence index.

Oral, Ece and Hamisici (2005) studied on Business Tendency Surveys' and measured whether it was a leading indicator. As a result, BTS was successful in predicting the future, yet argued that there should be changes in some aspects of the weighting of the participants on a sectoral basis.

Oral and Brand (2014) worked on Consumer Confidence Index. They tried to find out the effects of these criteria on the explanatory power of the indicators selected from the Consumer Confidence Index and determined criteria for the consumer such as demography and employment conditions. The empirical findings of this study found that demographic breakdown increased the explanatory power of the questionnaire-based indicators.

CHAPTER I
GENERAL INFORMATION ABOUT SURVEYS OF EXPECTATIONS OF
STATISTICS BY CENTRAL BANK OF TURKEY

1.1. EXPECTATION OF CONSUMER INFLATION

The Survey of Expectations was conducted with 67 participants consisting of real sector and financial sector representatives and professionals, and the results were evaluated by aggregating the responses of the participants by CBRT. For the profile of CBRT's Expectations Survey's Participants (CBRT, 2019) see Table 1.1.

Table 1.1 Profile of Participants/Central Bank of Turkey Survey of Expectations

Participants' Profile	Respondents
Real Sector	10
Employer Organizations	2
Holdings	8
Financial Sector	49
Banks	31
Non-Banks Financial Sector	18
Professionals	8
Academicians	4
Journalists	1
Other Professionals	3
Total	67

Source: Survey of Expectations Statics by Central Bank of Turkey, December 2019

Note: The number of the participants may vary according to the survey period.

In order to measure the consistency of inflation expectations, the CBRT's expectation survey was used. The CBRT asks the eight questions regarding consumer inflation. Questions asked about monthly inflation and the monthly

inflation of the participants during the survey period and monthly inflation forecast for one and two months later are asked. The question regarding annual inflation is the year-end annual inflation in the survey period, annual inflation forecast for 12 months and 24 months, and annual inflation forecasts for five years and ten years. In this thesis, the current year and year-end annual inflation forecasts are compared with the inflation realizations of the same period from the expectations survey. Based on these estimates, this point was examined as a result of MAE.

According to TURKSTAT (2019), the consumer price index (CPI) measures changes in weighted average of retail prices of goods and services purchased by consumers over a certain period of time. CPI calculation of the inflation rate for 2003 is aimed to find the change of goods and services prices which currently existed in the market covering institutional population, foreign visitors and households with taken into account about all of their final monetary consumption expenditure. This calculation excludes the owner from consuming expenditures on housing and home production.

Classification of Individual Consumption by Purpose (COICOP) is a reference classification and used for calculating the index and determining the weights. Expenditures are classified in 12 major groups and 43 sub-groups. The index is completed with 418 products.

Turkey's reported methodology to EUROSTAT is relevant to regional and international standards.

TURKSTAT (TURKSTAT, 2019) conducts Continuous Household Budget Survey by yearly and includes; administrative records of tourism survey, private households of all socio-economic groups (15000, over 3-year total data) and constitutional population expenditure survey. For the calculation of seasonal products, a strict annual weighting approach is used.

According to TURKSTAT (TURKSTAT, 2019) transactions coverage: All of the last monetary consumption expenditures, which are based on the consumption of services and goods in domestic markets, were used in the calculation of 100-based CPI for 2003. All data of 81 provincial centers and 225 connected district centers were used in the index. On a monthly basis, 544256 prices from 28711 sales points and 4274 tenant's data helped to determine the index. Depending on the seasons, sales points and prices can be observed with different numbers.

No matter the level of income and geopolitical region, index scaled for covering the whole of Turkey's population. Foreign visitors, institutional population and households' final monetary consumptions are taken into account. Purchasing price is applied to index as price coverage. Retail prices including taxes are included to the index for prices of goods and services, reckon without installments and deposits.

According to TURKSTAT (TURKSTAT, 2019) Laspeyres formulation is updated every year with item diversity and weight. Goods and services which lost their importance are exchanged with new items to the basket every year in December and used for calculation of Index.

Index is calculated by dividing current prices to the prices of previous December, which is "new price reference period (po)", and then chained by multiplying it with the index numbers of December.

$$I = w \cdot P_i / P_o$$

I: index

P_i: current price

w: weight

P_o: base year price

$$I_t = w_1 \cdot P_{it} / P_{December(t-1)} \cdot I_{December(t-1)}$$

w_i : new weight

t: time

Geometric average is used for the computations of commodity prices from commodity.

To sum up, main measure of cost of living in Turkey is Consumer Price Index and detailed information is up above and published TURKSTAT, which is National Statistics Office of Turkey.

1.2. EXPECTATION OF THE US DOLLAR RATE IN THE INTERBANK FOREIGN EXCHANGE MARKET

USD/TRY currency is the compared value of one US Dollar to equivalent value in the Turkish Lira. Major advantage of The Turkish economy is being in a global spot between Asia and Europe. Recently, domestic political and economic events lead to volatility of USD/TRY. Particularly geopolitical decisions and political factors affect the volatility of the currency pair which creates unpredictability for the future.

Being a developing country currency, the nature of the Turkish Lira has to be volatile. But many past crises, Turkey metrics that we look at the example of perception; in the vast majority, pricing before or after shows that; The Turkish Lira is or will be priced eventually.

Central Bank of Turkey Republic; In the Survey of Expectations (CBRT, 2019), asks 3 questions to the participants regarding the USD/TRY exchange rate; the exchange rate expectation at the end of the month in the survey period, the exchange rate expectation at the end of the year in the survey period and the exchange rate expectation for the next 12 months.

In this study, the median response of the participants which is the exchange rate expectation at the end of the year in the survey period was compared with the reality in the empirical study based on the results of the survey.

1.3. EXPECTATION OF THE CURRENT ACCOUNT BALANCE

Turkish Balance of Payments is a statistical report in the guidance of Balance of Payments and International Investment Position Manual provided by the International Monetary Fund (IMF, 2009) and aim for publishing systematic records of economic transactions by comparing residents of a country and residents of another country covering certain period of time.

Turkish Balance of Payments statistics are published monthly according to the IMF Balance of Payments and International Investment Position Manual which is the 6th edition released in 2009.

CBRT's Expectation Survey (CBRT, 2013-2018) poses two questions to participants regarding the current account balance. One of these is the expectation of the participants in terms of annual current account deficit/surplus dollar in the January-December period at the end of the year in which the survey period was conducted. The other question is the expectation of the current account deficit or current account surplus in dollars in the January-December period of the following year.

In this study, the balance of payments realizations includes the estimations for the current year in which survey period was conducted and realizations by the end of these years made in 2013.

1.4. EXPECTATION OF THE GDP GROWTH RATE

Gross domestic product (GDP) is the most important standard focusing the measurement for value added occurrence of goods and services produced in a certain period of time. GDP has importance for aggregates estimated in the system of national accounts. Include three approaches; Income Approach, Expenditure Approach and Production Approach (IMF, 2018).

According to expenditure approach, used for comparisons, GDP concentrate on expenditures for investment and consumption in an economy for a certain period time with net foreign demand contribution. Instruments of this approach are; the fixed capital investment and consumption of government, net exports and the final consumption of households. For the accuracy of measurement related to the changes in the productions, GDP in chain linked volume index is predicted by adjusting the inflation effect (IMF, 2018).

GDP growth rate is the increase rate in GDP as percentage. The ratio between each of the values calculated with the chain linked volume index gives the real growth rate (IMF, 2018).

Central Bank of the Republic of Turkey to the participants in Survey of Expectations; asks the GDP expectation at the end of the survey year. In this study, the monthly expectations regarding the GDP given to the Expectations Survey are compared with the full year growth at the end of the year (CBRT, 2019).

CHAPTER II

GENERAL INFORMATION ABOUT TENDENCY SURVEY OF TURKSTAT

2.1. CONSUMER CONFIDENCE INDEX

The idea that indexes of consumer confidence may be useful in forecasting consumption was first proposed by Eva Mueller (1963). She found that consumer confidence is an important explanatory variable for consumption expenditures in a decline, including delayed consumption in the equation.

There are many studies on the relationship between the Consumer Confidence Index and the stock market. Since Hard Economic Data is included in this study, its relation with national product is more important. Inquiries and findings that we can make inferences regarding private consumption, which has the highest weight in the responses to the questions in confidence working mainly in the fact that Turkey's growth composition is located.

Matsusaka and Sbordone (1995) examined the link between CCI and GNP using US data from 1953 to 1998. As a result of the study, it was found that the changes in consumer confidence index caused fluctuations in gross national product.

Utaka (2003) used a similar study in the Japanese economy to see whether the changes in the confidence index passed to the national product positively or negatively by using the consumer confidence index and the national product data from 1980 to 2000 quarterly.

Afshar, Arabian & Zomorrodian (2007), by taking US consumer confidence index and national product on a quarterly basis, proved the effect of confidence index on national income by Granger causality test.

The empirical studies of Barro (1991) and Knack and Keefer (1997) show that there is a positive correlation between confidence and growth rate (Özsagır, A. 2007).

Also, Carroll, C.D., Fuhrer, J.C. and Wilcox, D.W. (1994), Nahuis, N.J. (2000), Batchelor, R. and Dua, P. (1998) and McNabb, B. and Taylor, K. (2007), in their studies on the US economy, have found that consumer confidence index affects the gross domestic products.

Monthly Consumer Tendency Survey is calculated by TURKSTAT and intend to measure consumers' financial standing and general economic course for present situation and future period expectations to determine expenditure and saving tendencies for near future. (TURKSTAT, 2019)

4884 households with age scope covering 16 and above are accepted as a representative and selected randomly from data entry program.

European Union's balance method is used for compiling indices (European Commission, 2019). Difference between the percentages of positive and negative responses for each tendency questions is helping to calculation of the balance value. By adding 100 to balance value outcomes the diffusion indices for each question. Afterwards, calculation of the general index is possible by arithmetic means of diffusion indices of the related questions decided in consumer confidence index.

The index is evaluated in the range between 0 and 200. Values lower than 100 means the consumer confidence is pessimistic and higher than 100 means the consumer confidence is optimistic.

TURKSTAT and Central Bank of Turkey cooperation makes possible to carry out Consumer Tendency Survey by monthly with a computer-based and face-

to-face interview method. The survey was initiated in 2012 in accordance with the “Joint Harmonized European Union Business and Consumer Surveys Program” and has been implemented by the European Commission co-financing since May 2015 (European Commission, 2016).

In the first two weeks of each month fieldwork is applied for the survey and results are published on the third week depending on the National Data Release Calendar.

2.1.1. Sub-Indices of Consumer Confidence Index

The Consumer Confidence Survey by TURKSTAT can gather here to ask the questions under three main headings: Personal Financial Standing, General Economic Situation, Expenditure and Saving Tendencies (TURKSTAT, 2019).

TURKSTAT; to question the financial position of the household; asks the financial situation of the household in the last 12 months, the expectation regarding the financial situation of the household in the next 12 months and the possibility of borrowing in the next 3 months.

Accordingly to results (TURKSTAT, 2019) Consumers’ assessments on current general economic situation in Turkey compared to past 12 months, general economic situation expectation in Turkey over the next 12 months, number of people unemployed expectation over the next 12 months, buying time condition of durable goods in present period, saving time condition in present period, assessment on consumer prices change rate over the last 12 months, expectation for consumer prices change rate over the next 12 months, expectation for wages change rate over the next 12 months.

The indices mentioned here are calculated according to the equilibrium method used by the European Union.

Equilibrium coefficient for each trend question; the percentage of positive responders is calculated by taking the difference of the percentage of negative responders. A separate diffusion index is created for each question by adding 100 to the equilibrium coefficient. The Consumer Confidence Index is then calculated by taking the arithmetic average of the spread indices of the selected questions.

The index is between 0 and 200. The fact that the index is higher than 100 indicates that there is an optimistic situation in consumer confidence and that it is less than 100 indicates that there is a pessimistic situation in consumer confidence.

2.1.1.1. Each Tendency Questions

Each questions of consumer confidence index are down below (TURKSTAT, 2019).

- Financial situation of household (present compared to the last 12 months)
- Financial situation expectation of household (over the next 12 months)
- General economic situation (present compared to the past 12 months)
- General economic situation expectation (over the next 12 months)
- Number of people unemployed expectation (over the next 12 months)
- Assessment on spending money on semi-durable goods (over the next 3 months compared to the past 3 months)
- Buying time condition of durable goods (present)
- Assessment on spending money on durable goods (over the next 12 months compared to the past 12 months)
- Saving time condition (present)
- Statement on current financial situation of household
- The probability of saving (over the next 12 months)
- The probability of borrowing money (over the next 3 months)
- Assessment on consumer prices change rate (over the last 12 months)

- Expectation for consumer prices change rate (over the next 12 months compared to the past 12 months)
- Expectation for wages change rate (over the next 12 months compared to the past 12 months)
- The probability of buying a car (over the next 12 months)
- The probability of spending money on home improvements or renovations (over the next 12 months)
- The probability of buying or building a home (over the next 12 months)

2.2. SECTORAL CONFIDENCE

Monthly published business tendency surveys (TURKSTAT, 2019) are including business tendency statistics about business manager's situation and expectations for near future in private sector have more than 10 employees covering services, retail trade and construction.

Sectoral Confidence Index TURKSTAT has been using Statistical Classification of Economic Activities from the European Community, Revision 2 (NACE Rev. 2) (European Community, 2019). The tendency surveys implemented within the scope of workplace trend statistics are carried out in full compliance with the European Union Harmonized Workplace and Consumer Surveys Joint Program.

The service, retail trade and construction sector trend surveys have been carried out with the European Commission co-financing under the program European Harmonized Workplace and Consumer Surveys' joint program since May 2011.

Service, retail trade and construction industry trend surveys are compiled monthly via the web-based program. Field applications of the surveys are conducted within the first two weeks of each month and the results are announced to the public in the last week of the reference month.

NACE, Rev. 2 activity coverage for services tendency survey is right below:

- Land transport and transport via pipelines (49)
- Water transport (50)
- Air transport (51)
- Warehousing and support activities for transportation (52)
- Postal and courier activities (53)
- Accommodation (55)
- Food and beverage service activities (56)
- Publishing activities (58)
- Motion picture, video and tv prog. prod., sound reco. and music pub. activities(59)
- Programming and broadcasting activities(60)
- Telecommunications (61)
- Computer programming, consultancy and related activities (62)
- Information service activities (63)
- Real estate activities (68)
- Legal and accounting activities (69)
- Activities of head offices; management consultancy activities (70)
- Architectural and engineering activities; technical testing and analysis (71)
- Advertising and market research (73)
- Other professional, scientific and technical activities (74)
- Rental and leasing activities (77)
- Employment activities (78)
- Travel agency, tour operator reservation service and related activities (79)
- Security and investigation activities (80)
- Services to buildings and landscape activities (81)
- Office administrative, office support and other business support activities (82)
- Libraries, archives, museums and other cultural activities (91)

- Repair of computers and personal and household goods (95)

Postal and courier activities (53), Telecommunications (61) and Real estate activities (68) have been included in Services Tendency Survey since 2017 and programming and broadcasting activities (60) are added to the coverage in 2018.

NACE, Rev. 2 activity coverage for retail trade tendency survey:

- Wholesale and retail trade and repair of motor vehicles and motorcycles (45)
- Retail trade, except of motor vehicles and motorcycles (47)

NACE, Rev. 2 activity coverage for construction tendency survey:

- Construction of buildings (41)
- Civil engineering (42)
- Specialized construction activities (43)

The survey results provide a source for calculating Services, Retail Trade and Construction Confidence Indices. (6)

2.2.1. Sub-Indices of Sectoral Confidence Index

The balance method of European Union is used for compiling indices. Diffusion index is calculating for each question with the addition 100 to percentage of difference between positive and negative responses. The general index is calculated by the arithmetic mean of the selected numbers for each sector.

The index is evaluated in the range between 0 and 200. Values lower than 100 means the pessimistic outlook and higher than 100 means optimistic outlook related to the economic activity.

2.2.1.1. Each Tendency Questions

Topics covered in services tendency survey:

- Business situation
- Demand (turnover)
- Employment
- Selling prices
- Possibility to increase activity without any change in current resources
- Main factors limiting business activity
- Fixed capital investment

Topics covered in retail trade tendency survey:

- Business activity (sales)
- Volume of stock
- Orders placed with suppliers
- Employment
- Selling prices
- Possibility to increase activity without any change in current resources
- Main factors limiting business activity
- Fixed capital investment

Topics covered in construction tendency survey:

- Building activity
- Main factors limiting business activity
- Overall order books
- Employment
- Selling prices
- Possibility to increase activity without any change in current resources

- Fixed capital investment

2.3. ECONOMIC CONFIDENCE

The composite index, which consists of the construction, retail trade, services and real sector confidence index, is called the Economic Confidence Index and conducted by TURKSTAT (2019).

Source of Weights: Individual components, according to the ability to represent the sector and relation with the reference component, are used to combine sectoral weighting for economic index with the guidance of The Joint Harmonized EU Programme of Business and Consumer Surveys (European Commission, 2019).

There are many studies which are applied on EU to explain Business Cycles and the Role of Confidence. Using an under-utilized dataset on consumer and business confidence indicators across the UK, France, Italy and the Netherlands, this paper considers the extent to which such indicators are linked to GDP and the business cycle. We adopt, cross correlation descriptive statistics, Granger causality tests, variance decomposition, and forecast probit tests to investigate the properties of the data. In general consumer and business confidence indicators are leading indicators and pro-cyclical. There is some evidence of causality between the indicators and GDP and confidence indicators would appear to have good predictive power of cycle turning points in relation to other leading indicators (McNabb, Bob & Taylor, Karl. 2002, p. 1).

According to TURKSTAT (2019), the weights of the sectors whose sub-indices used are as below;

Consumer	:20%
Manufacturing industry	:40%

Services	:30%
Retail trade	:5%
Construction	:5%

These weights are not directly applied to the five confidence indices themselves but to their normalized individual sub-indices series as equally-distributed in each sector.

According to TURKSTAT (2019), Economic confidence index is the weighted average of totally 20 standardized balance values of the components, that consists of seasonally adjusted consumer (4), real sector (manufacturing industry) (8), services (3), retail trade (3) and construction (2) sectors. The moments of the average and standard deviation values for standardization are computed over a frozen sample. Frozen sample for 2019 is between January 2007 - December 2018. Although the long-term moments of the balance series are fairly stable due to their stationary nature, the sample is extended once a year to cover the last completed year to include latest developments. This expansion is the reason of the annual routine revision of whole series.

Based upon the balance series of the sub-indices, economic confidence index is calculated as below;

Each value of the sub-indices at the balance matrix is normalized by its serial's frozen sample average and standard deviation value. Second, a composite serial is obtained with computing weighted sum of averages of normalized balance values. Composite serial is normalized as average is equal to 0 and standard deviation is equal to 1. At last, weighted average is scaled to have a long-term mean of 100 and standard deviation of 10 to build economic confidence index.

Values of economic confidence index greater than 100 indicate an above-average confidence, whereas values below 100 indicate a below-average confidence.

TURKSTAT uses these sources for conducting to Economic Confidence Index: Consumer Tendency Survey carried out in cooperation with the TURKSTAT and CBRT; Business Tendency Survey (manufacturing industry) conducted by CBRT; Monthly Services Tendency Survey, Monthly Retail Trade Tendency Survey and Monthly Construction Tendency Survey conducted by TURKSTAT.

Sub-indices and indices are calculated by the data collected with these surveys in the first two weeks of each month. Sub-indices used at the calculation of economic confidence index are the seasonally adjusted values. Economic confidence index is calculated by using the same reference month's published five sector's confidence sub-indices series and published before the end of the month (TURKSTAT, 2019).

2.3.1. Sub-Indices of Economic Confidence Index

Before calculation steps as a preparation stage, at first data matrix for 20 sub-indices series are created by TURKSTAT (2019) and then balance matrix is created by extracting 100 from each value. The length of time series of 20 sub-indices of 5 sectors are as below;

- Seasonally adjusted consumer confidence index, 4 sub-indices: series starting at January 2007 (with backcasted series for the period between January 2007 - December 2011)
- Seasonally adjusted real sector (manufacturing industry) confidence index, 8 sub-indices: series starting at January 2007

- Seasonally adjusted services sector confidence index, 3 sub-indices: series starting at January 2011
- Seasonally adjusted retail trade sector confidence index, 3 sub-indices: series starting at January 2011
- Seasonally adjusted construction sector confidence index, 2 sub-indices: series starting at January 2011.

2.3.1.1. Each Tendency Questions

Questions asked by TURKSTAT (2019) for creating indexes are below;

Sub-indices of consumer confidence index;

- financial situation expectation of household (over the next 12 months)
- general economic situation expectation (over the next 12 months)
- number of people unemployed expectation (over the next 12 months)
- the probability of saving (over the next 12 months)

Sub-indices of real sector (manufacturing industry) confidence index;

- total amount of orders (current situation)
- amount of stocks of finished goods (current situation)
- volume of output (next 3 months)
- total employment (next 3 months)
- total amount of orders (past 3 months)
- export orders (next 3 months)
- fixed investment expenditure
- general business situation

Sub-indices of services confidence index;

- business situation (over the past 3 months)
- demand-turnover (over the past 3 months)
- demand-turnover expectation (over the next 3 months)

Sub-indices of retail trade confidence index;

- business activity-sales (over the past 3 months)
- current volume of stock
- business activity-sales expectation (over the next 3 months)

Sub-indices of construction confidence index;

- current overall order books
- total employment expectation (over the next 3 months)

CHAPTER III METHODOLOGY AND GUIDANCE

3.1. TABLE PARAMETERS/VARIABLES

Based on the surveys conducted by the CBRT and TURKSTAT, the predictors' predictions of economic realities were calculated by various methods. The CBRT surveys consist of questions that require direct point estimation. In this respect, the CBRT conducted surveys to determine whether the forecast and the answer to the question asked for the survey period confirm the estimate. Therefore, expectations and realizations are marked with True / False and Up / Down relationships in CBRT surveys. Surveys conducted by TURKSTAT were designed to understand the trend. Mean Absolute Error (MAE) and Kuipers Score were evaluated by looking at the monthly and yearly changes in the indices which are generated by the questions, as well as the changes in the realizations in order to understand how the participants' expectations were shaped on a subject basis.

While some of the questions asked in the questionnaires are expected to make point estimation, some of them are directed to the participants in order to determine the direction. It has been tried to measure how strongly they can predict economic realities by looking at monthly and yearly changes in forecasts. The methods used in the measurement are explained in the sample table.

In the sample table, the inflation expectations and the realization of the inflation for the expected period are compared. There are 72 estimates in total. These estimates are presented as monthly and annual expectations and realizations in the period time from January 2013 to December 2018 as in each table.

Both the expectations and the realized rates were calculated and their directions were revealed as a result of the differences between the changes, and the error margins were taken into account mathematically.

In the data set starting from January 2013, changes are started to be calculated in line with the figures realized in February 2013 on a monthly basis; has been evaluated on an annual basis from January 2014.

TRUE is marked if the direction of the forecast and the change is the same; otherwise FALSE is marked.

In order to measure the reliability of the measurements, the absolute error was evaluated by using monthly and yearly changes in the estimations with real values of known magnitudes. Mean Absolute Error (MAE) is the absolute difference between the monthly change in estimates and the realizations for the month in which the forecast is made, and the sum of these is divided by the number of measures.

In order to calculate the Kuipers Score, a table was created based on the estimates and actual values. The data in this table;

- UP-UP: Expectation rise, actual rise,
- DOWN-DOWN: Expectation decline, actual decline,
- DOWN-UP: Expectation decline, actual rise,
- UP-DOWN: Expectation ascension, actual decline

The scenario, which occurs in each data comparison on a monthly and yearly basis, is given a value of '1' and the rest is given a value of '0'. As a result, the total number of occurrences of four scenarios has been found and ready for use in the equations. In light of these total results, Confusion Matrixes were created monthly and yearly.

3.2. CALCULATIONS

3.2.1. Variables

$x_e = \text{Expectation}$

$x_r = \text{Realization}$

$x_d = |x_e - x_r|$

$n = \text{Total Samples}$

$\bar{x} = \text{Average of } x_d \text{ values}$

$\sigma = \text{Standard Deviation of } x_d \text{ values}$

3.2.2. MAE Calculation

MAE stands for Mean Absolute Error which measures the error of forecasts by difference between forecasts and realizations.

$$MAE = \bar{x} = \frac{1}{n} \sum_{j=1}^n |x_{ej} - x_{rj}|$$

3.2.3. Standard Deviation

The standard deviation is the square root of the sum of the squares of the difference of the numbers in a series from the arithmetic mean of the series, divided by the minus one number of elements of the array. In order to calculate the standard deviation, the arithmetic mean of the sum of the differences between expectations and realizations in the survey-based indicators in the whole series was taken. The difference of each difference from the arithmetic mean was found. The squares of the differences were summed and divided by a minus one of the total number of series obtained. The square root of the number found was taken.

It was calculated that the difference between the objective, expectations and realizations was how close to the average with standard deviation for all series.

$$\text{Standard Deviation} = \sigma = \sqrt{\frac{1}{n-1} \sum_{j=1}^n |x_{dj} - \bar{x}|^2}$$

3.2.4. Normalized Result

The purpose of the normalization method is to deal with the data in a single order where the differences between the data are variable. Data normalization is used to include all variables in a single range and takes values between zero and one. In the data set, the difference between realization and expectation is subtracted from the arithmetic mean and divided by the standard deviation value. After the obtained results are summed and averaged, the normalized deviation results of the whole data set are reached.

$$\text{Normalized Results} = \frac{1}{n} \sum_{j=1}^n \left| \frac{x_{dj} - \bar{x}}{\sigma} \right|$$

3.2.5. Confusion Matrix

Table 3.1 Confusion Matrix

Confusion Matrix		
	Prediction UP	Prediction Down
Actual Up	True Positive	False Positive
Actual Down	False Negative	True Negative

$$ALL = \text{True Positive} + \text{False Positive} + \text{False Negative} + \text{True Negative}$$

3.2.5.1. Accuracy

$$\text{Accuracy} = \frac{\text{True Positive} + \text{True Negative}}{\text{ALL}}$$

Accuracy's purpose in calculation is to measure the accuracy of the estimates of the participants participating in the surveys. In the answers given to the questionnaire-based questions, the accuracy of these forecasts is compared by looking at the monthly changes in the realizations if they anticipate that the trend will improve or deteriorate. Accuracy increased if the participant made a prediction of recovery / deterioration compared to the previous month and a recovery / deterioration occurred from month to month. Accuracy measures the correct estimation rate in the surveys.

3.2.5.2. Misclassification Rate

$$\text{Misclassification Rate} = \frac{\text{False Negative} + \text{False Positive}}{\text{ALL}}$$

The purpose of the Misclassification is to measure the extent to which the estimates of the participants participating in the surveys have made a mistake. If the answers to the survey-based questions predict that the trend has improved or deteriorated by months, the misclassification of these forecasts is compared by looking at the monthly changes in realizations. If the participant made his / her prediction in the direction of recovery / deterioration compared to the previous month and the opposite of the expectation occurred, the misclassification increased. Misclassification measures the wrong estimates rate in the surveys.

3.2.5.3. UP Positive Rate

$$\text{UP Positive Rate} = \frac{\text{True Positive}}{\text{ALL}}$$

The Up Positive rate was calculated to test the accuracy of the up-front estimates of the respondents. Among the answers given by the participants in the survey, if the answers have increased from month to month and year to year and the realizations have been realized in line with these forecasts, the down positive rate increases.

3.2.5.4. DOWN Positive Rate

$$DOWN\ Positive\ Rate = \frac{True\ Negative}{ALL}$$

The down-positive rate was calculated to test the accuracy of downstream estimates of the respondents. Among the answers given by the participants in the survey, if the answers have decreased from month to month and year to year and the realizations have been realized in line with these forecasts, the down positive rate increases.

3.2.5.5. UP Negative Rate

$$UP\ Negative\ Rate = \frac{False\ Positive}{ALL}$$

Up negative rate was calculated to test the wrong downward predictions of the survey participants. In the answers given by the participants in the survey, if the answers have decreased from month to month and year to year and the realizations have risen contrary to these forecasts, the up negative rate increases.

3.2.5.6. Down Negative Rate

$$DOWN\ Negative\ Rate = \frac{False\ Negative}{ALL}$$

The down negative rate was calculated to test the inaccuracy of the upward estimates of the respondents. Among the answers given by the participants in the

survey, if the answers increased from month to month and year to year and the realizations decreased in contrary to these forecasts, the down negative rate increases.

3.2.5.7. Precision

$$\textit{Precision} = \frac{\textit{True Positive}}{\textit{True Positive} + \textit{False Positive}}$$

Precision is calculated by looking at the number of predicted month-to-month or year-to-year increases in realizations if there is a month-to-month or year-to-year rise in realizations. The objective here is to measure the success of estimators in forecasting the upward trend in upward realizations.

3.2.5.8. Prevalence

$$\textit{Prevalence} = \frac{\textit{True Positive} + \textit{False Positive}}{\textit{ALL}}$$

The purpose of Prevalence is to calculate how upward the trend is by looking at monthly and yearly changes in realizations. Estimators' estimations on a monthly and yearly basis are the ratio of realizations to true and false predictions regardless of which direction they evolve. In other words, it is to calculate how much upwards are realized in monthly and yearly realizations.

3.2.6. Kuipers Score

KS is defined by $H-F$, where H is the proportion of ups that were correctly forecast to occur, and F is the proportion of downs that were in-correctly predicted.

These two proportions are known as the "hit rate" and "false alarm rate", respectively. In the case where the outcome is symmetric, in the sense that we

value the ability to forecast ups and downs equally, then the score statistic of zero means no accuracy, whilst high positive and negative values indicate high and low predictive power. KS provides a statistical measure of the accuracy of directional forecast however, it does not provide a statistical test (Yazgan, M.E., Kaya, H., 2012).

3.2.6.1. Kuipers Score (Up Event)

$$\text{Hit Rate (H)} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Positive}}$$

$$\text{False Alarm (F)} = \frac{\text{False Positive}}{\text{True Positive} + \text{False Positive}}$$

$$\text{Kuipers Score} = H - F$$

In the Up Event, the Kuipers Score is high with the change in the upward direction in line with the expectations from the same direction. When expectations change upwards from month to month, if the realizations change downwards on a monthly basis, the False alarm is getting higher.

3.2.6.2. Kuipers Score (Down Event)

$$\text{Hit Rate (H)} = \frac{\text{True Negative}}{\text{False Negative} + \text{True Negative}}$$

$$\text{False Alarm (F)} = \frac{\text{False Negative}}{\text{False Negative} + \text{True Negative}}$$

$$\text{Kuipers Score} = H - F$$

In the Down Event, the Kuipers Score is high in the downward direction and the downward change in the realization of expectations. When expectations change downwards from month to month, False alarm is high if realizations change upwards on a monthly basis.

CHAPTER IV
COMPARISON OF PREDICTIONS AND REALIZATIONS ON
TENDENCY SURVEYS OF CENTRAL BANK OF TURKEY

4.1. EXPECTATION OF CONSUMER INFLATION AND REALIZATION

The common goal of monetary policy authorities in the world is to ensure price stability. Since the 1990s, policy-makers have become more open to debate even their actions on monetary policy. This shift was motivated by the idea that clear communication can help reduce financial and economic volatility in response to central banks' decisions as well as augment the tool set of monetary policy (Blinder et al. 2008).

Such as Turkey; central banks of Brazil, China, Chile, Colombia, Czechia, Hungary, India, Indonesia, Korea, Mexico, Peru, Philippines, Russia, South Africa and Thailand measure inflation expectations with surveys (Jahan, 2012).

This sample is based on the Central Bank of Turkey establishes expectations for the Expectations Survey (CBRT, 2019). The survey was conducted with a total of 67 participants, including 9 real sector representatives, 54 financial sector representatives and 4 professionals. The participants were asked about the consumer inflation at the end of the year.

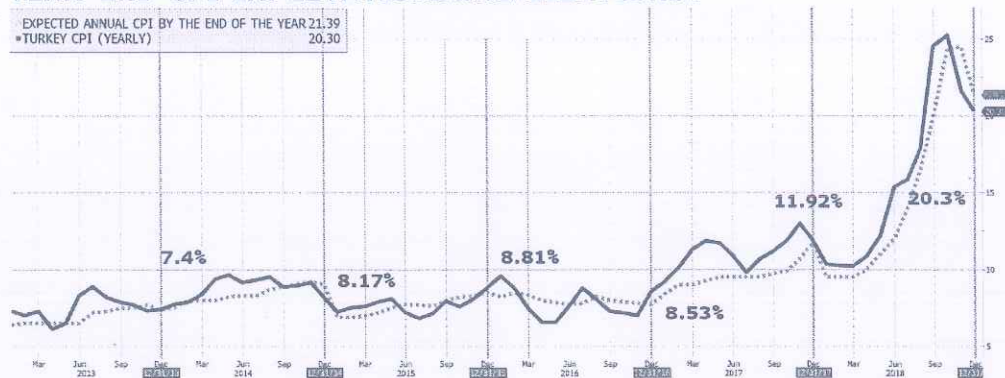
Central Bank of Republic of Turkey asks "What is your expectation of the CPI? (%)" to the participants on Survey of Expectations. The probability distributions for expectations of consumer inflation for the next 12 months and 24 months are also asked while filling out the questionnaire. In this study; the year-end consumer inflation expectation for every single month compared with the year-end realization for both monthly and annually basis.

The relationship between the current situation realized on a monthly basis and the monthly situation in the consumer price index was calculated. All

Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. In this study 72 expectation samples are covered and seem the relationship on Figure 4.1.

Figure 4.1 Year-End CPI Expectations

YEAR-END CPI EXPECTATIONS&REALIZATIONS:



Source: TURKSTAT, CBRT (2019)

The objective of this study was to calculate how much inflation is predictable that in Turkey. Results in both monthly and annual basis, reveals how difficult to predict the inflation in Turkey. As a result, when 72 samples were analyzed MAE was calculated as 1,941805556, Standard Deviation 2,740768026 and Normalized average result is 0,666417915.

Mean Absolute Error which measures the error of forecast by difference between forecasts and realizations. In this study; it would be better to look MAE on monthly basis, because of MAE look at inflation measurement variables sourced on a monthly basis due to the fact that Turkey will be healthier dynamic.

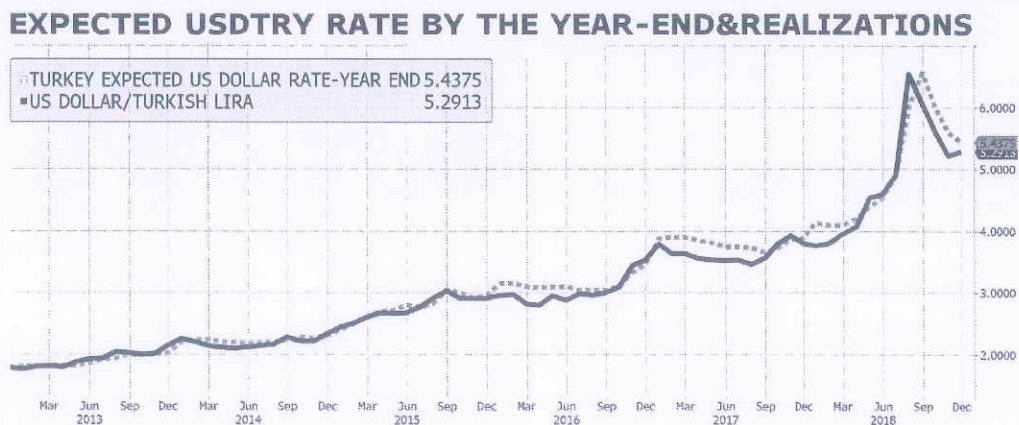
Survey-based indicators on inflation expectations are crucial for central banks in both developed and developing countries to ensure price stability and keep inflation under control. As mentioned earlier, many central banks use survey-based indicators to measure these expectations. However, there is a very important issue that requires distinction. Causing the dynamics of inflation in

developed and developing countries are very different from each other (Akcelik, 2016, pp.4-6). Therefore, inflation forecasts in developed countries are more consistent compared to developing countries

4.2. EXPECTATION OF THE US DOLLAR RATE IN THE INTERBANK FOREIGN EXCHANGE MARKET AND REALIZATION

This sample is based on the Central Bank of Turkey (2019) establishes expectations for the Expectations Survey. The survey was conducted with a total of 67 participants, including 9 real sector representatives, 54 financial sector representatives and 4 professionals. The participants were asked about the exchange rate at the end of the year and on the basis of the change in the median response on a monthly basis; the exchange rate was compared to the movement that occurred that month. The relationship between the current situation realized on a monthly basis and the monthly situation in the exchange rate was calculated.

Figure 4.2 Expectation of Foreign Exchange Rate



Source: CBRT (2019)

Expectations of the upward movement in the exchange rate, as well as clear how impressive the calculation was understood. All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72

samples were analyzed, the MAE result of all the samples was found to be 0,3524, Standard Deviation 0,343309182 and Normalized average result is 0,735563137.

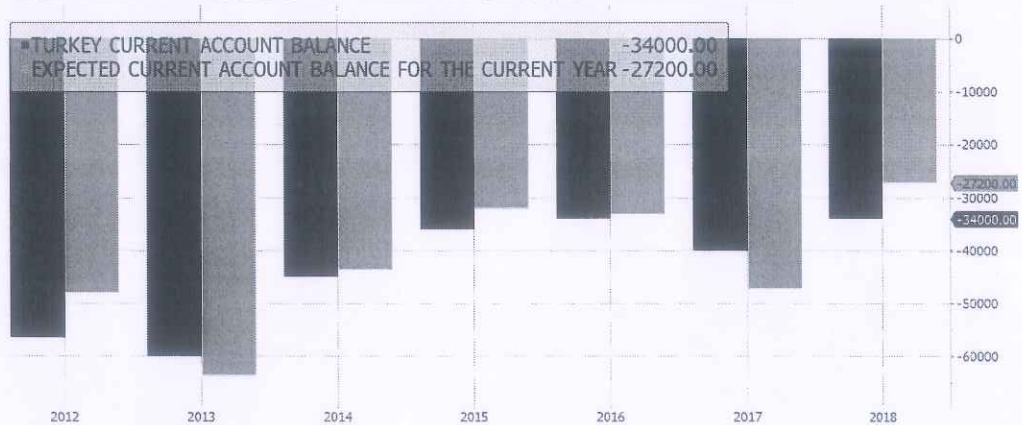
TRY has been losing value since 2013. So, the estimates were never wrong on an annual basis.

4.3. EXPECTATION OF THE CURRENT ACCOUNT BALANCE AND REALIZATION

The participants were asked about the current account balance at the end of the year and on the basis of the change in the median response on a monthly basis; the current account deficit was compared to the movement that occurred that month in the Central Bank’s Expectation Survey (2019). The relationship between the current situation realized on a monthly basis and the monthly situation in the current account was calculated.

Figure 4.3 Expectation of Current Account Balance

CURRENT ACCOUNT BALANCE&REALIZATIONS



Source: CBRT (2019)

All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of

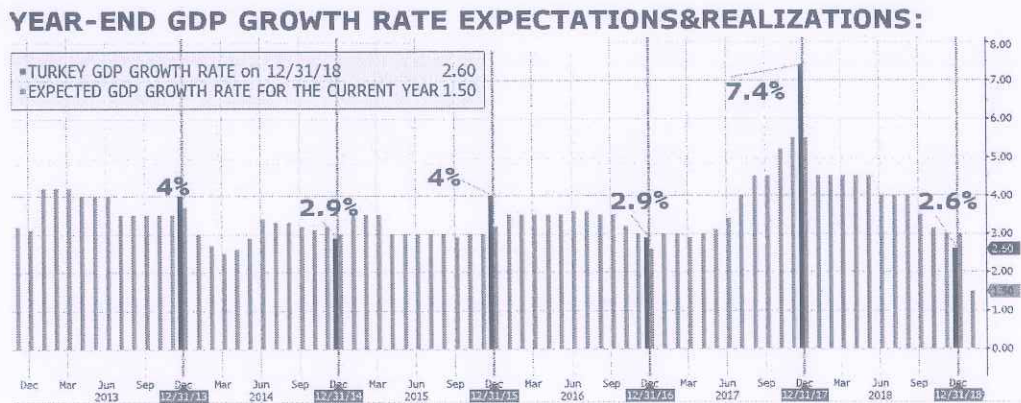
all the samples was found to be 7999.083333, Standard Deviation 6826.552624 and Normalized average result is 0.73207196.

After the global crisis, the composition of Turkey's growth became by growing current account deficit rather than budget deficit. In particular, as a result of the aggressive growth that continued until 2017, the current account deficit fed the external deficit due to our import-based production.

4.4. EXPECTATION OF GDP GROWTH RATE

The participants were asked about the GDP Growth Rate at the end of the year and on the basis of the change in the median response on a monthly basis; the GDP Growth Rate was compared to the movement that occurred that month. The relationship between the current situation realized on a monthly basis and the monthly situation in the GDP Growth Rate was calculated.

Figure 4.4 Year-End GDP Growth Rate



Source: TURKSTAT, CBRT (2019)

All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of

all the samples was found to be 1.116944444, Standard Deviation 1.213670534 and Normalized average result is 0.745239571.

After the global crisis, the composition of Turkey's growth became by growing current account deficit rather than budget deficit. In particular, as a result of the aggressive growth that continued until 2017, the current account deficit fed the external deficit due to our import-based production.

4.5. EXPORT EXPECTATIONS OF REAL SECTOR AND EXPORTS OF TURKEY

The real sector confidence index includes questions about the expectations of both domestic and foreign orders as well as price, cost, income and employment expectations of the companies operating in the manufacturing industry. In addition to providing information on economic activity and price developments, especially export expectations can produce very important signals for the coming period. The most important of these, falling export orders is an important leading indicator of both weakening external demand and the decrease in competitiveness in the currency. At the same time, its weakness may be due to geopolitical risks. To be an important pioneer indicator with an example; around the turn of 2002/03, manufacturers reported declining export orderbooks, signaling that the external sources of demand were waning. This development contributed to the renewed weakness in manufacturing activity in the first half of 2003. Weaker export orders reflected some deceleration in foreign demand, but also the impact on euro area price competitiveness of the past appreciation of the euro as well as the negative effect on trade related to geopolitical tensions and, in particular, the imminence of the conflict in Iraq (European Central Bank, 2004).

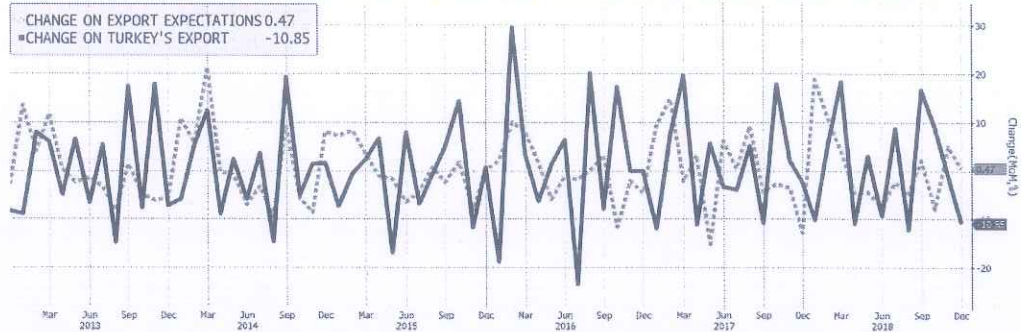
The purpose of the Business Tendency Statistics is to determine the of the senior managers, who shape the to reflect the short-term trends of the manufacturing

industry by monitoring their views and expectations for the future. To be able to predict the direction of economic activities by monitoring short-term trends in manufacturing industry produced in order. The difference between the percentage of the “more optimistic” (increased, will increase, more optimistic, above normal, improved) responses and the percentage of “more pessimistic” (decreased, will decrease, more pessimistic, below normal, deteriorated) responses given to the survey questions. The BTS is applied every month and consists of 28 questions in January, April, July and October. In the other months, a questionnaire consisting of 22 questions is used. In the questionnaire consisting of 22 questions, production, orders, employment, inventories, sales price, unit cost, capacity utilization rate, producer price inflation, loan interest rate and assessments of the overall course. In this context, 5 of the questions are present 15 of them are related to past and future trends and 2 of them are related to rate reporting. In the questionnaire, factors limiting production, production capacity level, production time of existing order records and 6 additional questions on competitiveness in Turkey and abroad. One of these questions is the others are related to the current situation and the determination of trends for the last three months. In this case The Real Sector Confidence Index acts as a summary indicator constructed by joint evaluation of the responses given to different questions of the BTS for the purpose of tracking general views of the real sector representatives about general economic outlook.

All goods subject to foreign trade (purchase / sale, exchange, free of charge) have value. In accordance with the World Trade Organization Appraisal Agreement (2019), the customs value is the transaction value of the good, ie the actual paid or payable value. Exports are evaluated according to FOB delivery type (delivery of goods on ship's deck), and imports are considered according to CIF delivery type (goods cost + freight + insurance).

Figure 4.5 Export Expectations of Reel Sector

REAL SECTOR'S EXPORT EXPECTATIONS&REALIZATIONS:



Source: TURKSTAT, Republic of Turkey Ministry of Trade (2019)

In this study, the realizations in the real sector's export expectations are as follows; Again, it was compared with the Turkish exports prepared by Turkey's Minister of Trade and published by TURKSTAT (2019).

Table 4.1 Confusion Matrix of Export Expectations

CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	17	20	Actual UP	19	19
Actual DOWN	15	19	Actual DOWN	9	12
Total	32	39	Total	28	31
Accuracy	0.507042254		Accuracy	0.525423729	
Misclassification Rate	0.492957746		Misclassification Rate	0.474576271	
Up Positive Rate	0.23943662		Up Positive Rate	0.322033898	
Down Positive Rate	0.267605634		Down Positive Rate	0.203389831	
Up Negative Rate	0.281690141		Up Negative Rate	0.322033898	
Down Negative Rate	0.211267606		Down Negative Rate	0.152542373	
Precision	0.459459459		Precision	0.500000000	
Prevalence	0.521126761		Prevalence	0.644067797	
Kuipers Score (Up Event)	-0.081081081		Kuipers Score (Up Event)	0	
Kuipers Score (Down Event)	0.117647059		Kuipers Score (Down Event)	0.142857143	

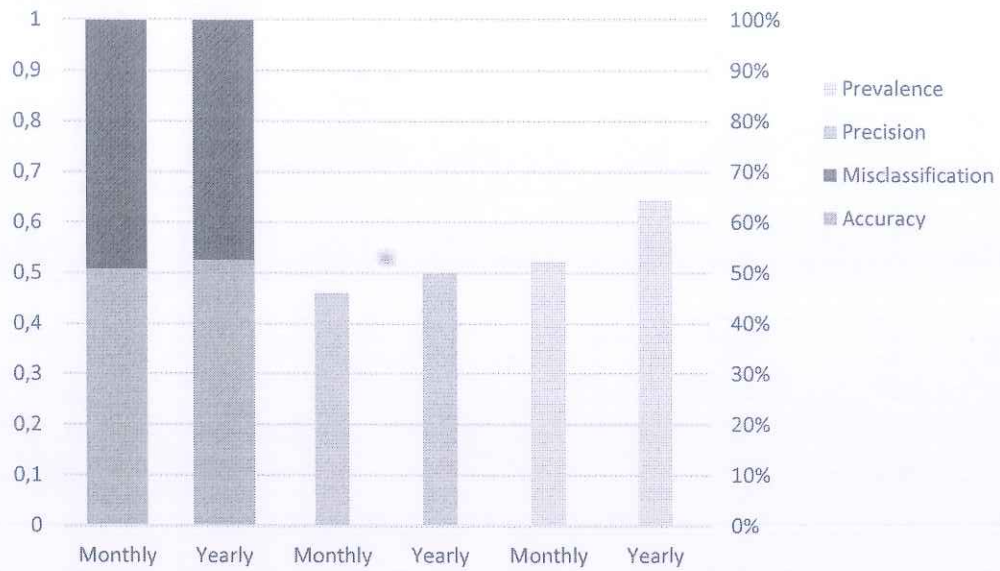
The relationship between the expectation of real sector and the realization of export numbers was calculated. All Expectation Surveys that ended in December

2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of all the samples was found to be 9,741296364.

On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual monthly results; Up-Up 17; Down-Down 19; Up-Down 15; Down-Up 20. Confusion Matrix's accuracy on a monthly basis is 0,507042254; misclassification rate 0,492957746; Up-Positive Rate 0.23943662; Down-Positive Rate 0.267605634; Up-Negative Rate 0.281690141; Down-Negative Rate 0.211267606. Precision 0.459459459; The prevalence 0.521126761. As a result, the Kuipers Score for Up Event -0.081081081 and for Down Event 0.117647059. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 36 times; and the number of False samples appeared 35 times.

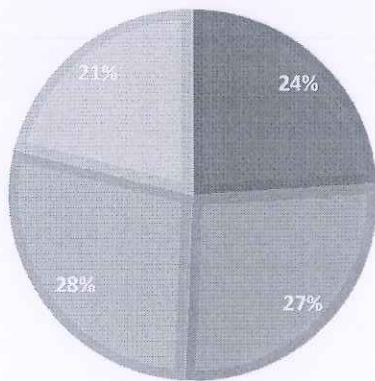
According to yearly results for Prediction-Actual annual results; Up-Up 19; Down-Down 12; Up-Down 9; Down-Up 19. Confusion Matrix's accuracy on a yearly basis is 0,525423729; misclassification rate 0,474576271; Up-Positive Rate 0.322033898; Down-Positive Rate 0.203389831; Up-Negative Rate 0.322033898; Down-Negative Rate 0.152542373. Precision 0,5; The prevalence 0.644067797. As a result, the Kuipers Score for Up Event 0 and for Down Event 0.142857143. On yearly basis; True result is 31 times; and the number of False samples appeared 28 times.

Figure 4.6 Distribution of Export Expectations' Confusion Matrix



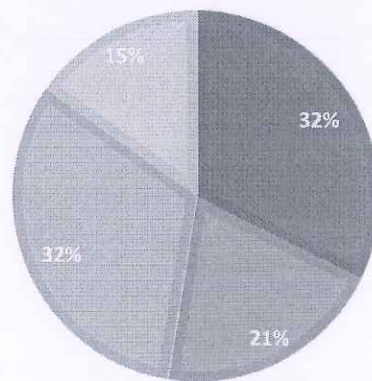
RATES MONTHLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



RATES YEARLY

Up Positive
 Down Positive
 Up Negative
 Down Negative

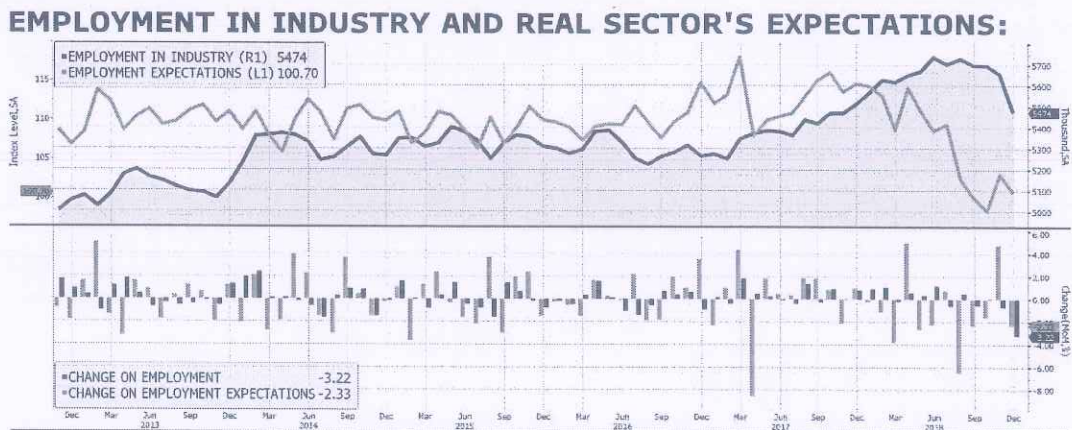


As a result of this analysis, accuracy was 0.507042254. This shows us that the results of the real sector participants are accurate in predicting the direction. The prevalence level was realized as 0.521126761 due to the fact that exports increased during the sampling period. The fact that the Turkish lira depreciated linearly during the sampling period had a positive impact on our exports.

4.6. THE EMPLOYMENT EXPECTATIONS OF REAL SECTOR AND EMPLOYMENT OF INDUSTRY

Business Tendency Survey is organized by the Central Bank of the Republic of Turkey (2019). With the Business Tendency Statistics, it is aimed to produce indicators that will reflect the trends of the manufacturing industry in the short term by monitoring the evaluations of the senior managers of the enterprises operating in the manufacturing industry about their recent and current situation and their expectations for the future. The Real Sector Confidence Index is a part of the Business Tendency Survey.

Figure 4.7 Employment Expectations of Real Sector



Source: CBRT, TURKSTAT (2019)

Within the Business Tendency Survey, participants are asked about their employment expectations for the next three months. This question is one of the main index questions. The value used in the analysis is a comparison of the equilibrium value in the answer to this question and the change in the number of people employed in the industrial sector.

Table 4.2 Confusion Matrix of Employment Expectations

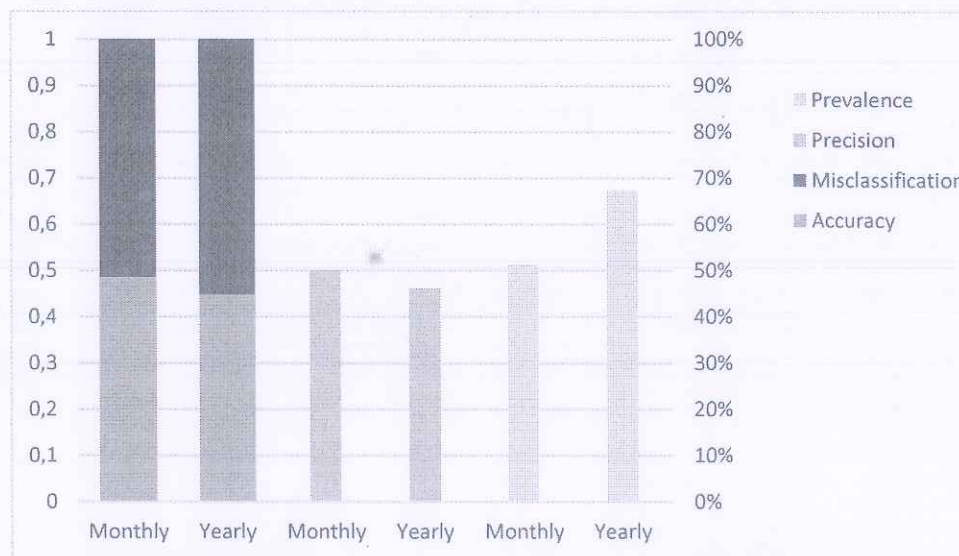
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	18	18	Actual UP	18	21
Actual DOWN	18	16	Actual DOWN	11	8
Total	36	34	Total	29	29
Accuracy	0.485714286		Accuracy	0.448275862	
Misclassification Rate	0.514285714		Misclassification Rate	0.551724138	
Up Positive Rate	0.257142857		Up Positive Rate	0.310344828	
Down Positive Rate	0.228571429		Down Positive Rate	0.137931034	
Up Negative Rate	0.257142857		Up Negative Rate	0.362068966	
Down Negative Rate	0.257142857		Down Negative Rate	0.189655172	
Precision	0.500000000		Precision	0.461538462	
Prevalence	0.514285714		Prevalence	0.672413793	
Kuipers Score (Up Event)	0		Kuipers Score (Up Event)	-0.076923077	
Kuipers Score (Down Event)	-0.058823529		Kuipers Score (Down Event)	-0.157894737	

The relationship between the employment expectation over next three months of real sector and the employment in industry was calculated. All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of all the samples was found to be, the MAE result of all the samples was found to be 2.100294861 for monthly.

On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual monthly results; Up-Up 18; Down-Down 16; Up-Down 18; Down-Up 18. Confusion Matrix's accuracy on a monthly basis is 0.485714286; misclassification rate 0.514285714; Up-Positive Rate 0.257142857; Down-Positive Rate 0.228571429; Up-Negative Rate 0.257142857; Down-Negative Rate 0.257142857. Precision 0.5; The prevalence 0.514285714. As a result, the Kuipers Score for Up Event is 0 and for Down Event is -0.058823529. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 34 times; and the number of False samples appeared 37 times.

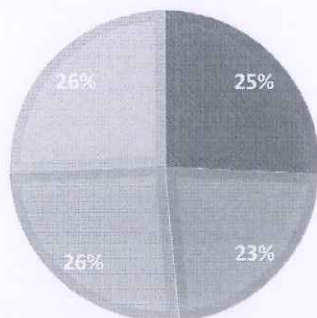
According to yearly results; MAE is 4.42432901. Prediction-Actual annual results; Up-Up 18 Down-Down 8; Up-Down 11; Down-Up 21. Confusion Matrix's accuracy on a yearly basis is 0.448275862; misclassification rate 0.551724138; Up-Positive Rate 0.310344828; Down-Positive Rate 0.137931034; Up-Negative Rate 0.362068966; Down-Negative Rate 0.189655172. Precision 0.461538462; The prevalence 0.672413793. As a result, the Kuipers Score for Up Event -0.076923077 and for Down Event -0.157894737. On yearly basis; True result is 27 times; and the number of False samples appeared 33 times.

Figure 4.8 Distribution of Employment Expectations' Confusion Matrix



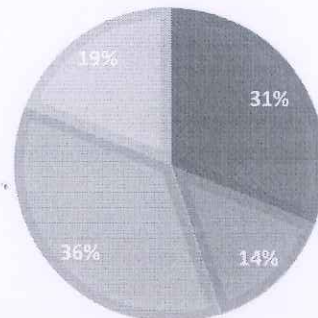
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



Within this survey, the total employment expectation of the real sector for the next three months is asked. The expectation here was compared with adjusted industrial employment, but the values did not yield healthy results both on annual and monthly basis and Kuipers score was close to 0. Within this survey, the industrial sector is not a healthy predictor of employment. The purpose of the comparison with the industrial sector is that the real sector confidence index survey is based on the expectations of the top managers of the establishments operating in the manufacturing industry. However, after August 2018, the index value decreases regularly on a monthly basis. August 2018 is the date when the USD/TRY has risen twice due to the deterioration in relations with the United States. The sharp rise in the exchange rate also deteriorated the expectations as it affected other macroeconomic indicators and micro-scale costs of companies in a negative way.

In this study, determinants of unemployment in Turkey have been investigated with the help of Johansen Co-integration Method by using the data 2000:Q1-2011Q1 period. According to the findings a co-integration relationship has been identified among variables. Increases in confidence index of real sector reduce unemployment rate as expected, but increases in the number of collective bargaining agreements raise unemployment rate. When it is looked at Error Correction term (ECt-1); it is statistically significant and negative. With reference to this result approximately 23% of deviations from long-run equilibrium value eliminate in each period. According to the results of this study; unemployment is effected by the future expectations of real sector and the attitude of the union about worker's wage in Turkey. Optimistic case of real sector's future expectation depends on mostly economic stability; If the economic stability ensured, investments would rise and employment opportunities would increase in parallel with this. Furthermore trade union's tend to targets for increased employment is considered as an important factor in reducing unemployment. But in fact, trade unions often tend to deal about wages, it is possible to say this case is created by conjuncture of global economic crisis (Peker and Bölükbaş, 2012).

4.7. REAL SECTOR CONFIDENCE INDEX AND CHANGE ON FOREIGN CURRENCY DEPOSIT ACCOUNTS

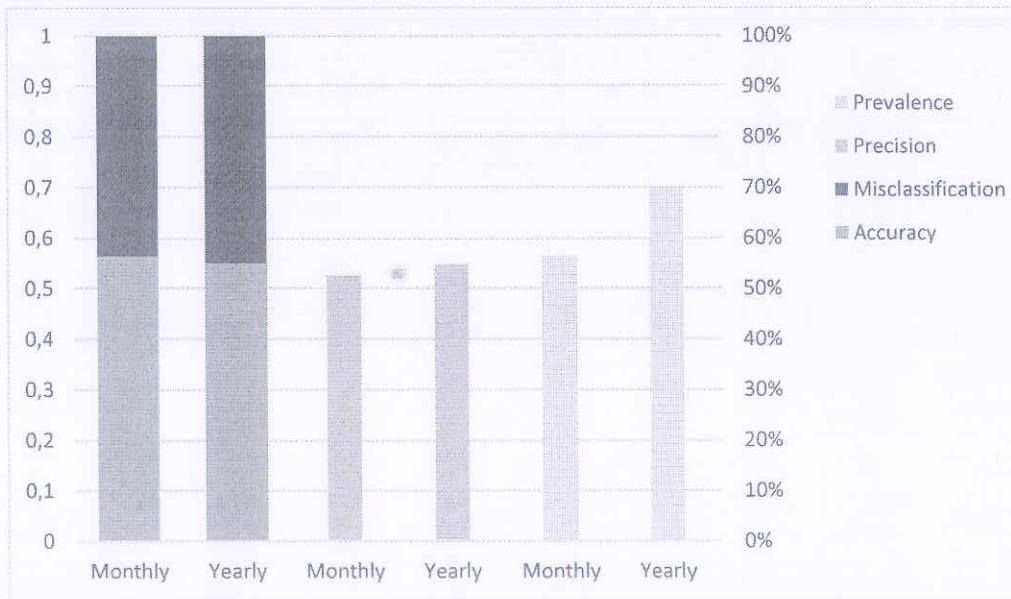
Many central banks around the world aim to gather information about the economic outlook by gathering regional and sectoral expectations. Since the 1970s, the Federal Reserve (2019) has applied the Beige Book. An example is the Agents Survey, which has been conducted since 1997 by the Bank of England (2019). Likewise, Bank of Canada, Norges Bank, Sveriges Riksbank and Swiss National Bank conduct surveys with sector representatives to get information about the economic outlook.

Total order quantity, finished goods stock quantity; production volume, total employment expectations and export order quantity for the next three months; total order quantity for the last three months; for fixed capital investment expenditures and general courses are the sub-indices forming the Real Sector Index. In this analysis, the relationship between Real Sector Confidence Index and dollarization is discussed. For the dollarization statement used here, the foreign currency deposit accounts of legal entities were analyzed through weekly money and bank statistics published by the CBRT (2019) weekly. Since the real sector confidence index is announced monthly, the data of the last week of foreign currency deposit accounts are used.

Table 4.3 Confusion Matrix of Real Sector Confidence

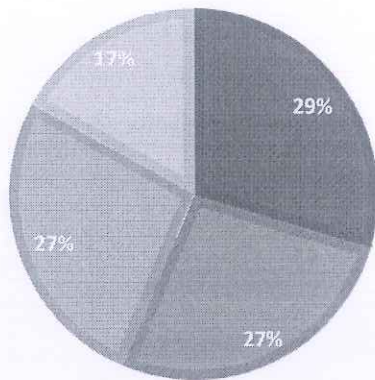
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	21	19	Actual UP	23	19
Actual DOWN	12	19	Actual DOWN	8	10
Total	33	38	Total	31	29
Accuracy	0,563380282		Accuracy	0,55	
Misclassification Rate	0,436619718		Misclassification Rate	0,45	
Up Positive Rate	0,295774648		Up Positive Rate	0,383333333	
Down Positive Rate	0,267605634		Down Positive Rate	0,166666667	
Up Negative Rate	0,267605634		Up Negative Rate	0,316666667	
Down Negative Rate	0,169014085		Down Negative Rate	0,133333333	
Precision	0,525		Precision	0,547619048	
Prevalence	0,563380282		Prevalence	0,7	
Kuipers Score (Up Event)	0.05		Kuipers Score (Up Event)	0.095238095	
Kuipers Score (Down Event)	0.225806452		Kuipers Score (Down Event)	0.111111111	

Figure 4.9 Distribution of Real Sector Confidence Confusion Matrix



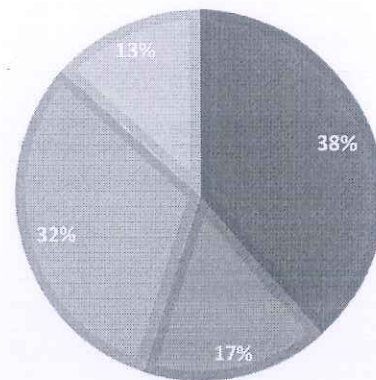
RATES MONTHLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



RATES YEARLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



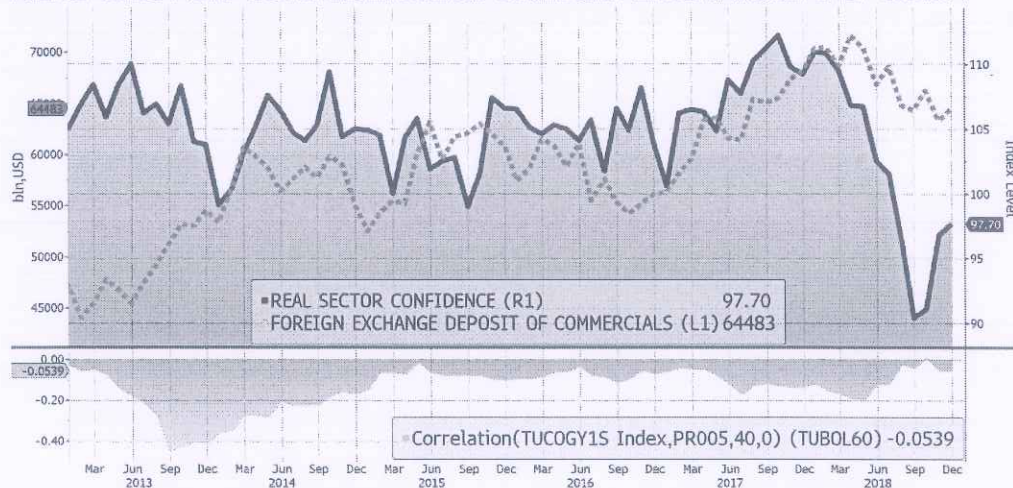
The relationship between the Real Sector Confidence Index and Change on Foreign Currency Deposit Accounts was calculated. All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of all the samples was found to be, the MAE result of all the samples was found to be 3.302851124 for monthly.

On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual monthly results; Up-Up 21; Down-Down 19; Up-Down 12; Down-Up 19. Confusion Matrix's accuracy on a monthly basis is 0.563380282; misclassification rate 0.436619718; Up-Positive Rate 0.295774648; Down-Positive Rate 0.267605634; Up-Negative Rate 0.267605634; Down-Negative Rate 0.169014085. Precision 0.525; The prevalence 0.563380282. As a result, the Kuipers Score for Up Event is 0.05 and for Down Event is 0.225806452. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 40 times; and the number of False samples appeared 31 times.

According to yearly results; MAE is 11.75204847. Prediction-Actual annual results; Up-Up 23 Down-Down 10; Up-Down 8; Down-Up 19. Confusion Matrix's accuracy on a yearly basis is 0.55; misclassification rate 0.45; Up-Positive Rate 0.383333333; Down-Positive Rate 0.166666667; Up-Negative Rate 0.316666667; Down-Negative Rate 0.133333333. Precision 0.547619048; The prevalence 0.7. As a result, the Kuipers Score for Up Event 0.095238095 and for Down Event 0.111111111. On yearly basis; True result is 33 times; and the number of False samples appeared 27 times.

Figure 4.10 Dollarization of Real Sector

REAL SECTOR CONFIDENCE&FOREIGN EXCHANGE DEPOSIT:



Source: CBRT, TURKSTAT (2019)

The results of the analysis show that both accuracy and misclassification rate are very close to each other. The Kuipers score is therefore close to zero. The realization of the real sector dollarization is not related to the general economic situation expectations. However, regardless of the course of the real sector confidence index, foreign exchange deposits of legal entities increased on a monthly basis in election of 2017 and recurred election in November 2015.

CHAPTER V COMPARISON OF PREDICTIONS AND REALIZATIONS ON TENDENCY SURVEYS OF TURKSTAT

5.1. THE PROBABILITY OF BUYING OR BUILDING A HOME AND HOME SALES

In this section, in the Consumer Confidence Index prepared by TURKSTAT, the optimism / pessimism is based on the answers to the question "Buying or building housing in the next 12 months" directed to the participants; whether it is reflected in the housing sales data announced by TURKSTAT (2019). This question was directed to the named by "Expenditure and Saving Tendencies" sub-indices forming the Consumer Confidence Index. Balance value is obtained by taking the percentage difference between the positive and negative answers given.

Figure 5.1 Probability of Buying Home



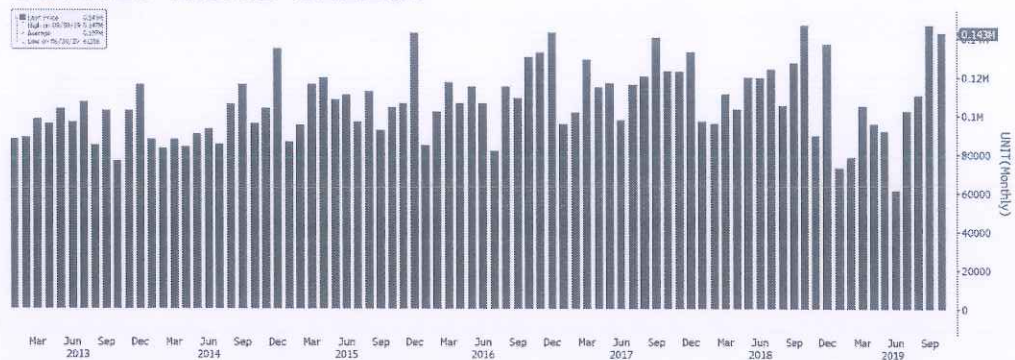
Source: TURKSTAT (2019)

Housing sales data used for benchmarking is also published by TURKSTAT. Between 2008 and 2012, the residences that were subject to sale in provincial centers and central districts were published at the provincial level on a quarterly basis. As of 2013, data has been published at provincial level to include all settlements. 2013 is the starting date of the comparison in order to keep the scope of the data wide. General Directorate of Land Registry and Cadastre, Land Registry

and Cadastre Information System - TAKBIS database was used as a data source in TURKSTAT data which can be seen on Figure 5.2.

Figure 5.2 Turkey Home Sales

TURKEY HOME SALES:



Source: TURKSTAT (2019)

According to TURKSTAT considered in detail the reasons for obtaining housing in Turkey has been the subject of sales. Reasons for acquiring housing;

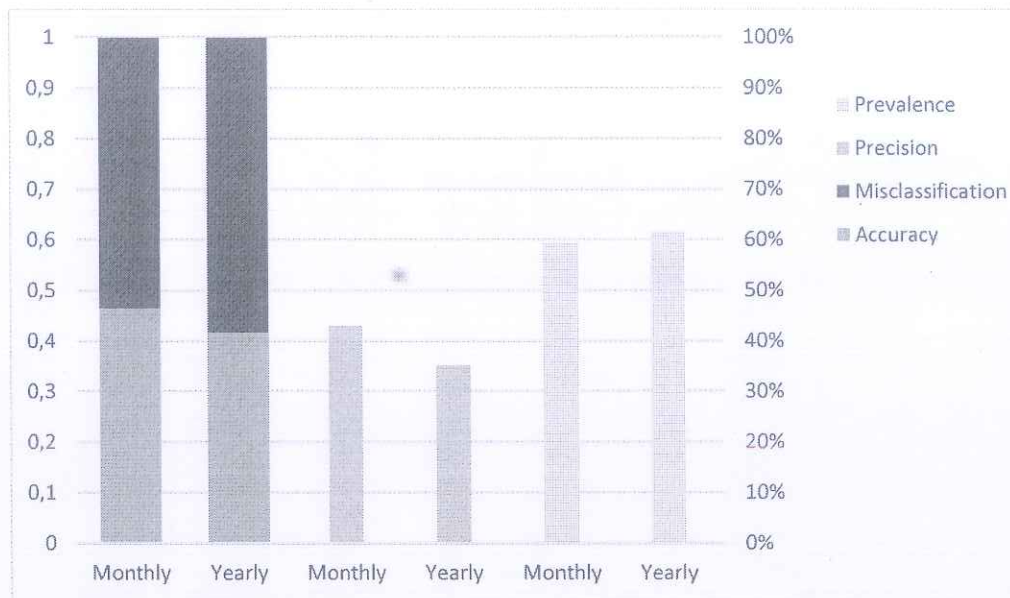
1. Sales
2. Mortgaged sales
3. Assignment for the 3rd floor
4. Sale of the shares of the real estate in the condominium / easement properties
5. Sale by court order
6. Assignment of shares by sale
7. Saving property of persons under guardianship
8. Sale of naked property and transfer of usufruct to third party
9. Sale of bare property holding on usufruct right
10. Subsidiary and shareholding

transactions are included in the scope. All house-to-person, person-to-institution, institution-to-person and institution-to-institution housing transactions are also included if a monetary transaction has been carried out.

Table 5.1 Confusion Matrix of Probability of Buying Home

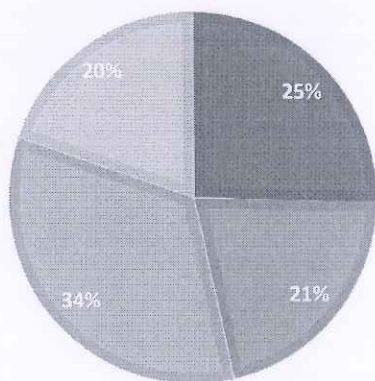
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	18	24	Actual UP	13	24
Actual DOWN	14	15	Actual DOWN	11	12
Total	32	39	Total	24	36
Accuracy	0,464788732		Accuracy	0,416666667	
Misclassification Rate	0,535211268		Misclassification Rate	0,583333333	
Up Positive Rate	0,253521127		Up Positive Rate	0,216666667	
Down Positive Rate	0,211267606		Down Positive Rate	0,2	
Up Negative Rate	0,338028169		Up Negative Rate	0,4	
Down Negative Rate	0,197183099		Down Negative Rate	0,183333333	
Precision	0,428571429		Precision	0,351351351	
Prevalence	0,591549296		Prevalence	0,616666667	
Kuipers Score (Up Event)	-0.142857143		Kuipers Score (Up Event)	-0.297297297	
Kuipers Score (Down Event)	0.034482759		Kuipers Score (Down Event)	0.043478261	

Figure 5.3 Distribution of Home Sales Probability Confusion Matrix



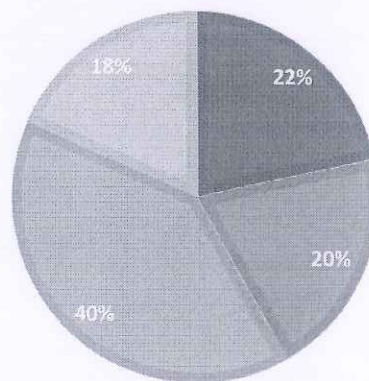
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



The relationship between the Probability of Buying or Building a Home realized on a monthly basis and the and Home Sales was calculated. All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 72 samples were analyzed, the MAE result of all the samples was found to be 20,39775724; SQRT was determined as 20,39775724. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the

calculation of Kuipers Score. Prediction-Actual results; Up-Up 18; Down-Down 15; Up-Down 14; Down-Up 24. Confusion Matrix's accuracy on a monthly basis is 0,464788732; misclassification rate 0,535211268; Up-Positive Rate 0,253521127; Down-Positive Rate 0,211267606; Up-Negative Rate 0,338028169; Down-Negative Rate 0,197183099. Precision 0,428571429; The prevalence 0,591549296. As a result, the Kuipers Score for Up Event is -0.142857143 and for Down Event is 0.034482759. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 33 times; and the number of False samples appeared 38 times.

According to yearly results; MAE is 20,9564411; SQRT is 20,9564411. Prediction-Actual results; Up-Up 13; Down-Down 12; Up-Down 11; Down-Up 24. Confusion Matrix's accuracy on a yearly basis is 0,416666667; misclassification rate 0,583333333; Up-Positive Rate 0,216666667; Down-Positive Rate 0,200000000; Up-Negative Rate 0,400000000; Down-Negative Rate 0,183333333. Precision 0,351351351; The prevalence 0,616666667. As a result, the Kuipers Score for Up Event is -0.297297297 and for Down Event is 0.043478261. On yearly basis; True result is 25 times; and the number of False samples appeared 35 times.

As a result of the analysis, it has been found that the consumer's success in estimating the consumer confidence index is very weak. Up negative and down negative rates have been found quite weak, even in the direction of estimators' tendency to buy house.

5.2. THE PROBABILITY OF BUYING AUTOMOTIVE

In the Consumer Confidence Index which is conducted by TURKSTAT (2019), participants were asked about the possibility of buying a car in the next 12 months and a comparison was made with the retail sales figures announced by the automotive distributors' association. Monthly and yearly changes in the probability of buying automobiles which is one of the sub-indices of the consumer confidence

index, were compared with the changes in retail sales figures (ODD, 2019) which are can be seen on Figure 5.4 and Figure 5.5.

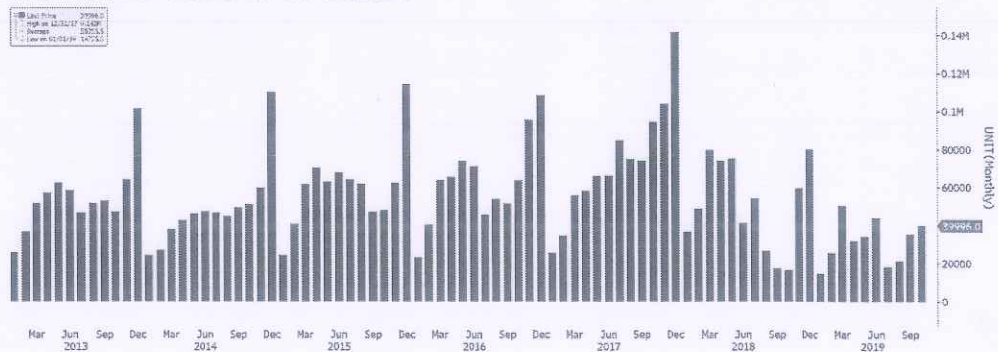
Figure 5.4 The Probability of Buying Automotive



Source: ODD, TURKSTAT (2019)

Figure 5.5 Turkey Auto Sales

TURKEY AUTO SALES:



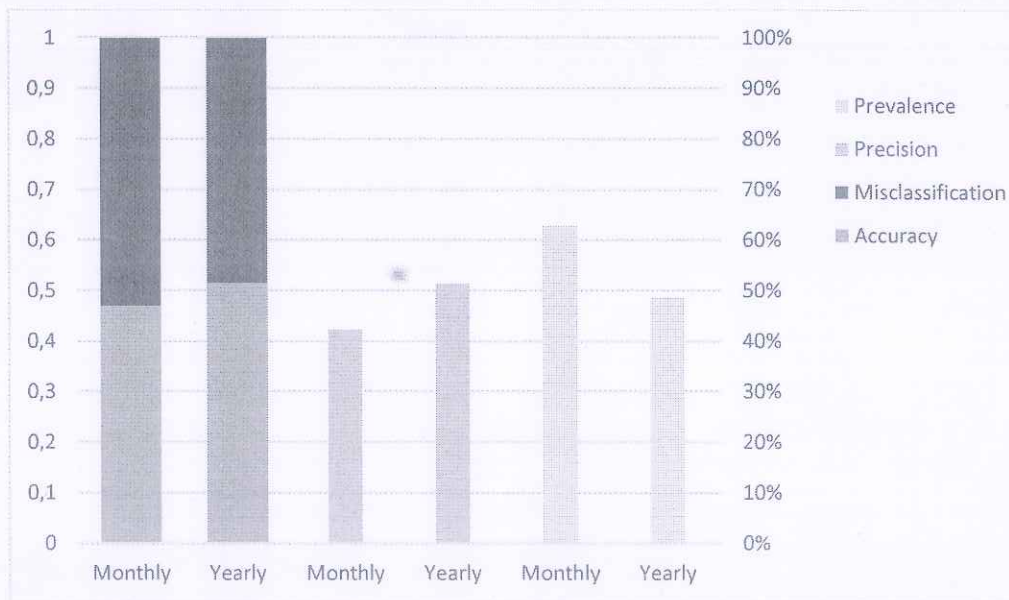
Source: ODD, TURKSTAT (2019)

The Confusion Matrix' distribution which shows the relationship between the probability of buying auto and the realization of auto sales month by month can be seen on Figure 5.6.

Table 5.2 Confusion Matrix of Probability of Buying Automotive

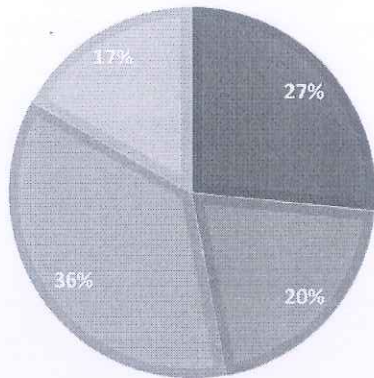
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	22	30	Actual UP	18	17
Actual DOWN	14	17	Actual DOWN	18	19
Total	36	47	Total	36	36
Accuracy	0,469879518		Accuracy	0,513888889	
Misclassification Rate	0,530120482		Misclassification Rate	0,486111111	
Up Positive Rate	0,265060241		Up Positive Rate	0,250000000	
Down Positive Rate	0,204819277		Down Positive Rate	0,263888889	
Up Negative Rate	0,361445783		Up Negative Rate	0,236111111	
Down Negative Rate	0,168674699		Down Negative Rate	0,25	
Precision	0,4230769		Precision	0,5142857	
Prevalence	0,6265060		Prevalence	0,4861111	
Kuipers Score (Up Event)	-0.153846154		Kuipers Score (Up Event)	0.028571429	
Kuipers Score (Down Event)	0.096774194		Kuipers Score (Down Event)	0.027027027	

Figure 5.6 Distribution of Automotive Sales Probability Confusion Matrix



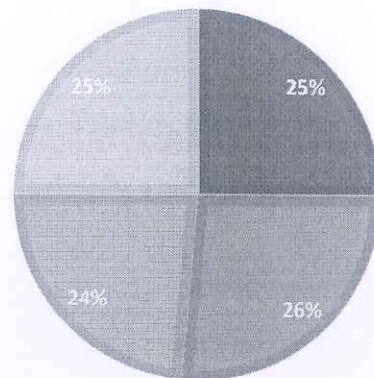
RATES MONTHLY

Up Positive Down Positive
 Up Negative Down Negative



RATES YEARLY

Up Positive Down Positive
 Up Negative Down Negative



All Expectation Surveys that ended in December 2018 from January 2012 were included in the sample. When 84 samples were analyzed, the MAE result of all the samples was found to be 29,87707147; SQRT was determined as 29,87707147. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 22; Down-Down 17; Up-Down 14; Down-Up 30. Confusion Matrix's accuracy on a monthly basis is 0,469879518; misclassification rate 0,530120482; Up-Positive Rate 0,265060241; Down-Positive Rate 0,204819277; Up-Negative Rate 0,361445783; Down-Negative Rate 0,168674699. Precision 0,4230769; The prevalence 0,6265060. As a result, the Kuipers Score for Up Event is -0.153846154 and for Down Event is 0.096774194. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 39 times; and the number of False samples appeared 44 times.

According to yearly results; MAE is 25,36468778; SQRT is 25,36468778. The Prediction-Actual results; Up-Up 18; Down-Down 19; Up-Down 18; Down-Up 17. Confusion Matrix's accuracy on a yearly basis is 0,513888889; misclassification rate 0,486111111; Up-Positive Rate 0,250000000; Down-Positive

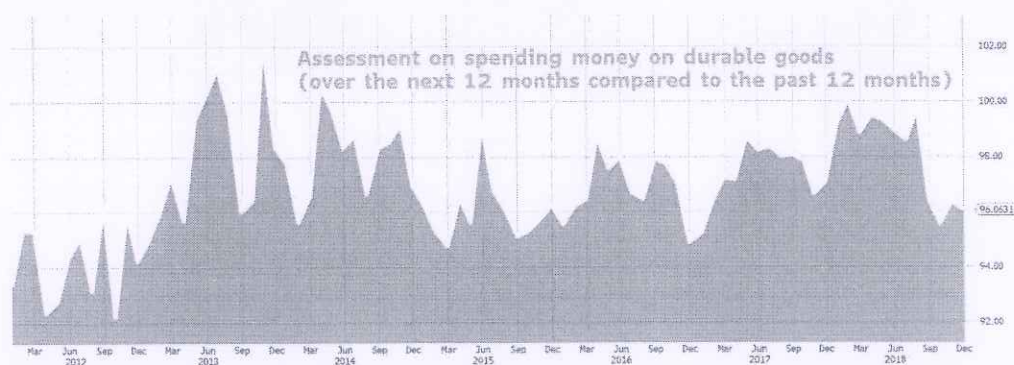
Rate 0,263888889; Up-Negative Rate 0,236111111; Down-Negative Rate 0,25. Precision 0,5142857; The prevalence 0,4861111. As a result, the Kuipers Score for Up Event is 0.028571429 and for Down Event is 0.027027027. On yearly basis; True result is 37 times; and the number of False samples appeared 35 times.

However, the results do not produce healthy results both on a monthly and yearly basis and the results are show parallelism with the housing sales figures.

5.3. ASSESSMENT ON SPENDING MONEY ON DURABLE GOODS AND SALES OF DURABLE GOODS

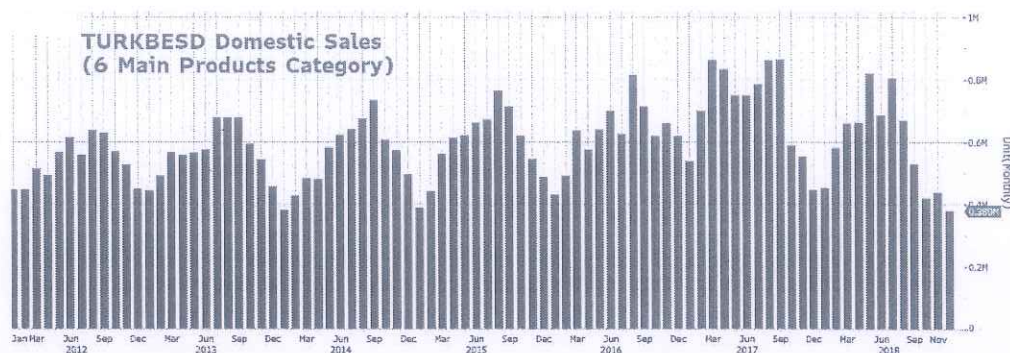
Durable goods are one of the most important parts of the business cycle in terms of investment, production and consumption. Domestic consumption is the most important component in the growth of almost every country, and academic studies place great emphasis on durable consumer goods, which are the largest share of domestic consumption by expenditures. In the times of global economic crisis, households were worried that the level of income would fall, and even if they needed it, they had to postpone their spending on durable goods.

Figure 5.7 Probability of Buying Durable Goods



Source: TURKBESD, TURKSTAT (2019)

Figure 5.8 Domestic Sales of Durable Goods



Source: TURKBESD (2019)

Household spending on durable goods is the part of private consumption that is most sensitive to the business cycle. Private consumption encompasses services, non-durable goods, semi-durable goods and durable goods. Durable goods typically have an expected lifetime of more than three years, whereas semi-durables and non-durables have a shorter lifetime.¹² Households do not derive utility directly from spending on durable goods in the current period, but rather from the flow of services they provide over their lifetime. As a result, the consumption of durable goods is more sensitive to the business cycle. Households may temporarily reduce these purchases when their income falls, without any great reduction in utility in the short term. When their income recovers, they can then resume their purchases again in order to offset earlier losses in their stock of durables.¹³ In addition, durable goods also have a greater tendency to be financed using credit, owing to their high unit value and their longer lifetime. The high unit value of durable goods means that current income may not be sufficient, so households may need credit to finance them (European Central Bank, 2018).

Durable consumer goods as stated in the article of the European Central Bank; It is one of the most important parts of the business cycle due to its ability to represent both confidence and consumption and indirect credit growth from consumption and production due to demand. This is the white goods segment of durable consumer goods. Durable goods or durables are goods such as televisions,

white goods and furniture or cars which are expected to last a long time, and are bought infrequently.

In the article of the Australian central bank examines the relationship between durable consumer goods and the economic business cycle; Globally, measures of consumer and business confidence fell in late 2007 and 2008 in an environment of increased uncertainty and higher risk aversion. Consistent with the pattern in the long-run data, spending on consumer durables fell more sharply than spending on non-durable goods and services. The falls in confidence also contributed to the decline in global industrial that took place. In line with softer global demand for consumer durables and capital equipment, the largest declines in production were for these goods and there was a large contraction in world trade. Economies that are large producers and exporter of durable goods tended to be significantly affected by the sharp fall in durables spending. For example, exports from east Asia (excluding Japan and China) declined by around 20 per cent during 2008. In addition to uncertainty, tighter access to various forms of credit also seems to have been a factor in the declines in production and international trade (Central Bank of Australia, 2010)

Each question constituting the consumer confidence index is created by balancing method in accordance with the European Union standards. The answer to each question; it is calculated according to the balancing method by looking at whether it is negative or positive. The diffusion balance is added to the weight of 100 for each question. The Consumer Confidence Index, which is the index itself, is calculated by taking the weighted average of the sub-items of the index in diffusion indices.

TURKSTAT of the questions to the participants in the monthly Consumer Confidence Index, which was organized, is asking the likelihood of durable goods in the next 12 months which can be seen on Figure 5.7.

If compared here; in the Consumer Confidence Index, the participants were asked "Do you plan to buy durable goods in the next 12 months?" the monthly and annual changes in the answers given to the question; Comparison of monthly and annual changes in white goods sales provided by Turkey in White Goods Suppliers Association (TURKBESD) which can be seen on Figure 5.8. More positive answers to this question asked in consumer confidence index; TURKBESD data is reflected in the number of sales of white goods are asked to answer.

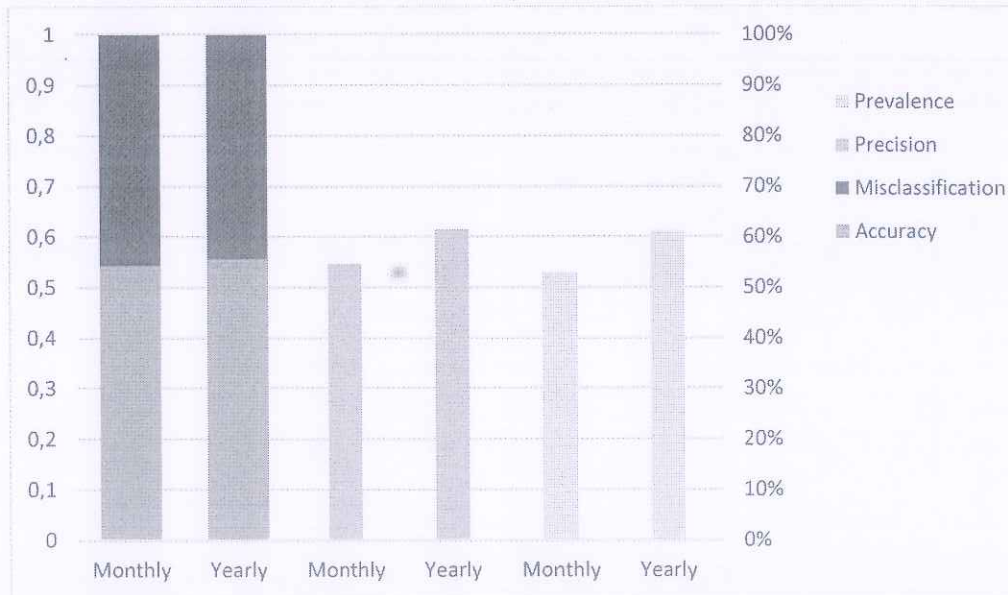
Short name TURKBESD White Goods Industrialists Association of Turkey, which, together with the arrival of the industry's leading white goods company in 1986. White Goods Industrialists Association was established. In 1999, the association of the European Union sector apex organization for which APPLIA (Home Appliance Europe) or the Council of Ministers decision on the fact that members have received permission to use Turkey name for TURKBESD has changed its name. The Association currently has 7 members: Arçelik, B/S/H, Candy Group, Demirdöküm, Electrolux, Silverline and Vestel.

The association represents approximately 90-91% of the sector. Besides, TURKBESD met the manufacturer of home appliances in the EU decision, which is a platform in which APPLIA represents Turkey. The studies within the EU are carried out through this membership and the expert technical personnel of the member companies take part in the technical committee works of the said organization.

Table 5.3 Confusion Matrix of Probability of Buying Durable Goods

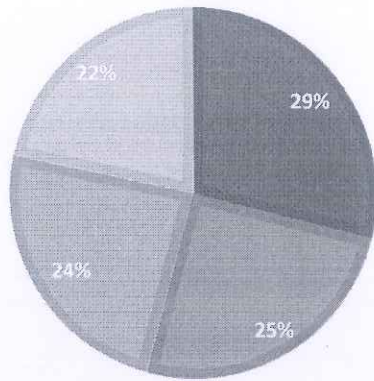
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	24	20	Actual UP	27	17
Actual DOWN	18	21	Actual DOWN	15	13
Total	42	41	Total	42	30
Accuracy	0,542168675		Accuracy	0,555555556	
Misclassification Rate	0,457831325		Misclassification Rate	0,444444444	
Up Positive Rate	0,289156627		Up Positive Rate	0,375000000	
Down Positive Rate	0,253012048		Down Positive Rate	0,180555556	
Up Negative Rate	0,240963855		Up Negative Rate	0,236111111	
Down Negative Rate	0,21686747		Down Negative Rate	0,208333333	
Precision	0,5454545		Precision	0,6136364	
Prevalence	0,5301205		Prevalence	0,6111111	
Kuipers Score (Up Event)	0.090909091		Kuipers Score (Up Event)	0,227272727	
Kuipers Score (Down Event)	0.076923077		Kuipers Score (Down Event)	-0,071428571	

Figure 5.9 Distribution of Durable Goods Sale Probability Confusion Matrix



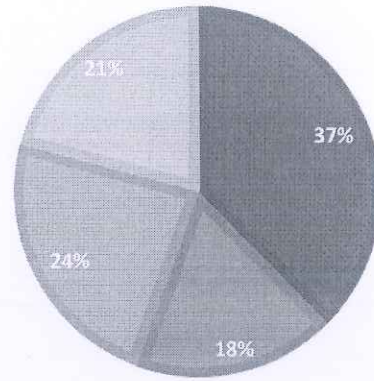
RATES MONTHLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



RATES YEARLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



The relationship between the current situation realized on a monthly basis and the monthly situation in the consumer price index was calculated. All Expectation Surveys that ended in December 2018 from January 2013 were included in the sample. When 84 samples were analyzed, the MAE result of all the samples was found to be 11,33568444; SQRT was determined as 11,33568444. When we look at the annual changes in responses and data of TURKBESD, MAE is 12,46994432; SQRT was performed at 12,47.

On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score based on TURKBESD data. Prediction-Actual monthly results; Up-Up 24, Down-Down 21, Up-Down 18 and Down-Up 20. Confusion Matrix's accuracy on a monthly basis is 0,542168675; misclassification rate 0,457831325; Up-Positive Rate 0,289156627; Down-Positive Rate 0,253012048; Up-Negative Rate 0,240963855; Down-Negative Rate 0,21686747. Precision 0,5454545; The prevalence 0,5301205. As a result, the Kuipers Score calculated as 0,090909091 (Up Event) and 0,076923077 (Down Event). If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 45 times; and the number of

False samples appeared 38 times. For this case, participants were asked for the current month; so annual bases are not meaningful.

Prediction-Actual annual results; Up-Up 27, Down-Down 13, Up-Down 15 and Down-Up 17. Confusion Matrix's accuracy on a monthly basis is 0,555555556; misclassification rate 0,444444444; Up-Positive Rate 0,375; Down-Positive Rate 0,180555556; Up-Negative Rate 0,236111111; Down-Negative Rate 0,208333333. Precision 0,6136364; The prevalence 0,6111111. As a result, the Kuipers Score calculated as 0,227272727 (Up Event) and -0,071428571 (Down Event). If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 40 times; and the number of False samples appeared 32 times.

As a result of the analysis, it has been found that the consumer's success in estimating the consumer confidence index is very weak. Up negative and down negative rate have been found quite weak, even in the direction of estimators' tendency to buy durable goods.

5.4. NUMBER OF PEOPLE UNEMPLOYED EXPECTATION AND UNEMPLOYMENT

Household Labor Force Survey has been being regularly implemented since 1988 by TURKSTAT (2019). Household Labor Force Survey of persons employed defined by economic activity, occupation (or employment), job status and working time; unemployed is applied in order to compile information about the duration of the job search and the profession and the similar characteristics they are looking for.

In order to be considered unemployed, one is expected to meet all of the following criteria: over 15 aged, non-employed (for no profit, casual, paid or unpaid), used at least one of the job search channels in the last 4 weeks to look for

a job, able to start working in 2 weeks. Prior to 2014, last 3 months was used instead of last 4 weeks as the reference period.

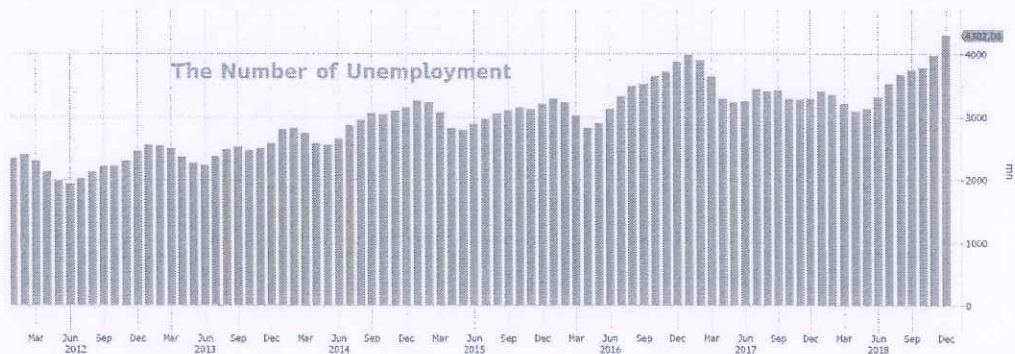
In addition, those who have found a job or started their own business within three months but are waiting to complete their various shortcomings to get started or work are also included in the unemployed population.

Figure 5.10 Number of Unemployed Expectation



Source: TURKSTAT (2019)

Figure 5.11 The Number of Unemployment



Source: TURKSTAT (2019)

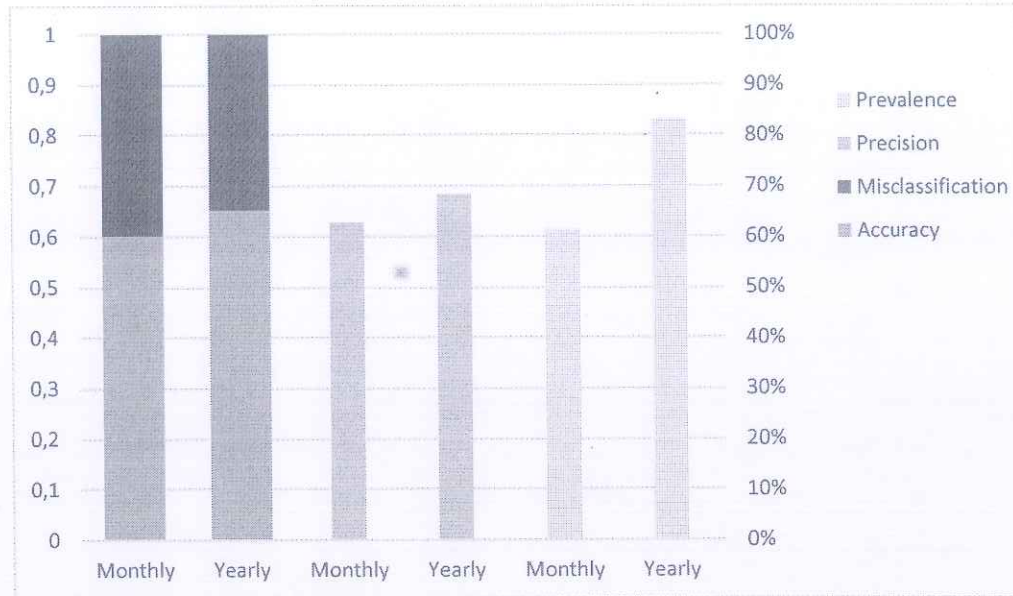
The aim of this study; In the Consumer Confidence Index, the question of Expectation (TURKSTAT, 2019) of the number of unemployed persons in the next 12 months is to measure whether there is an increase in the number of unemployed

persons by looking at the results of the Household Labor Force Survey which is shown by graph on Figure 5.10. This question asked in Consumer Confidence Index; reverse direction. In the tendency question how negative the answer is; the decrease in the number of unemployed shows the expected or vice versa. here, in order to measure the trend correctly, the index for the number of unemployed in the Consumer Confidence Index was multiplied by -1.

Table 5.4 Confusion Matrix of Probability of Unemployment

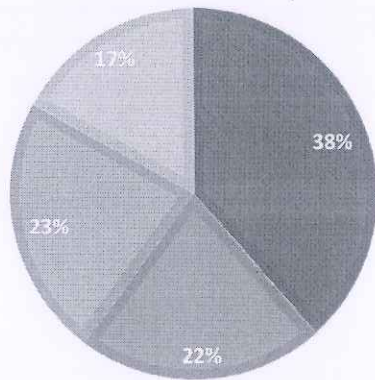
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	32	19	Actual UP	41	19
Actual DOWN	14	18	Actual DOWN	6	6
Total	46	37	Total	47	25
Accuracy	0,602409639		Accuracy	0,652777778	
Misclassification Rate	0,397590361		Misclassification Rate	0,347222222	
Up Positive Rate	0,385542169		Up Positive Rate	0,569444444	
Down Positive Rate	0,21686747		Down Positive Rate	0,083333333	
Up Negative Rate	0,228915663		Up Negative Rate	0,263888889	
Down Negative Rate	0,168674699		Down Negative Rate	0,083333333	
Precision	0,6274510		Precision	0,6833333	
Prevalence	0,6144578		Prevalence	0,8333333	
Kuipers Score (Up Event)	0.254901961		Kuipers Score (Up Event)	0.366666667	
Kuipers Score (Down Event)	0.125		Kuipers Score (Down Event)	0	

Figure 5.12 Distribution of Unemployment Expectation Probability Confusion Matrix



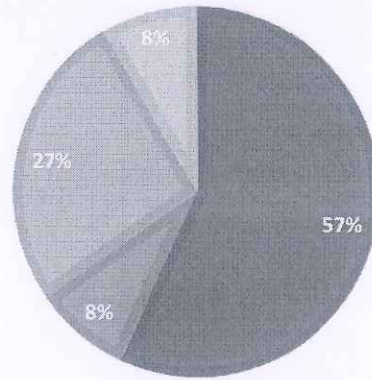
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



The relationship between the expectation and the realization by the numbers of unemployment calculated on monthly and annually basis on the Table 4.4. All Expectation Surveys that ended in December 2018 from January 2012 were included in the sample. When 84 samples were analyzed, the MAE result of all the samples was found to be 4,930432639; SQRT was determined as 4,930432639. On a monthly and yearly basis, results are gathered together to generate confusion

matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 32; Down-Down 18; Up-Down 14; Down-Up 19. Confusion Matrix's accuracy on a monthly basis is 0,602409639; misclassification rate 0,397590361; Up-Positive Rate 0,385542169; Down-Positive Rate 0,21686747; Up-Negative Rate 0,228915663; Down-Negative Rate 0,168674699. Precision 0,6274510; The prevalence 0,6144578. As a result, the Kuipers Score for Up Event is 0.6274510 and for Down Event is 0.6144578. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 50 times; and the number of False samples appeared 33 times.

According to yearly results; MAE is 10,48242265; SQRT is 10,48242265. Prediction-Actual results; Up-Up 41; Down-Down 6; Up-Down 6; Down-Up 19. Confusion Matrix's accuracy on a yearly basis is 0,652777778; misclassification rate 0,347222222; Up-Positive Rate 0,569444444; Down-Positive Rate 0,083333333; Up-Negative Rate 0,263888889; Down-Negative Rate 0,083333333. Precision 0,68333333; The prevalence 0,83333333. As a result, the Kuipers Score for Up Event is 0.366666667 and for Down Event is 0. On yearly basis; True result is 47 times; and the number of False samples appeared 25 times.

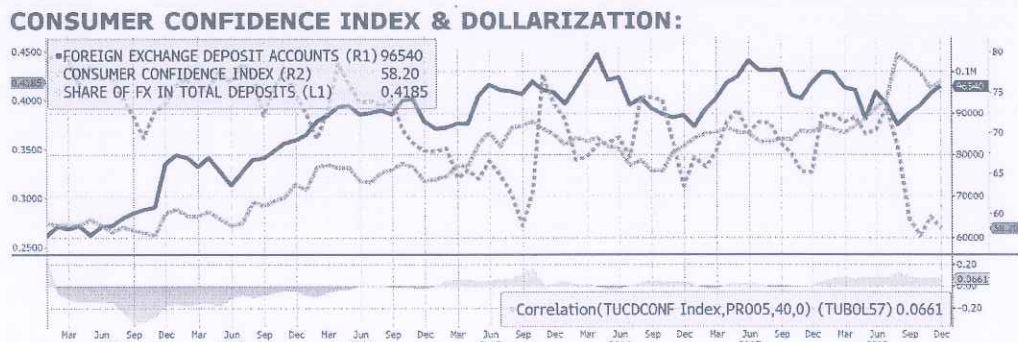
Within the consumer confidence index; the increase represents the decrease in the number of unemployed expectation; and the decrease represents the increase in the number of unemployed expectation. Results are calculated with multiplying by minus one for comparison. As a result of the analysis, it gives consistent results both monthly and yearly. Especially, the accuracy rate of 0.6024 shows that participants were successful in predicting the decrease or increase tendency in the number of unemployed. In particular, upward expectations are more consistent when there is an increase in the number of unemployed. Mostly, the number of unemployed people is increasing at a prevalence level of 0.6144. As the precision ratio is realized as 0.6274, it is seen that the expectations of the increase in the number of unemployed are more likely to be realized in all estimates. Annual results confirm that the rate of increase in the number of unemployed.

5.5. CONSUMER CONFIDENCE INDEX AND CHANGE ON FOREIGN CURRENCY DEPOSIT ACCOUNTS

In this calculation, the changes in the tendency of households to foreign currency provided in the Weekly Securities Statistics data obtained from the CBRT in case of an increase or decrease in the Consumer Confidence Index are compared on a monthly and yearly basis.

To define the dollarization; it can be said that a country is turning to the US dollar instead of its own currency. When describing it as a foreign currency, this expression may also take the form of turning to the euro instead of the dollar. Especially in developing countries; the fact that currencies are fragile in cases where economic stability cannot be achieved and cannot be predicted is the situation that occurs as a result of inflation rising and decreasing purchasing power of people.

Figure 5.13 Dollarization of Households



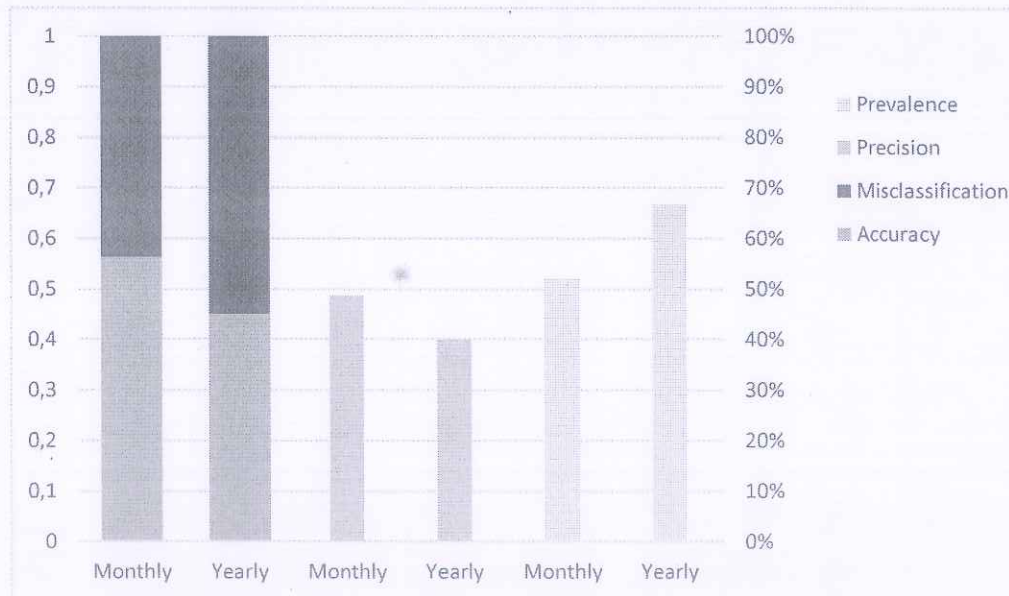
Source: TURKSTAT, CBRT (2019)

In this part of Turkey's Central Bank Monetary and acquired in the report published on Money and Banking statistics on a weekly basis under the Bank; Turkish Statistical Institute announced monthly Consumer Confidence Index has been examined and it is in inverse relationship which is shown on Figure 5.13.

Table 5.5 Confusion Matrix of Households' Dollarization

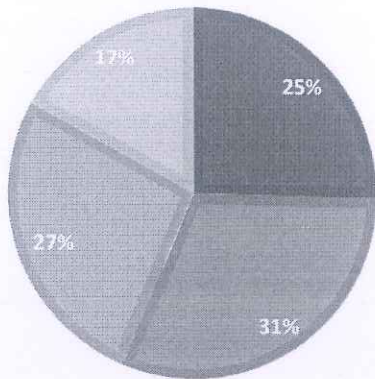
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	18	19	Actual UP	16	24
Actual DOWN	12	22	Actual DOWN	9	11
Total	30	41	Total	25	35
Accuracy	0,563380282		Accuracy	0,45	
Misclassification Rate	0,436619718		Misclassification Rate	0,55	
Up Positive Rate	0,253521127		Up Positive Rate	0,267	
Down Positive Rate	0,309859155		Down Positive Rate	0,183333333	
Up Negative Rate	0,267605634		Up Negative Rate	0,4	
Down Negative Rate	0,169014085		Down Negative Rate	0,15	
Precision	0,486		Precision	0,4	
Prevalence	0,5211268		Prevalence	0,6666667	
Kuipers Score (Up Event)	-0.027027027		Kuipers Score (Up Event)	-0.2	
Kuipers Score (Down Event)	0.294117647		Kuipers Score (Down Event)	0.1	

Figure 5.14 Distribution of Dollarizations Confusion Matrix



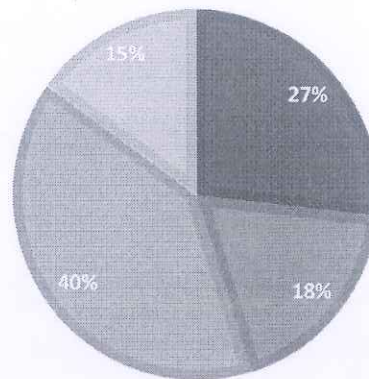
RATES MONTHLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



RATES YEARLY

Up Positive
 Down Positive
 Up Negative
 Down Negative



The results in the table 71 samples, covering the data announced from January 2013 to December 2018 were used. When 71 samples were analyzed, the MAE result of all the samples was found to be 4,14624662; SQRT was determined as 4,14624662. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 18; Down-Down 22; Up-Down 12; Down-Up 19. Confusion Matrix's accuracy on a monthly basis is 0,563380282; misclassification rate 0,436619718; Up-Positive Rate 0,253521127; Down-Positive Rate 0,309859155; Up-Negative Rate 0,267605634; Down-Negative Rate 0,169014085. Precision 0,486; The prevalence 0,5211268. As a result, the Kuipers Score for Up Event is -0.027027027 and for Down Event is 0.294117647. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 40 times; and the number of False samples appeared 31 times.

According to yearly results; MAE is 4,14624662; SQRT is 4,14624662. On yearly basis, Prediction-Actual results; Up-Up 16; Down-Down 11; Up-Down 9; Down-Up 24. Confusion Matrix's accuracy on a yearly basis is 0,45; misclassification rate 0,55; Up-Positive Rate 0,267; Down-Positive Rate

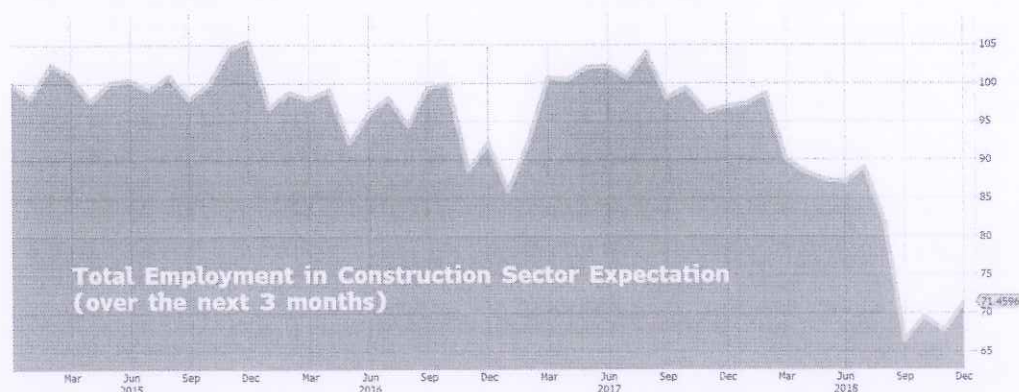
0,183333333; Up-Negative Rate 0,4; Down-Negative Rate 0,15. Precision 0,400; The prevalence 0,6666667. As a result, the Kuipers Score for Up Event is -0.2 and for Down Event is 0.1. On yearly basis; True result is 27 times; and the number of False samples appeared 33 times.

As a result of this study, the relationship between consumer confidence index and dollarization is discussed. The results do not produce healthy results both on monthly and yearly basis between the increase or decrease in consumer confidence index and the change in foreign exchange deposit accounts of real persons. Also, the Kuipers score was 0,1365. However, one of the striking issues in the study is related to the consumer confidence index itself. As a matter of fact, the consumer confidence indices made in both August 2016 when Operation Euphrates Shield started and January 2018 when Operation Olive Branch started are increased by 11.1 percent on a monthly basis.

5.6. CONSTRUCTION SECTOR CONFIDENCE INDEX AND CHANGE ON EMPLOYMENT OF CONSTRUCTION

Construction Industry Confidence Index; the current level of registered orders received in the sector and the total number of employees over the next three months which can be seen by graph on Figure 5.15.

Figure 5.15 Expectation of Employment in Construction Sector



Source: TURKSTAT (2019)

Figure 5.16 Employment in Construction Sector



Source: TURKSTAT (2019)

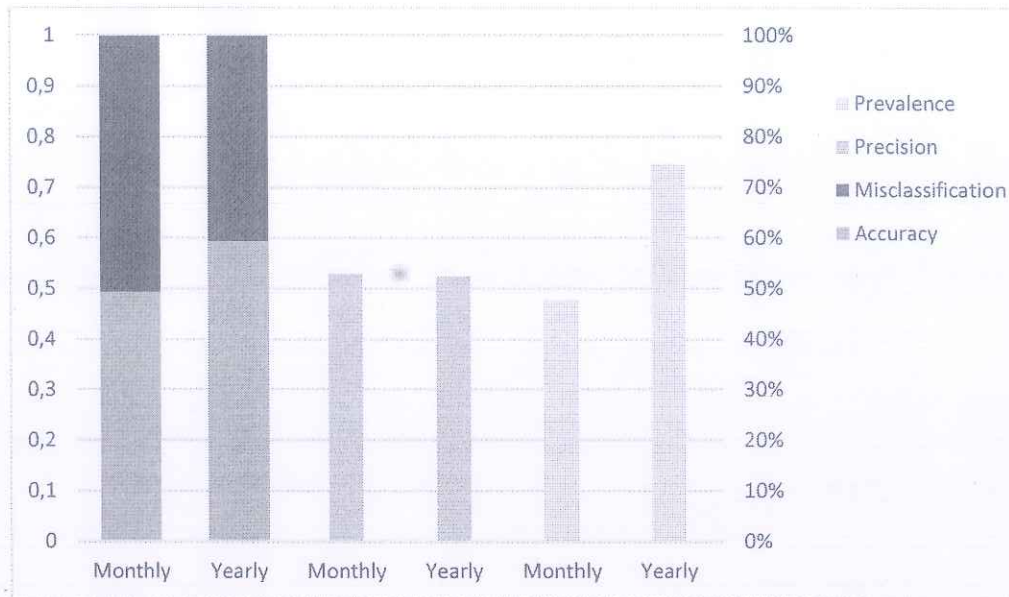
In this study, whether the increase in confidence leads to an increase in construction sector employment is discussed. The trend of employment in construction sector can be seen on Figure 5.16. Expectations and realizations of construction sector’s employment are calculated and shown on table 5.6.

Table 5.6 Confusion Matrix of Employment in Construction

CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	18	16	Actual UP	23	21
Actual DOWN	20	17	Actual DOWN	3	12
Total	38	33	Total	26	33
Accuracy	0,492957746		Accuracy	0,593220339	
Misclassification Rate	0,507042254		Misclassification Rate	0,406779661	
Up Positive Rate	0,253521127		Up Positive Rate	0,389830508	
Down Positive Rate	0,239436620		Down Positive Rate	0,203389831	
Up Negative Rate	0,225352113		Up Negative Rate	0,355932203	
Down Negative Rate	0,281690141		Down Negative Rate	0,050847458	
Precision	0,529411765		Precision	0,522727273	
Prevalence	0,478873239		Prevalence	0,745762712	
Kuipers Score (Up Event)	0.058823529		Kuipers Score (Up Event)	0.045454545	
Kuipers Score (Down Event)	-0.081081081		Kuipers Score (Down Event)	0.6	

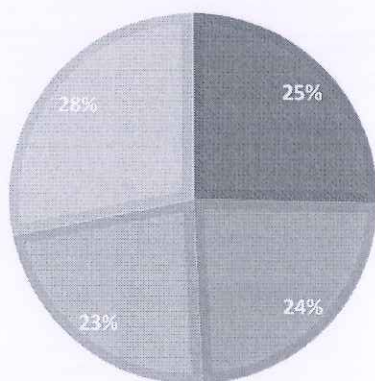
The Distribution of Confusion Matrix can be seen on Figure 5.17.

Figure 5.17 Distribution of Employment in Construction Confusion Matrix



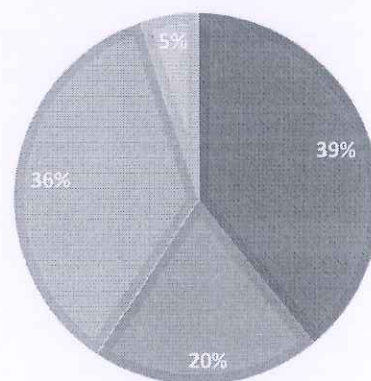
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



The results in the table 72 samples, covering the data announced from January 2013 to December 2018, were used. When 72 samples were analyzed, the MAE result of all the samples was found to be 3,787891717; SQRT was determined as 3,787891717. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 18; Down-Down 17; Up-Down 20; Down-Up 16. Confusion Matrix's accuracy on a monthly basis is 0,492957746; misclassification rate

0,507042254; Up-Positive Rate 0,253521127; Down-Positive Rate 0,239436620; Up-Negative Rate 0,225352113; Down-Negative Rate 0,281690141. Precision 0,529411765; The prevalence 0,478873239. As a result, the Kuipers Score for Up Event is 0.058823529 and for Down Event is -0.081081081. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 35 times; and the number of False samples appeared 36 times.

According to yearly results; MAE is 7,20959251; SQRT is 7,20959251. On yearly basis, Prediction-Actual results; Up-Up 23; Down-Down 12; Up-Down 3; Down-Up 21. Confusion Matrix's accuracy on a yearly basis is 0,593220339; misclassification rate 0,406779661; Up-Positive Rate 0,389830508; Down-Positive Rate 0,203389831; Up-Negative Rate 0,355932203; Down-Negative Rate 0,050847458. Precision 0,522727273; the prevalence is 0,745762712. As a result, the Kuipers Score for Up Event is 0.045454545 and for Down Event is 0.6. On yearly basis; True result is 35 times; and the number of False samples appeared 25 times.

Monthly and yearly changes in the expectations of the managers of the companies operating in the construction sector for the number of employees for the next three months were compared with the employment of the construction sector. However, the results of the study do not allow a meaningful inference.

5.7. REAL SECTOR CONFIDENCE INDEX AND FIXED CAPITAL FORMATION

According to EUROSTAT (2019), gross fixed capital formation is measured by the total value of certain additions to the value of a producer's acquisitions with fixed assets, negative disposals and the value of the undiscounted assets realized through the production activities of the corporate unit. The largest part of the gross fixed capital formation consists of tangible fixed assets. These assets are examined in two sub-groups as machinery-equipment and construction.

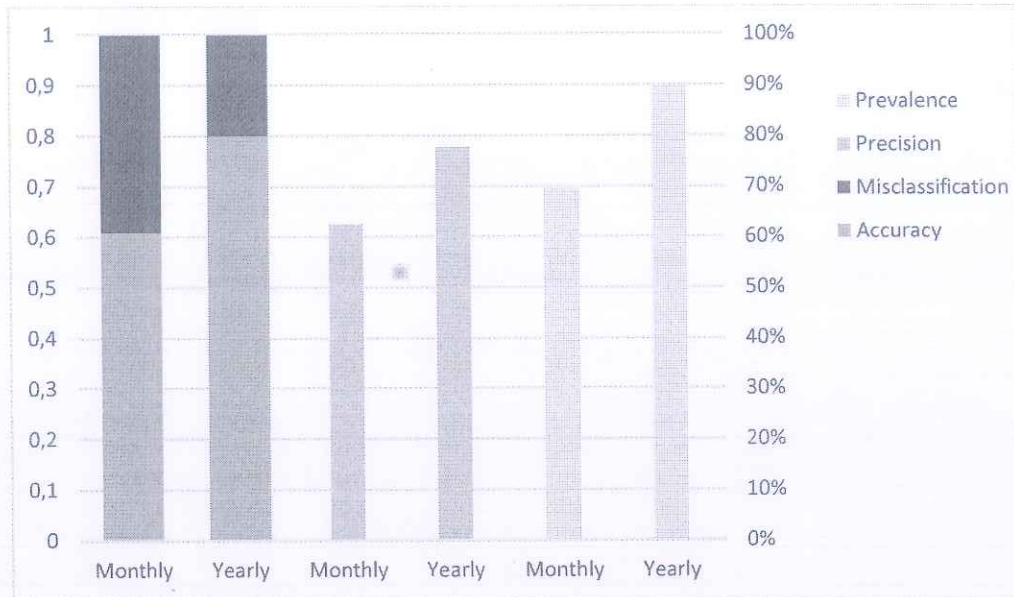
Fixed assets are used in the production process for more than one year and it is the one of the components of gross national product.

In this study, as the confidence of the real sector increases, a positive reflection on investments is observed. Since the gross national product was announced quarterly, 24 samples were analyzed from the national income accounts announced from January 2013 to December 2018.

Table 5.7 Confusion Matrix of Real Sector Confidence Index and Investments

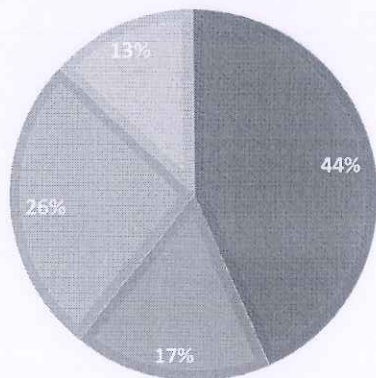
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	10	6	Actual UP	14	4
Actual DOWN	3	4	Actual DOWN	0	2
Total	13	10	Total	14	6
Accuracy	0,608695652		Accuracy	0,8	
Misclassification Rate	0,391304348		Misclassification Rate	0,2	
Up Positive Rate	0,434782609		Up Positive Rate	0,7	
Down Positive Rate	0,173913043		Down Positive Rate	0,1	
Up Negative Rate	0,260869565		Up Negative Rate	0,2	
Down Negative Rate	0,130434783		Down Negative Rate	0	
Precision	0,625		Precision	0,778	
Prevalence	0,6956522		Prevalence	0,9	
Kuipers Score (Up Event)	0.25		Kuipers Score (Up Event)	0.555555556	
Kuipers Score (Down Event)	0.142857143		Kuipers Score (Down Event)	1	

Figure 5.18 Distribution of Investment Probability Confusion Matrix



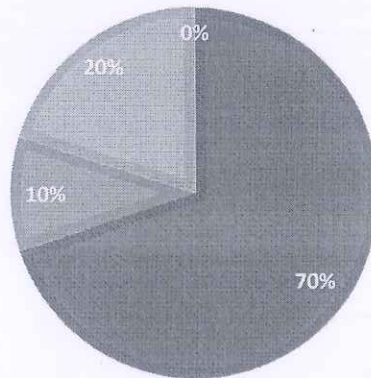
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative

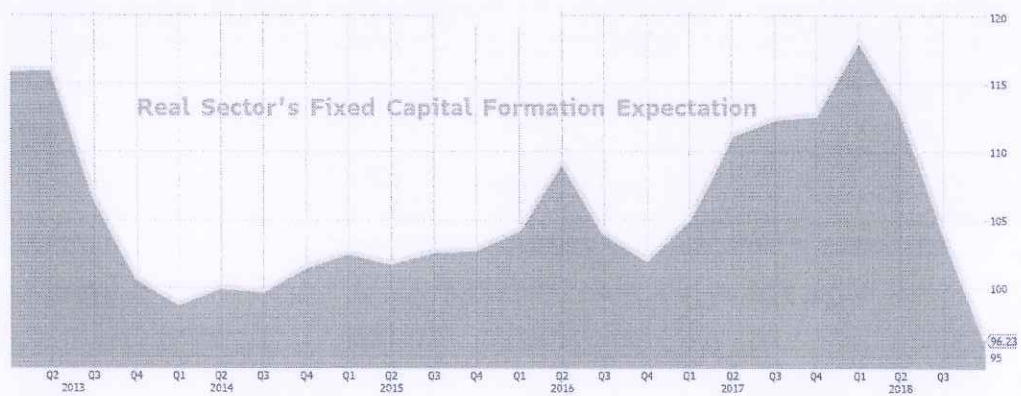


When 24 samples were analyzed, the MAE result of all the samples was found to be 3,608936809; SQRT was determined as 3,608936809. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 10; Down-Down 4; Up-Down 3; Down-Up 6. Confusion Matrix's accuracy on a monthly basis is 0,608695652; misclassification rate 0,391304348; Up-Positive Rate 0,434782609;

Down-Positive Rate 0,173913043; Up-Negative Rate 0,260869565; Down-Negative Rate 0,130434783. Precision 0,625; The prevalence 0,6956522. As a result, the Kuipers Score for Up Event is 0.25 and for Down Event is 0.142857143. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 14 times; and the number of False samples appeared 9 times. According to yearly results of 12 samples; MAE is 2,359556321; SQRT is 2,359556321.

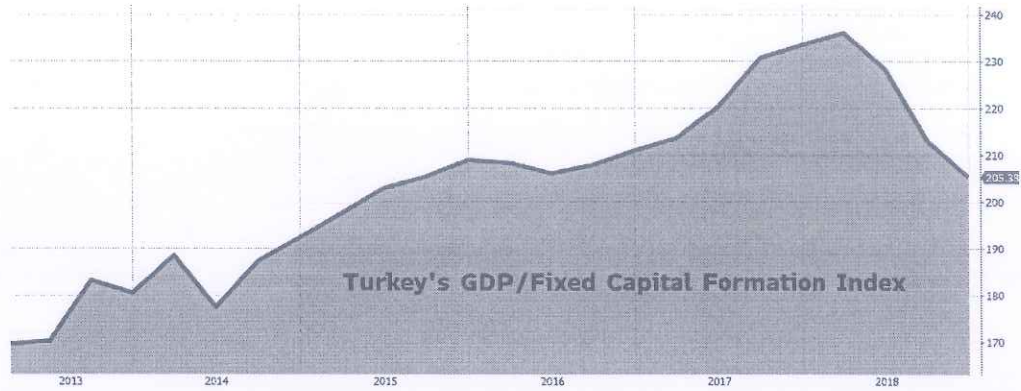
On annual basis, Prediction-Actual results; Up-Up 14; Down-Down 2; Up-Down 0; Down-Up 4. Confusion Matrix's accuracy on a yearly basis is 0,8; misclassification rate 0,2; Up-Positive Rate 0,7; Down-Positive Rate 0,1; Up-Negative Rate 0,2; Down-Negative Rate 0. Precision 0,778; the prevalence is 0,9000000. As a result, the Kuipers Score for Up Event is 0.555555556 and for Down Event is 1. On yearly basis; True result is 16 times; and the number of False samples appeared 1 time.

Figure 5.19 Real Sector's Fixed Capital Formation Expectation



Source: TURKSTAT (2019)

Figure 5.20 Turkey's GDP/Fixed Capital Formation Index



Source: TURKSTAT (2019)

In this study, the reflection of the increase in real sector confidence on investments is discussed. Monthly and annual changes in the index value of fixed capital formation in GDP for investments are discussed. As the number of samples is published quarterly, the national product is relatively less compared to the other part of the study. However, quarterly changes in the index created for fixed asset investments in the real sector confidence index were accepted as expectations and compared with the formation of fixed capital in the GDP.

Accuracy was realized as 0.6086 on a monthly basis, and rose to 0.80 on an annual basis. Therefore, it has been found that as real sector confidence increases, it has a positive effect on investments. The rate of up positive rate estimates was realized as 0.4347 on a monthly basis and 0.70 on a yearly basis, and it was seen that optimistic expectations were met. When the prevalence values are analyzed, it is observed that the rates reaching 0.6956 monthly and 0.90 yearly are both high in the predicted increases and the increase in all the results.

5.8. RETAIL TRADE TENDENCY SURVEY AND RETAIL SALES

Retail Sales Indices is an index that measures the sales of enterprises of different types and sizes in the Retail Trade sector on a monthly basis by

TURKSTAT (2019). In addition, it is aimed to monitor the development of the retail sector over time, to monitor the changes in months and years, and to produce data that is compatible with European Union legislation and allows for international comparisons.

In addition to measuring the development of the Retail Trade sector, Retail Sales Indices are also considered as indicators of consumer confidence and household demand. Therefore, it is considered as one of the most important indicators in order to observe the state of the economy.

Retail Sales Indices are among the European Principal Economic Indicators (PEEIs). It is also considered among the important economic indicators in other developed countries outside the EU.

Scope: All enterprises that submit VAT declarations to the Revenue Administration are included in the index account.

Figure 5.21 Retail Sales Volume Index



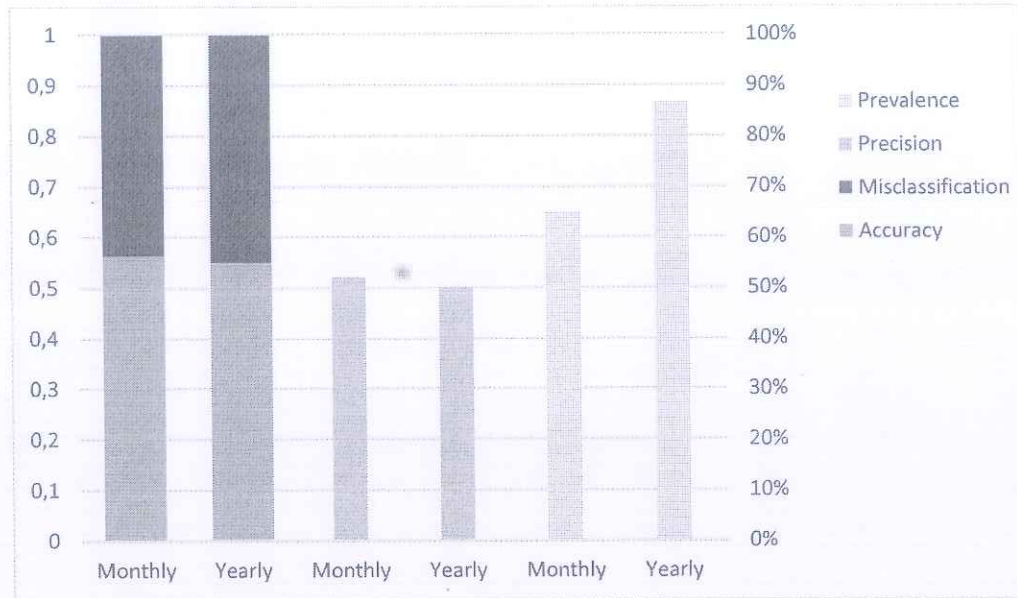
Source: TURKSTAT (2019)

In the retail trade trend survey, the sales volume, stock level, quantity of orders, number of employees, sales price, the ability to increase activities without making changes in the existing resources, factors limiting the activity and fixed capital investments were determined through sales; It is the confidence index that tries to measure the trend of the sector as in other confidence indices. The aim of this study is to measure the relationship between retail trade sector and the change in turnover of the sector.

Table 5.8 Confusion Matrix of Expectation of Retail Sales

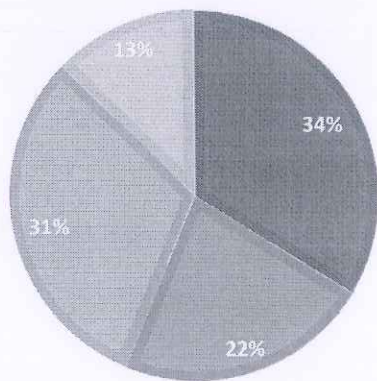
CONFUSION MATRIX / MONTHLY			CONFUSION MATRIX / YEARLY		
	Prediction UP	Prediction DOWN		Prediction UP	Prediction DOWN
Actual UP	24	22	Actual UP	26	26
Actual DOWN	9	16	Actual DOWN	1	7
Total	33	38	Total	27	33
Accuracy	0,563380282		Accuracy	0,55	
Misclassification Rate	0,436619718		Misclassification Rate	0,45	
Up Positive Rate	0,338028169		Up Positive Rate	0,433333333	
Down Positive Rate	0,225352113		Down Positive Rate	0,116666667	
Up Negative Rate	0,309859155		Up Negative Rate	0,433333333	
Down Negative Rate	0,126760563		Down Negative Rate	0,016666667	
Precision	0,521739130		Precision	0,5	
Prevalence	0,647887324		Prevalence	0,866666667	
Kuipers Score (Up Event)	0.043478261		Kuipers Score (Up Event)	0	
Kuipers Score (Down Event)	0.28		Kuipers Score (Down Event)	0.75	

Figure 5.22 Distribution of Retail Sales Probability Confusion Matrix



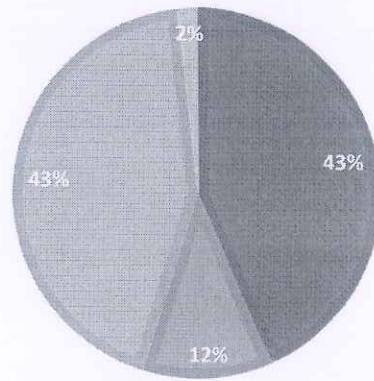
RATES MONTHLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



RATES YEARLY

- Up Positive
- Down Positive
- Up Negative
- Down Negative



The results in the table 72 samples, covering the data announced from January 2013 to December 2018, were used. When 72 samples were analyzed, the MAE result of all the samples was found to be 3,48698283; SQRT was determined as 3,48698283. On a monthly and yearly basis, results are gathered together to generate confusion matrix for the calculation of Kuipers Score. Prediction-Actual results; Up-Up 24; Down-Down 16; Up-Down 9; Down-Up 22. Confusion Matrix's

accuracy on a monthly basis is 0,563380282; misclassification rate 0,436619718; Up-Positive Rate 0,338028169; Down-Positive Rate 0,225352113; Up-Negative Rate 0,309859155; Down-Negative Rate 0,126760563. Precision 0,521739130; The prevalence 0,647887324. As a result, the Kuipers Score for Up Event is 0.043478261 and for Down Event is 0.28. If the prediction and commencement have same trend; we can consider it on True/False test. On monthly basis; True result is 40 times; and the number of False samples appeared 31 times.

According to annual results; MAE is 6,53010681; SQRT is 6,53010681. On yearly basis, Prediction-Actual results; Up-Up 26; Down-Down 7; Up-Down 1; Down-Up 26. Confusion Matrix's accuracy on a yearly basis is 0,550000000; misclassification rate 0,450000000; Up-Positive Rate 0,433333333; Down-Positive Rate 0,116666667; Up-Negative Rate 0,433333333; Down-Negative Rate 0,016666667. Precision 0,500000000; the prevalence is 0,866666667. As a result, the Kuipers Score for Up Event is 0 and for Down Event is 0.75. On yearly basis; True result is 33 times; and the number of False samples appeared 27 times.

In this study, whether the improvement in the trust of the companies operating in retail sector is related to the increase in turnover is discussed. The results obtained from the study show that the precision rate is 0.5712 and the improvement in confidence is mostly compatible with the increase in turnover. Prevalence was realized at 0.6478 levels, indicating that even if confidence declined on a monthly basis, turnover increased mostly. However, these results should be evaluated by considering the increase in inflation in Turkey during the sample period. On an annual basis, the prevalence was 0.8666, and also showed that the tendency of turnover was mostly upward, apart from sector confidence mostly because of the inflation.

CONCLUSION

In this study, Turkish Statistical Institute and Central Bank of the Republic of Turkey Based on the survey made by; the answers to the questions selected from the survey conducted in Turkey and asked questions by looking at the nature of the questions' realizations were compared. Some questions; while participants asked for point estimation, the rest included expectations for the train. In Turkey because starting from the said survey on earlier work done in other markets where inflation and employment and are qualified to be involved in this work is done in the present case, an application is made for the first time. When the results obtained; the desired point estimates of the Expectations Survey of the Central Bank of Turkey; Compared with the answers given in the Turkey Statistical Confidence Index it seems to be more consistent.

One reason; market survey of the Central Bank of the Republic of Turkey is being sourced from the participating professionals. Another reason and conclusions are; to be asked in the survey conducted by the Statistics Institute of Turkey is the requirement should be other questions. To give an example; macro-economic conditions change very quickly be sourced in Turkey; consumption trends may vary. The level of interest during the survey period, expectations about prices, the financial situation of the person or institution; It may affect the consumption decision and cause it to be shifted suddenly.

Especially; these parameters should be questioned in the decision of the household regarding the purchase of automobiles, the purchase of automobiles and the purchase of durable goods, and also the need situation should be known. These are very important details; because the consumer, rather than the business or the government, has become the dominant actor in shaping the course of the aggregate economy (Curtin, R., 1982). Turkey's growth in private consumption due to the composition and the nature of the very important component of Turkey's economy is starting from a consumer society; again, with an example; if it is necessary to

make a purchase, which price range to make purchases are also among the questions to be asked. The same applies to the real sector.

When the survey results are examined; as in the surveys conducted with households, especially in the sub-results that constitute the confidence indices of the real sector; although there is an expectation of recovery, more work is normally accompanied by growth; hence it requires more employment; at the end of the study, confidence indices and the realization of employment expectations do not produce successful results. This reveals that in addition to household surveys, the questions asked in the surveys with the Real Sector are more questions that need to be explained or added to the current situation. Empirical findings show that consumer confidence, industrial production and stock exchange have a long-run relationship in emerging economies (Celik, Aslanoglu & Uzun, 2010).

Turkish Statistical Institute in the survey; there is a need to diversify the questions and to ask the participants more details. However, the course and volatility of the USD/TRY is particularly interesting during the period in which the study was conducted. Since 2013, the Turkish Lira has depreciated against the dollar on an annual basis. However, besides this loss of value; during periods of high volatility; Turkey responses to survey questions indicating the direction of the Institute of Statistics showed his confusion. In particular, there are geopolitical developments that create volatility; it has led to periodic deviations in surveys that help determine direction. TURKSTAT surveys were not delayed monthly. The reason for this is the tendency of the participant in the nature of the questions asked in the next 12 months. However, when the data is analyzed on a yearly basis, it gives more successful results in predicting directions. Nevertheless, given the volatility periods just mentioned; Turkey's economy has suffered from a distinct improvement from the previous year every year. For example; Failed coup attempt in 2016, referendum on system change in 2017, tension in relations with the US in 2018, and intense election schedule in 2019; it undermines the ability of surveys to predict. During periods of relatively quiet agenda; leading indicators used to

determine trends have started to show less deviation. In the upcoming period, similar studies to be made on the leading indicators; implementation of delay; a quarterly expectation of expectations; it can be aimed to achieve healthier results by separating the participants according to the regions by adding parameters such as job status, demographic structure, needs, income and budget.

REFERENCES

Afshar, T., Arabian, G., & Zomorrodian, R. 2007. "Stock return, consumer confidence, purchasing manager's index and economic fluctuations". *Journal of Business & Economics Research*, 5(8),pp. 97-106

"Agents' Survey". bankofengland.co.uk.2019

<https://www.bankofengland.co.uk/about/people/agents>

Akçelik, F. (2016). Income Groups and Inflation in Turkey. Master Thesis, The Graduate School Of Social Sciences of Middle East Technical University

Barro J. R., Economic Growth in a Cross Section of Countries, *The Quarterly Journal of Economics*, Volume 106, Issue 2, May 1991, Pages 407–443, <https://doi.org/10.2307/2937943>

"Beige Book". federalreserve.gov.2019

<https://www.federalreserve.gov/monetarypolicy/beige-book-default.htm>

Black, S., Cusbert T., (2010) "Durable Goods and the Business Cycle", *Reserve Bank of Australia Economic Bulletin September Quarter*

"Business and Consumer Survey". ec.europa.eu.2019

https://ec.europa.eu/info/sites/info/files/file_import/metadata_tr_cons_en_0.pdf

"Business Economy by Sector". ec.europa.eu.2007

https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Business_economy_by_sector_-_NACE_Rev._2

“Business Tendency Survey”.tcmb.gov.tr.2019

<https://www.tcmb.gov.tr/wps/wcm/connect/en/tcmb+en/main+menu/statistics/tendency+surveys/business+tendency+statistics+and+real+sector+confidence+index>

Candemir, H.B. and H.B. Karabudak. 1994. The Search for a Business and/or Investment Confidence Index in Turkey. Selected Papers submitted to the 21st Cirt Conference 1993 in Stellenbosch, Studien 48

Carroll, C., Fuhrer, J. And Wilcox D. (1994)

“Does consumer sentiment forecast household spending? If so, why?”, *American Economic Review*, 84(5), pp. 1397-1408

“Consumer Confidence and Economic Fluctuations”.

onlinelibrary.wiley.com.2019

<https://onlinelibrary.wiley.com/doi/10.1111/j.1465-7295.1995.tb01864.x#reference> (April, 1995)

“Consumer Confidence Index”.turkstat.gov.tr.2019.

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30927>

“Consumer Price Index”.turkstat.gov.tr.2019.

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30859> (December, 3, 2019)

“Consumer Tendency Survey and Consumer Confidence Index In Accordance With The Joint Harmonised EU Programme of Business and Consumer Surveys”.turkstat.gov.tr.2019

[http://www.turkstat.gov.tr/indir/tge/cci_2012_revisions.pdf\(2012\)](http://www.turkstat.gov.tr/indir/tge/cci_2012_revisions.pdf(2012))

Curtin, R. (1982). Indicators of Consumer Behavior: The University of Michigan Surveys of Consumers. *The Public Opinion Quarterly*, 46(3), 340-352.

Çelik, S. , Aslanoğlu, E. , Uzun, S. (2010). Determinants of Consumer Confidence in Emerging Economies: A Panel Cointegration Analysis
30th Annual Meeting of The Middle East Economic Association,
Allied Social Science Associations, Atlanta, GA, January 3-6, 2010

“Domestic Sales”. turkbesd.org.2019
<http://www.turkbesd.org/bilgiler.php?P=25>
(Data is not published. Shared with members of the media)

Dossche, M., Saiz, L., 20018. “Consumption of durable goods in the ongoing economic expansion”. *ECB Economic Bulletin, Issue 1*, pp. 25

Ece, D., Hamsici, T., Oral, E. (2005) “Building Up A Real Sector Business Confidence Index For Turkey”, Central Bank of the Republic of Turkey, Research and Monetary Policy Department

“Economic Confidence Index”.turkstat.gov.tr.2019
http://www.turkstat.gov.tr/PreTablo.do?alt_id=1102
(Monthly data retrieved between January 2013, December 2018)

European Central Bank. (2019). *Monthly Bulletin* (January, 2004). European Central Bank: Author. p:58

“Eurostat Guide to Principal European Economic Indicators”. ec.europa.eu.2019
<https://ec.europa.eu/eurostat/documents/4031688/5928360/KS-30-10-689-EN.PDF/bf7da443-edf0-4d48-ad65-373ee6ec4c69?version=1.0>

“Foreign Trade Statistics”.turkstat.gov.tr.2019
<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30662>

(Monthly data retrieved between January 2013, December 2018)

“Gross Domestic Product: An Economy’s All” .imf.org.2019

<https://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm> (December, 2018)

“Gross Fixed Capital Formation at Current Prices”. ec.europa.eu.2019

<https://ec.europa.eu/eurostat/web/products-datasets/product?code=tipsna20>

“House Sales Statistics”. turkstat.gov.tr.2019

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30884>

(Monthly data retrieved between January 2013, December 2018)

“Indices Based on Individual Questions Concerning the Consumer Tendency”. turtstat.gov.tr. November, 2019

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30927>

Kaya, H. & Yazgan, M.. (2013). Probability Forecasts of Macro Aggregates in Turkish Economy. *Emerging Markets Finance and Trade*. 50. 10.2139/ssrn.2162187.

Knack, S., Keefer, P.,1997. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics*, 112 (4) (Nov., 1997), pp. 1251-1288

“Labor Force Statistics”. turkstat.gov.tr.2019

<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30688>

(Monthly data retrieved between January 2013, December 2018)

McNabb, Bob & Taylor, Karl. (2002). Business Cycles and the Role of Confidence: Evidence from Europe. *Discussion Papers in Economics*, 02(3) (February,2002) pp:7-8

Mueller, E. (1963). Ten Years of Consumer Attitude Surveys: Their Forecasting Record, *Journal of the American Statistical Association*, 58:304, 899-917, DOI: [10.1080/01621459.1963.10480677](https://doi.org/10.1080/01621459.1963.10480677)

Oral, E., Brand, T., (2014) "Consumer Tendency Survey of Turkey: A Disaggregated Analysis", Central Bank of the Republic of Turkey, Research and Monetary Policy Department

"Passenger Car and Light Commercial Vehicle Market Evaluation".
odd.org.tr.2019
http://www.odd.org.tr/web_2837_2/neuralnetwork.aspx?type=35
(Monthly data retrieved between January 2013, December 2018)

Peker, O. , Bölükbaş, M. (2012). An Empirical Analysis of the Factors Determine Unemployment in Turkey, *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi* 26(3-4), pp. 9-10

"Survey of Expectations Statistics' Participants".tcmb.gov.tr.2019.
https://www.tcmb.gov.tr/wps/wcm/connect/7d0b1e66-2858-4b82-80fe-78592a41945f/SE-Report_Int.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-7d0b1e66-2858-4b82-80fe-78592a41945f-mXGr5ZU (December, 2019)

"Survey of Expectations Statistics". Tcmb.gov.tr.2019
<https://evds2.tcmb.gov.tr/index.php?/evds/portlet/8vIELFjySFU%3D/en#>
(December, 2019)

"Sixth Edition of the IMF's Balance of Payments and International Investment Position Manual (BPM6)".imf.org.2019
<https://www.imf.org/external/pubs/ft/bop/2007/bopman6.htm> (November, 2013)

“Survey of Expectations Statistics”. Tcmb.gov.tr.2019

<https://evds2.tcmb.gov.tr/index.php?/evds/portlet/NhvFHanyLQg%3D/en#>

(Monthly data retrieved between January 2013, December 2018)

“Survey of Expectations Statistics”. Tcmb.gov.tr.December, 2019

<https://evds2.tcmb.gov.tr/index.php?/evds/portlet/EFfGqPdf9ns%3D/en#>

“The Joint Harmonised EU Programme of Business and Consumer Surveys”.ec.europa.eu.March, 2016

https://ec.europa.eu/economy_finance/db_indicators/surveys/documents/bcs_user_guide_en.pdf

“Technical Information on Customs Valuation”.wto.org.2019

https://www.wto.org/english/tratop_e/cusval_e/cusval_info_e.htm

Utaka, A. (2003). Confidence and the real economy-the Japanese case. *Applied Economics*, 35(3), 337-342.

“Weekly Money and Banking Statistics”.tcmb.gov.tr.2019

<https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Statistics/Monetary+and+Financial+Statistics/Weekly+Money+and+Banking+Statistics/>

(December, 2019)

APPENDICES

Appendix A : Sample of Data Set and Calculations-I

	The probability of buying or building a home (over the next 12 months)	Change of Probability (Monthly, %)	Change of Probability Rate (Annual, %)	House Sales by Years	Change of House Sales by Months (%)	Monthly T/F	Annual T/F	Change of House Sales by Years (%)	MAE (Monthly)	SQRT (Monthly)	MAE (Annual)	SQRT (Annual)
2016 01	D.67	-	-	87444	-	-	-	-	-	-	-	-
02	D.49	-163	-	88519	123	F	-	-	2.85937447	2.86	-	-
03	D.38	7.92	-	97956	0.66	T	-	-	2.74277287	2.74	-	-
04	D.56	-6.76	-	95361	-2.63	T	-	-	4.03693425	4.18	-	-
05	D.8	-3.56	-	103261	8.26	F	-	-	1.82189738	1.82	-	-
06	D.62	14.5	-	96424	-6.62	F	-	-	2.07724241	2.07	-	-
07	D.55	7.97	-	106636	0.59	T	-	-	2.624447632	2.62	-	-
08	D.69	-14.84	-	84490	-20.78	T	-	-	5.940570065	5.94	-	-
09	D.01	-6.31	-	102280	2.107	F	-	-	27.3762948	27.38	-	-
10	D.51	4.95	-	76344	-25.36	F	-	-	30.31090693	30.31	-	-
11	D.75	2.30	-	102681	34.50	T	-	-	32.8623045	32.20	-	-
12	D.08	-6.21	-	115784	2.76	F	-	-	18.97367841	18.97	-	-
2014 01	D.38	2.97	-2.67	87639	-24.31	F	F	0.22	27.2768403	27.28	2.889366266	2.89
02	8.61	-7.08	-7.95	82597	-5.75	T	F	-6.69	11.32518986	11.33	1128.84578	1126
03	D.02	39.61	6.14	87617	6.08	T	T	-0.55	33.52875254	33.53	16.69415456	16.69
04	11.00	-8.48	4.9	83610	-4.57	T	F	-12.34	3.9047197979	3.90	16.52956638	16.53
05	D.64	14.85	24.08	90317	8.09	F	F	-12.48	67.98559893	67.6	36.55147774	36.56
06	D.06	-4.41	3.91	92936	2.83	F	F	-3.62	7.238478797	7.24	7.525417308	7.53
07	9.28	-23.20	-26.09	85101	-8.43	T	F	-20.8	4.7765318	4.77	5.883882945	5.89
08	9.94	7.12	-7.03	105624	24.2	T	F	25.03	10.84549298	10.85	31.983646799	32.06
09	D.98	D.47	3.48	115766	9.62	T	T	0.20	33.87955782	33.88	25.58627529	25.59
10	D.88	-0.92	3.48	95645	-7.40	T	T	107	16.47637541	16.48	21.8029434	21.80
11	8.2	-25.37	-24.51	103783	8.51	F	F	16.31	33.87955782	33.88	32.92047541	32.92
12	8.41	3.60	-18.61	132656	29.76	T	F	-168	26.5423465	26.5	18.84055878	18.84
2015 01	8.25	-1.86	-20.52	86167	-36.01	T	T	15.04	0.428267563	0.43	8.933036507	8.93
02	9.14	D.70	6.11	95021	D.28	T	F	32.43	16.76105881	16.76	53.87780825	53.88
03	9.44	3.35	-2.145	116030	22.11	T	T	42.71	3.676988726	3.68	57.80371841	57.80
04	9.36	-0.84	-14.90	119317	2.83	F	F	42.71	3.676988726	3.68	57.80371841	57.80
05	8.72	-6.83	-30.97	107888	9.58	F	F	10.38	2.74389105	2.74	50.3421835	50.34
06	8.49	-2.86	-29.70	110657	-2.57	F	F	10.07	5.226203464	5.23	48.7727055	48.77
07	8.84	1.71	-6.90	96589	-12.71	F	F	9.50	14.4205985	14.42	20.40389301	20.40
08	8.52	-1.31	-14.23	112483	16.43	F	F	6.47	17.74293985	17.74	20.70504988	20.71
09	6.99	-7.93	-36.28	92493	-17.77	T	T	-20.13	0.18622721	0.17	16.5378263	16.5
10	6.48	-7.34	-40.41	104098	2.66	F	F	8.84	18.99474784	18.99	49.24445682	49.24
11	8.78	35.45	8.6	106008	183	F	F	2.14	33.61682983	33.62	6.0174053	6.02
12	7.51	-14.42	-10.85	142539	34.52	F	F	5.89	48.93728283	48.94	16.5456409	16.55
2016 01	8.51	13.31	3.6	84556	-40.70	F	F	-187	54.0128605	54.01	5.019656955	5.02
02	8.57	0.68	-6.9	107103	20.28	T	F	7.03	18.90051057	18.90	13.22334579	13.22
03	8.79	2.58	-6.88	117205	16.24	F	F	101	12.65743407	12.66	7.887182508	7.90
04	9.44	7.34	0.80	108348	-9.26	T	F	-10.87	18.59939829	18.60	1168676894	1167
05	8.92	-5.50	2.24	114800	7.95	F	T	6.41	13.4446812	13.44	4.183902466	4.18
06	D.46	-7.34	23.25	105187	-7.30	F	F	-4.04	24.84427385	24.84	27.29320486	27.29
07	7.95	-24.08	-7.99	81343	-23.40	T	T	-15.78	0.67182669	0.68	7.719545782	7.79
08	9.97	25.50	7.00	114751	41.07	T	T	2.03	6.5720424	6.57	14.96425563	14.96
09	9.88	-2.88	38.46	109318	-5.08	T	T	7.77	2.20555456	2.21	20.88940464	20.89

Appendix B : Sample of Data Set and Calculations-II

	The probability of buying or building a home (over the next 12 months)	Change of Probability (Monthly)	Change of Probability (Rate/Annual)	House Sales by Years	Change of House Sales by Months	Monthly T/F	Annual T/F	Change of House Sales by Years	MAE (Monthly)	SQRT (Monthly)	MAE (Annual)	SQRT (Annual)
01	9.25	-4.47	42.74	130274	19.61	F	T	25.45	24.0772259	24.08	7.5989733	7.60
11	7.81	-15.53	-10.98	132655	18.3	F	F	25.74	7.35786929	7.36	36.1993934	36.12
12	6.39	-8.18	-14.89	142743	7.58	F	F	0.08	25.75835949	25.76	14.9698945	14.97
207/01	6.92	8.19	-18.74	95389	-33.19	F	F	12.81	413449278	4134	315502945	3155
02	9.12	31.79	6.37	101468	6.37	F	F	-0.23	25.4733127	25.41	6.60069775	6.60
03	8.75	-4.02	-0.48	128923	27.06	F	F	0.00	3107873664	3108	0.47788351	0.48
04	11.7	27.69	18.39	114446	-12.3	F	T	7.61	38.91551559	38.92	10.7736609	10.77
05	11.2	-0.47	24.68	116568	18.5	F	T	15.3	2.36739573	2.32	23.6298427	23.65
06	7.29	-34.43	-30.33	97579	-16.28	T	T	-8.11	18.1488952	18.15	22.2237483	22.22
07	10.45	43.38	31.57	115869	18.74	F	F	4.75	23.9375579	23.94	210850279	2109
08	8.34	-20.20	-15.34	120198	3.74	F	F	4.75	23.9375579	23.94	210850279	2109
09	6.63	-20.50	-31.52	140298	16.72	F	F	28.81	37.27982356	37.22	60.32638781	60.33
10	7.49	-22.12	-19.08	122882	-12.41	F	T	-5.67	25.2945985	25.29	13.40295589	13.40
11	5.83	19.04	-25.39	122732	-0.12	T	T	-7.48	219992307	22.00	7.911934	7.91
12	6.94	19.04	8.54	132972	8.34	T	F	-6.83	10.6985876	10.70	15.37043254	15.37
208/01	8.94	28.81	29.24	97049	-27.04	F	T	17.1	55.85229783	55.85	27.5343344	27.53
02	8.78	-8.54	-10.31	95953	-1.0	T	T	-5.44	7.444637967	7.44	4.872990486	4.87
03	8.56	4.70	-2.15	110505	15.58	T	T	-1.98	10.8974898	10.89	11.827744	11.81
04	8.09	-5.48	-27.57	103087	-7.05	T	T	-9.93	15.7453079	15.7	7.6494679	7.65
05	7.71	-4.68	-30.62	118665	16.07	F	F	2.66	20.7273383	20.73	33.2764437	33.28
06	8.88	15.06	21.75	119413	-0.20	F	T	22.38	45.29796606	45.29	0.62970192	0.63
07	7.78	-12.41	-25.63	123878	3.74	F	F	6.91	16.14682055	16.15	32.55732625	32.54
08	8.57	0.24	2.75	105164	-15.11	F	F	-12.52	25.3547752	25.35	15.28305233	15.26
09	6.04	-29.54	-8.93	127327	21.09	F	T	-9.25	50.62263749	50.62	0.370586093	0.31
10	4.83	-20.00	-35.46	146536	15.09	F	F	19.25	35.08362893	35.08	54.70822824	54.71
11	5.97	23.57	2.40	89626	-38.84	F	F	-26.97	62.40379035	62.40	29.37897321	29.38
12	5.51	-7.71	-20.61	136845	52.68	F	F	2.91	60.39286751	60.39	23.5945405	23.52

Monthly Total		Yearly Total	
True	33	36	25
False			

Average Results			
MAE (Monthly)	SQRT (Monthly)	MAE (Yearly)	SQRT (Yearly)
20.39775724	20.39775724	20.95644109	20.95644109

Appendix C : Sample Calculation of Confusion Matrix and Kuipers Score-I

Date	KUIPERS SCORE / Monthly				KUIPERS SCORE / Yearly			
	Up-Up	Down-Down	Down-Up	Up-Down	Up-Up	Down-Down	Down-Up	Up-Down
2013 01	-	-	-	-	-	-	-	-
02	0	0	1	0	-	-	-	-
03	1	0	0	0	-	-	-	-
04	0	1	0	0	-	-	-	-
05	0	0	1	0	-	-	-	-
06	0	0	0	1	-	-	-	-
07	1	0	0	0	-	-	-	-
08	0	1	0	0	-	-	-	-
09	0	0	1	0	-	-	-	-
10	0	0	0	1	-	-	-	-
11	1	0	0	0	-	-	-	-
12	0	0	1	0	-	-	-	-
2014 01	0	0	0	1	0	0	1	0
02	0	1	0	0	0	1	0	0
03	1	0	0	0	0	0	0	1
04	0	1	0	0	0	0	0	1
05	1	0	0	0	0	0	0	1
06	0	0	1	0	0	0	0	1
07	0	1	0	0	0	1	0	0
08	1	0	0	0	0	0	1	0
09	1	0	0	0	1	0	0	0
10	0	1	0	0	1	0	0	0
11	0	0	1	0	0	0	1	0
12	1	0	0	0	0	0	1	0
2015 01	0	1	0	0	0	1	0	0
02	1	0	0	0	1	0	0	0
03	1	0	0	0	0	0	1	0
04	0	0	1	0	0	0	1	0
05	0	1	0	0	0	0	1	0
06	0	0	1	0	0	0	1	0
07	0	0	0	1	0	0	1	0
08	0	0	1	0	0	0	1	0
09	0	1	0	0	0	1	0	0
10	0	0	1	0	0	0	1	0
11	1	0	0	0	1	0	0	0
12	0	0	1	0	0	0	1	0
2016 01	0	0	0	1	0	0	0	1
02	1	0	0	0	0	0	1	0
03	1	0	0	0	0	0	1	0
04	0	0	0	1	0	0	0	1
05	0	0	1	0	1	0	0	0
06	0	0	0	1	0	0	0	1
07	0	1	0	0	0	1	0	0
08	1	0	0	0	1	0	0	0
09	0	1	0	0	1	0	0	0
10	0	0	1	0	1	0	0	0
11	0	0	1	0	0	0	1	0
12	0	0	1	0	0	0	1	0
2017 01	0	0	0	1	0	0	1	0
02	1	0	0	0	0	0	0	1
03	0	0	1	0	0	0	1	0
04	0	0	0	1	1	0	0	0
05	0	0	1	0	1	0	0	0
06	0	1	0	0	0	1	0	0
07	1	0	0	0	1	0	0	0
08	0	0	1	0	0	0	1	0
09	0	0	1	0	0	0	1	0
10	0	0	0	1	0	1	0	0
11	0	1	0	0	0	1	0	0
12	1	0	0	0	0	0	0	1
2018 01	0	0	0	1	1	0	0	0
02	0	1	0	0	0	1	0	0
03	1	0	0	0	0	1	0	0
04	0	1	0	0	0	1	0	0
05	0	0	1	0	0	0	1	0
06	0	0	0	1	1	0	0	0
07	0	0	1	0	0	0	1	0
08	0	0	0	1	0	0	0	1
09	0	0	1	0	0	1	0	0
10	0	0	1	0	0	0	1	0
11	0	0	0	1	0	0	0	1
12	0	0	0	1	0	0	0	1
TOTAL	18	15	24	14	13	12	24	11

Appendix D : Sample Calculation of Confusion Matrix and Kuipers Score-II

Confusion Matrix / Monthly		
	Prediction UP	Prediction DOWN
Actual UP	18	24
Actual DOWN	14	15
Total	32	39

Confusion Matrix / Yearly		
	Prediction UP	Prediction DOWN
Actual UP	13	24
Actual DOWN	11	12
Total	24	36

Accuracy:	0.464788732
Misclassification Rate:	0.535211268
Up Positive Rate:	0.253521127
Down Positive Rate:	0.211267606
Up Negative Rate:	0.338028169
Down Negative Rate:	0.197183099
Precision:	0.428571429
Prevalence:	0.591549296
Kuipers Score (UP Event):	-0.142857143
Kuipers Score (DOWN Event):	0.034482759

Accuracy:	0.416666667
Misclassification Rate:	0.583333333
Up Positive Rate:	0.216666667
Down Positive Rate:	0.2
Up Negative Rate:	0.4
Down Negative Rate:	0.183333333
Precision:	0.351351351
Prevalence:	0.616666667
Kuipers Score (UP Event):	-0.297297297
Kuipers Score (DOWN Event):	0.043478261

**Gizem
UZUNER GENÇTÜRK**

**FINANCIAL
ECONOMICS
MASTERS DEGREE
PROGRAM**

2020