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THE RELATIONSHIP BETWEEN CONSUMER CONFIDENCE INDEX AND MACROECONOMIC INDICATORS IN TÜRKİYE

SALİH KASAPOĞLU

THESIS ADVISOR: ASSOC. PROF. (PHD) AYŞE ÖZDEN BİRKAN

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We certify that, as the jury, we have read this thesis and that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts.

Jury Members: **Signature:**

Assoc. Prof. (PhD) Ayşe Özden Birkan
(Supervisor)
Yaşar University   ....

Prof. (PhD) Durmuş Özdemir
Yaşar University   ....

Assist. Prof. (PhD) Gül Şerife Huyugüzel Kışla
Ege University   ....

Prof. (PhD) Yücel Öztürkoğlu
Director of the Graduate School

ABSTRACT

THE RELATIONSHIP BETWEEN CONSUMER CONFIDENCE INDEX AND MACROECONOMIC INDICATORS IN TÜRKİYE

Kasapoğlu, Salih

MA, Economics

Advisor: Assoc. (PhD) Ayşe Özden Birkan

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This study examines the relationship between consumer confidence index (CCI) and macroeconomic variables in the case of Türkiye, starting from the hypothesis that macroeconomic variables are influential on consumer confidence. For this purpose, various macroeconomic variables were investigated within the scope of time series analysis using the monthly data set from 2005 until 2021. Since there are two CCIs announced in Türkiye, these indices were analyzed by establishing two different models. Our empirical results show that, the consumer confidence is significantly affected by variables such as stock market and real effective exchange rate in the short term.

Keywords: Turkish economy, consumer confidence index, time series analysis, impulse response analysis, forecast error variance decomposition, innovation accounting

ÖZ

TÜRKİYE'DE TÜKETİCİ GÜVEN ENDEKSİ İLE MAKROEKONOMİK GÖSTERGELER ARASINDAKİ İLİŞKİ

Kasapoğlu, Salih

Yüksek Lisans Tezi, Ekonomi

Danışman: Doç. Dr. Ayşe Özden Birkan

Ağustos 2022

Bu çalışma, makroekonomik değişkenlerin tüketici güveni üzerinde etkili olduğu hipotezinden yola çıkarak, Türkiye özelinde tüketici güven endeksi (TGE) ile makroekonomik değişkenler arasındaki ilişkiyi incelemektedir. Bu amaçla 2005 yılından 2021 yılına kadar aylık veri seti kullanılarak zaman serisi analizi kapsamında çeşitli makroekonomik değişkenler incelenmiştir. Türkiye'de açıklanan iki TGE olduğundan bu endeksler iki farklı model kurularak analiz edilmiştir. Ampirik sonuçlarımız, tüketici güveninin kısa dönemde borsa ve reel efektif döviz kuru gibi değişkenlerden önemli ölçüde etkilendiğini göstermektedir.

Anahtar Kelimeler: Türkiye ekonomisi, tüketici güven endeksi, zaman serisi analizi, etki tepki analizi, öngörü hatası varyansı ayrıştırması

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TEXT OF OATH

I declare and honestly confirm that my study, titled "THE RELATIONSHIP BETWEEN CONSUMER CONFIDENCE INDEX AND MACROECONOMIC INDICATORS IN TÜRKİYE" and presented as a Master's Thesis, has been written without applying to any assistance inconsistent with scientific ethics and traditions. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are indicated in the text and listed in the list of references.

Salih Kasapoğlu

August 22, 2022

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LIST OF ABBREVIATIONS

ADF:	Augmented Dickey–Fuller test
ARIMA:	Autoregressive Integrated Moving Average
ARMA:	Autoregressive Moving Average
BCCI:	Bloomberg Consumer Confidence Index
BCI:	Business Consumer Index
BCS:	The Joint Harmonised EU Program of Business and Consumer Surveys
CBCCI:	The Conference Board's Consumer Confidence Index
CBRT:	The Central Bank of the Republic of Türkiye
CCCI:	The CNBC-e Consumer Confidence Index
CCI:	Consumer Confidence Index
CEI:	Consumer Expectation Index
CLI:	Composite Leading Indicator
CTI:	Consumption Tendency Index
ECB:	European Central Bank
EU:	European Union
FM-OLS:	Fully Modified Ordinary Least Squares
GDP:	Gross Domestic Product
GNP:	Gross National Product
INF:	Inflation Rate based on CPI
IPI:	Industrial Production Index
ISE:	Istanbul Stock Exchange
LM:	Lagrange Multiplier
MCSI:	The University of Michigan Consumer Sentiment Index
NBS / CEMAC:	National Bureau of Statistics / China Economic Monitoring and Analysis Centre
OECD:	Organisation for Economic Co-operation and Development
OLS:	Ordinary Least Squares
ON:	Overnight Interbank Interest Rate
PPI:	Producer Price Index
REERCPI:	Real Effective Exchange Rate based on CPI
REPIH:	Rational Expectations Permanent Income Hypothesis
TCCI:	TURKSTAT Consumer Confidence Index

TURKSTAT:	Turkish Statistical Institute
US:	The United States of America
VAR:	Vector Autoregression
VECM:	Vector Error Correction Model

CHAPTER 1

INTRODUCTION

The effect of consumer confidence on economic parameters is one of the frequently discussed elements in the current literature from the time of social situation effect behind economic decisions was explained to the nonce. Because, it has been emphasized by numerous scholars that consumer reactions, especially in times of crisis, are a predictable factor and affect economic and social variables. Thus, consumers' pessimism about economic performance can itself cause reductions in output (Matsuaka & Sbordone, 1995).

According to the definition of CCI announced by TURKSTAT (2021), CCI is an indicator that aims to evaluate consumers' individual financial stance and current outlook of the general economic status of the country. Plus, spending and saving tendencies were also tried to be measured based on the level of expectations for the near future. Attributed to consumer confidence measured by this definition, it is thought that the degree of confidence expressed by consumers regarding economic activities has a significant impact on analysing motivation towards economic activities which have imbedded linkage with economic, social and political activities. Therefore, the main purpose of this thesis is to reveal which economic variable has a strong relationship with CCI and to analyse the relationship between consumer confidence and macroeconomic indicators in Türkiye. In this regard, especially in the papers dealing with the case of Türkiye, the importance of the financial sector as well as monetary policy on consumer confidence or the effect of signals from macroeconomic variables on confidence are issues in focus. However, both the fact that the indexes of consumer confidence in Türkiye were formed as of the beginning of the 21st century and the researchers' handling of the subject with limited variables support that there is room for further research on this subject. Thus, this study examines the impact of a pool of explanatory variables on consumer confidence.

In this thesis, monthly data from January 2005 until December 2021, were used. In the empirical analysis by using general to specific modelling, a model was created using

various macroeconomic variables and the relationship between consumer confidence and macroeconomic indicators was examined through this model. Explanatory variables were selected by eliminating some variables from the model so that model could work smoothly in econometric tests during the analysis phase of the thesis. Some of the variables used in empirical analysis can be listed as real effective exchange rate, monetary policy interest rate, inflation and so on.

The most essential elements that distinguish this thesis from other studies are that it focuses on real economic indicators rather than the direct effect of financial markets and fund prices on confidence by including diversified explanatory variables in the analysis process. In addition, since the CCI has just begun to be published in 2000s in Türkiye, the number of observations in previous studies could not naturally accumulate enough for a time series analysis. Both the addition of new observations and consumer reactions to extreme events such as the pandemic and the crisis created opportunities for innovative approaches to this subject. In addition, the inclusion of the comparison between the two CCIs published by TURKSTAT and Bloomberg HT is also important for the robustness of the results of the analysis.

In accordance with these considerations and mentioned objectives this study is organised as in the sections after the introduction part of the thesis, first of all, Chapter 2 focuses on the effect of trust in social sciences and the concept of confidence in economics. After the wide-scale explanation of trust, the concepts of economic confidence and ultimately consumer confidence are explained more specifically. Chapter 3 explains the factors that can lead to the change in consumer confidence noted in the literature review. In particular, the financial and political events in the articles and the expectations that affect the consumer's decision for the future are indicated with theoretical frameworks. In addition, the effect of Covid-19, which has been frequently examined in the past years, on the expectations has also been included. In Chapter 4, several most cited CCIs, which are the most basic variable of both Turkish case and international studies, are explained by including the theoretical and methodological framework of the indexes. Chapter 5 is devoted entirely to empirical literature. In this section, cited articles are divided into two study categories that first use consumer confidence in macroeconomic forecasting and second studies that examine the effect of consumer confidence directly on the monetary policy, financial market or in general macroeconomic structure. Considering the historical development

of these two issues, empirical literature has been written. Then, in chapter 6, econometric analysis started. Here, first of all, the purpose of the research and information about the data set are explained. Subsequently, the methods to be used in the analysis were reviewed. Finally, the results obtained by applying econometric methods to dataset are reported. After all, the Chapter 7 presented as concluding section. The final outputs of the thesis are presented briefly.

CHAPTER 2

NOTION OF CONFIDENCE IN ECONOMIC FRAMEWORK

2. 1. Concept of Confidence

Academics and researchers widely acknowledge the importance of trust. Because trust enables collaborative efforts to happen. It is a key that determines how person will behave in bond with other parties. Similarly, confidence emerges based upon this impression. However, even though they seem to be synonymous, there are also differences in the definition of trust and confidence (Mcknight & Chervany, 1996). The concept of confidence has been a highly studied phenomenon in social sciences. So that; many different interdisciplinary views have contributed to the definition of confidence. Although in some cases trust and confidence are used replaceable, there is a clear distinction between them. While trust is a manifestation of relationship-oriented emotions, the concept of confidence includes instrumental and computational approaches (Earle, 2009). The definition of confidence in the dictionary is the quality of being reliable in your ability, plan, future, or trust in people (Cambridge, n. d.). In this direction, when the primary studies in the literature are taken into consideration about confidence, the pessimistic thoughts of consumers about the state of the country's in the economic field can damage the macroeconomic structure of the country by affecting many variables, even if the basis of these thoughts is not based on economic problems (Matsusaka & Sbordone, 1995). In this case, it is seen that not only economic issues, but also other political and social events that may have a nationwide impact can affect confidence. In this sense, when defining notion of confidence or trust these concepts should be considered multidimensionally. Thus, Coleman (1988) stated that, the definition of the individual, whose social aspect of the economy is ignored, is no longer sufficient. Because this definition has been incapable to examine the impact of individual relations and the social norms that will arise from them in economic life since economic transactions are influenced by fundamental concepts such as trust and expectations embedded in social relationships. For that

reason, particularly when the social dimension of the term is considered, it becomes clear that there are several types of trust. In this way, different distinctions and definitions for trust types are used in the literature. Bachmann (2003); is divided into three main groups and treated them as different definitions of trust. While the trust formed as a result of the sincere and daily relations between two individuals is described as *personal trust*. *System trust* is characterized as the type of trust that emerges especially in the field of organizational relations at the end of processing the impersonal social structure. Lastly, *institutional trust*, trust between individuals in the face of existing impersonal social rules. Another classification that is frequently cited in the literature belongs to Uslaner (2003). According to the researcher, trust is divided into three categories and these different types of trust can be called strategic, moral and social. In this manner, the notion of trust can be based on comprehensive systems and norms established collectively as well as interpersonal ties. Thus, since the concept of trust is in many social formations, various social sciences have been discussed in this field. Mainly in the economics literature, trust is often regarded as a bond against an institutional structure. Thus, confidence can be considered as trust link both to individuals within institutions and to the structure existing within the institutions' systems (Halis, et al., 2007). Ultimately, confidence in the economic sense focuses on a generalized basis, rather than examining events in which only a few parties were affected. Thus, in the science of economics, the scholars deal with the social organization of economic life, and it has been argued that trust or confidence are fundamentally effective in economic functioning (Tonkiss, 2009).

2. 2. Economic Confidence

Economics has a vital role in civil society theories. Based on this definition, there is a relationship between the trust of the individuals who make up the society to each other and the confidence towards the state. In this case, the concept of confidence in associating economic activity with the collective point of view meets with social capital theories (Tonkiss, 2000). Because confidence is the agreement of the parties making decisions in the economic sense not to harm each other in mutual transactions. In this context, confidence is equal to the trust people in society have for each other. In a way, economic trust can also be seen as social capital. (Özsağır, 2007). Coleman (1988) also gives an explanation of the social side of the economics. The idea that

economics accepts societies only as devices of transactions is invalid as all consumers are social beings. Because it has been seen that implicit bonds of confidence dominate in all economic transactions. However, nations may differ in their social norms and cultural values. That's why the level of trust of societies differs culturally. Societies with a high degree of trust agree within the framework of common ethical values, and the level of interpersonal trust in these societies is relatively high. In low trust societies, the opposite understanding prevails. This psychological structure affects the way they do business. Therefore, the economic growth systems of nations with varying degrees of confidence are different (Fukuyama, 1995). Favourably not only the level of economic development among nations, but also it is possible to explain the regional economic differences in terms of confidence. Because regional economic structure and economic development gap in these regions can be explained by differences in interregional social structure. It is possible to clarify; strong social ties in the region support social trust. As a result, all economic actors increase economic progress by trusting the economy (Putnam, 1993). The point of view of Bourdieu (1986) on this issue is also causally related to the social dimensions of the economy. Social trust has been described as an item that individuals deliberately collect for the purpose of providing economic benefit. Therefore, social capital is augmented by cultural and economic capital. The idea of social capital is built on the phenomenon of trust in society. Apart from this, other studies in the literature show that there is a relationship between social cohesion and social trust, and as a result of this relationship, overall confidence has a positive effect on the economy. In this respect, it cannot be ignored that the source of trust in society is the economic conditions in that region (Forrest & Kearns, 2001). The idea of social capital confirms the importance of trust, solidarity, and collective action for solving social problems. Thus, it indicates that untamed individual interests and actions will reduce the welfare in society and critiques the uncontrolled free market. Ultimately, a person's trust in the society he lives in directly affects economic life. There is a positive relationship between social trust and a successful economy (Bowles & Gintis, 2002). Similarly, the relationship between confidence and economic activity has also been examined by antecedent scholars. Because the idea that economic fluctuations can make changes on expectations and confidence goes back to the views of a century ago. As Pigou (1927) stated; the effect of economic factors whose source is not based on the actual economy depends on the optimism or pessimism of the traders, especially in cases where the risk cannot be

measured and therefore confidence is low. In other words, the forerunner of major economic changes depends on the society's view of the economic conditions. In addition to this approach, it can be said that Keynes' (1936) views also acted in common with Pigou. For example, the definition of animal spirits clearly demonstrates the link between confidence and macroeconomic indicators. Especially from the consumer's point of view, previous economic indicators can directly affect consumers' decision to purchase a good, as well as affect their confidence in future economic conditions. Households can change their economic decisions in the light of macroeconomic signs. Hence, psychological perceptions such as confidence cause the consumer to interpret economic developments subjectively and act accordingly. At this point, measuring and indexing consumer confidence in the context of economic confidence has gained importance in order to show the macroeconomic structure of the country. Ultimately, evaluation, which does not only include economic changes, but also from a social and psychological perspective, is essential. The preliminary studies in this direction are based on the work of Katona (1974), especially in the context of the consumer. Since consumers' spending or saving behaviour does not depend only on macroeconomic movements in view of the fact that to explain these behaviours, confidence needs to be measured.

2. 3. Consumer Confidence

The first modern studies to measure consumer confidence date back to the 1950s. University of Michigan researchers conducted a survey to measure consumers' sensitivity to the economy. This analysis is a pioneering study to measure consumer sentiment, and also; a similar variation today still in use as The University of Michigan Consumer Sentiment Index (MCSI). This study uses the survey method to measure the spending decision of consumers. The purpose of choosing the survey method is that it will be difficult to predict consumer behaviour, particularly at the turning points of economic life. Thus, surveys are seen as a substantial tool both in understanding consumer behaviour within the macroeconomic life and in estimating consumers' future expenditure conditions (Çelik & Güneş, 2010). The main fact to be measured with consumer confidence indices like MCSI is how optimistic consumers are about their personal financial situation along with the general economic situation of the state. The change in confidence creates a general effect, as the consumption or investment

decisions of individuals within the framework of their own economic situation will collectively affect the macroeconomic situation. Thus, momentary changes in confidence may change the factors that determine economic activity such as industrial production (Mendicino & Punzi, 2013). Correspondingly, in line with these considerations there is a link between consumer sentiment as well as confidence and the variables that reflect on all parties in the economic field. Because, as investor confidence is associated with returns, as does consumer confidence is also related with stock returns (Charoenrook, 2003). Similarly, since political events in the country directly affect both sides, it is also another area in which consumer confidence is linked. Because political fluctuations that may cause stress in the markets directly affects confidence. Considering the drastic movements in economic indicators during a political shock play a vital role since it provides an observing change in confidence. The reason for this is that there are sudden fluctuations in consumer confidence in countries where political shocks are experienced. This case is also suitable in scenarios where recession or recovery occurs. Particularly, the variation experienced in macro indicators during recession and recovery are important in understanding and estimating the change in the confidence trend. Such fluctuations are helpful in understanding the impact of a political shock (Dees & Brinca, 2013). Although a small number of variables explain most fluctuations in the consumer confidence, the data may be insufficient as they may ignore unusual systematic factors. Since extraordinary events affecting all economic balances demonstrate major changes in consumer sentiment indices. However, in order for their direct reflection to be observed, political, non-systemic events should also be included in the process. Because the high volatility in consumption demand experienced in such periods of political or economic crisis is similar to the crisis that will occur in another period, and projections for the estimate future complication can be made based on consumer confidence (Garner, 1981). Eventually, it is persuasive that, changes in consumer confidence can be decisive in times of crisis. Since, consumer demand is sensitive to the macroeconomic and political changes. Apart from that, major political events that have taken place in recent history have greatly influenced the expectations and confidence of households as economic actors. Thus, the political dimension underlying economic trust is also significant and a beneficial area to investigate (Haller & Norporth, 1994).

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It has been discussed in the social sciences literature as well as in public administration practices that consumer sentiment is a fact that affects the economic structure of the country. Although consumer confidence basically denotes an economic concept, it also characterizes a statistically measured concept. From a statistical point of view, the definition of indices that measure consumer confidence or sentiment is clear. The indices quantify the future expectations of consumers according to their own economic income and also the current situation in their country, through surveys applied to households. However, the explanation of the concept within economics is a debatable subject. Since scholars have regularly investigated the relationship between consumer confidence and various macroeconomic indicators (Fuhrer, 1993). Based on studies that are frequently cited in the literature, broadly consumer confidence in economic perspective varies and supported by different theories. As a precedent, Acemoğlu & Scott (1994)'s, study aimed to examine the relationship between consumer confidence and rational expectations. Because they specified that the concept of trust is including many dimensions and does not depend only on economic indicators. To clarify this, they attached REPIH to study, therefore in line with the results they have reached, there is a link between consumer confidence and REPIH. Similarly, there is a positive correlation between trust and the current economic situation. Accordingly, it is legitimate to assert that, there are many factors such as the psychological states of individuals and expectations of consumers are effective to determine confidence. In parallel to this statement, consumer confidence can only be used as an independent variable in determining consumption expenditures. However, other variables are needed to determine the consumption expenditures for the next period. These include economic variables, expectations and so on. Therefore, in the economic context, consumer confidence has an intricate structure due to its many sub-components (Carroll, et al., 1994).

CHAPTER 3

FACTORS AFFECTING CONSUMER CONFIDENCE

Consumer confidence surveys can be examined in more depth because they include the subjective opinions of the participants. In this way, rather than just determining an index value, it also illuminates the reasons for the consumption expenditure decisions of the participants. While constructing consumer confidence surveys, researchers also want to examine the underlying meaning of the respondents' answers given in the survey questions. In this direction, there are also component questions in the questionnaires. These components include both consumers' views of the present state of their economy and their expectations for the future. Because although the sample surveyed by each institution is different, it is expected to give approximately the same result geographically since similar issues are examined (Ludvigson, 2004). In particular, there are some similar aspects that emerged as a result of the comparative evaluation of consumer confidence indices. For instance, Bram & Ludvigson (1998) compared two consumer confidence indices frequently used in the United States, which are the MCSI and the Conference Board's Consumer Confidence Index (CBCCI). Although the aim of the researchers is to compare the forecasting power of these two surveys, it is valuable because it shows the areas that the two surveys want to examine in common. In essence, this research showed that MCSI and CBCCI both aimed to measure consumers' economic expectations for the next period, their spending tendencies, and their views on the general economy with similar questions and scenarios. Thus, regardless of the institution administering the survey, the criteria to be measured regarding consumer confidence and the factors affecting consumers attitude are in common. Additionally, in indices related with confidence, the indicators that make up the various macroeconomic perceptions of consumers cannot be handled individually. For this, the factors that make up the economic perception should be considered in a general framework. Because the shortcomings of singular answers such as disposable income or propensity to save can only be possible by taking into

account the factors commonly used in the literature (Malovana, et al., 2021). By consequence of these, it can be asserted that the core of the sub-components examined in various confidence indices consists of political events, financial crises and consumer expectations for the future, which embedded in the survey questions.

Contrary to these thoughts, although many academics say that the results of the CCI are a valuable indicator, nevertheless there are scholars who do not agree with this. Because they argue that confidence does not make any significant effect and that there is no relationship between consumer confidence and current spending decisions. This idea, which is sceptical of consumer confidence, argues that consumers do not spend confidence and they spend regardless of factors linked with consumers' perception. However, empirical studies examining the relationship between confidence and economic factors, also the theoretical background of these studies indicate that consumer confidence changes depending on expectations and externalities. These psychological changes directly affect the purchasing behaviour of individuals. Because particularly researchers can observe the connection between the misery index and CCI. The economic discomfort index, also called the misery index in the media, broadly; gives the sum of the seasonally adjusted unemployment and inflation rate. If this index value is high, it is claimed that a general depressive sphere prevails in the economy due to high unemployment and inflationary market conditions. Since this wave of negativity will affect not only production but also consumption, it is seen that economic growth is low in countries where there is economic discomfort, due to lower expenditure of consumers. That's why, the psychological state of consumers cannot be considered independently of macroeconomic conditions. Because negative situations affecting the general economic structure will influence all economic actors and therefore will also affect the confidence of the consumer. Similarly, the previous studies of the researchers clarified that the positive or negative perceptions that spread throughout the society become evident in economic indicators even in the short term. In fact, it has been argued that consumers' expectations for the future of the economy are a very dominant indicator in terms of impact on the amount of spending in the next period. Thus, since it is known that consumer expectations are also dependent on the political stability and health of the financial structure in the country at the macro level; there is a direct and intricate relationship between political issues, financial situations

and expectations in terms of influencing consumer confidence (Curtin, 1982; Garner, 1991; Eppright, et al., 1998; Lovell & Tien, 2000).

3. 1. Expectations

Consumer confidence studies generally aim to qualitatively examine consumers' current thoughts and future interpretations. In particular, the responses received from consumers about the future state of the economy are related to expectations. Since reputable indices use the term expectation as a subcomponent of the CCI, they used questions that directly measure expectations in their surveys. For example, CEI is published in University of Michigan surveys as a subsidiary of CCI. Therefore, expectations have always had a strong impact on the future of the economy and measuring this strong impact has been a major concern of economists (Ludvigson, 2004).

In the economics literature, expectations are defined as estimations for the values of future economic indicators. Therefore, various assumptions about the future period form the basis of economic expectations. Since economic units will change their behaviour in the period they are in, based on their predictions for the future, expectations will not affect the future only but also the present condition. That's why in economics, the term expectations affect both producers and consumers. Particularly, if the consumers' side are examined; while households make consumption expenditures, they make price predictions for the future. Estimating the price of money, especially in purchasing decisions, is an important issue for consumers. Thus, the scholars defined the expectation as, it is the estimation made by the decision maker for uncertain economic values for the next term which would affect today's action. Another important aspect of expectations is that; they are subjective. The concept of expectation has no independent meaning without the economic decision maker. Although it is personal, the concept of expectation in the market also refers to the cumulative expectation of all individuals. (Carter & Maddock, 1984) Analysis of the world's major economies have confirmed that consumer expectations measured within the scope of CCI are in a causal relationship with fluctuations in various indicators in the country. For example, analysis on the US has shown that aggregate consumer expectations are influential in predicting future spending. In addition, based on the results of the survey on consumer confidence in China, it has been determined that

there is a significant relationship between CEI, production and industrial output. Because expectation shocks can affect economic outputs even if they are not economically based (Eppright, et al; 1998; Li, 2011). In similar line, when the Turkish case is examined, it is observed that the quantity of studies on consumer confidence and expectations has increased recently. Initially, since expectations are very substantial in terms of influencing financial markets, researchers have examined consumer expectations by taking into account financial indicators. Especially recently, studies on the effects of expectations on financial markets are used in the estimation of financial assets. Because parties in the economic activity make their decisions in terms of their emotions and these emotions are built around expectations. Similarly, investors make their decisions in uncertain environments, there are always risks for the future. For this reason, investors shape their incomplete information about the future with their expectations (Köse & Akkaya, 2016). In essence, as Garner (1991) points out, consumers' positive or negative expectations for the future of the economy, based on the general condition in the country and their own financial structure, have different results in the economy. Because expectation directly formed consumers' tendency. Since this effect occurs in decisions such as consumption, investment and saving, expectations directly affect macro decisions. In this way, it is decided that expectations are at the basis of the decision-making process and this will be based on confidence and also at the end of these stages, it became a tool to determine the macroeconomic indicators.

3. 1. 1. Effect of Covid-19 to Consumer Expectations

The damage caused by the pandemic, especially in the economic field, is widely discussed as a subject worthy of research within the framework of consumer confidence and expectations. The negative impact of the coronavirus on the macroeconomy is evident in all indicators. But, in order to understand the negative economic impact of the outbreak, it is necessary to examine the economic transmission channels where shocks will have a critical impact. There are three main pillars to observe the impact of Covid-19 on the economy. These can be divided into groups as direct, indirect and supply-side. Basically, in the supply side, as the restrictions reduce or completely terminate production activities, the demand for labour decrease and in accordance with the employment rate decrease due to layoffs. This process would also

harm the supply chain. Indirect effects are the effects of the shock on the real economy through financial assets. As the household income decreases, it will be possible to see less consumption expenditure and more savings. Lastly, direct effects are clearly related to the psychological state of consumers. Social distancing and the long-lasting isolation prevent people from making arbitrary consumption expenditures by keeping them at home, and more cautious spending is made due to future uncertainty. This is due to the existence of pessimistic expectations in the long run and is a phenomenon that reduces consumer confidence (Carlsson-Szlezak, et al., 2020).

The pessimistic atmosphere experienced in this process created serious uncertainties and particularly advanced economies suffered serious damage due to the lockdowns. Coibion, Gorodnichenko & Weber (2020) studied how local lockdowns causally affect household macroeconomic expectations and spending in the US by using survey method. According to the responds, there was a serious decrease in consumption expenditures and employment rate. Households whose income has decreased have reduced all their consumption and especially their travel and clothing expenditures have almost stopped in the short run. Under all this economic downturn, consumer expectations have also become extremely pessimistic. However, it was also stated that pessimistic expectation effect, which emerged as a result of local quarantine practices and uncertainty, will shift to a positive direction in the long run and expenditure would increase accordingly. Similar outcomes also revealed in the study conducted by Binder (2020), it is analysed which expenditure items of consumers increase, and which ones decrease by survey method. Similarly, it has been observed that consumers cut their spending for travel but overspend on food products. On the expectation side, the most remarkable result is consumers are linking serious concerns about the coronavirus pandemic to higher inflationary expectations. Commonly respondents' inflation expectation acts as a tool to express the pessimistic feelings of the consumers. In other words, it is pointed out that the general negative expectation of consumers during the outbreak is high inflation that will be encountered in the future periods. Ultimately, the measures taken against the coronavirus caused a sudden cost with a social and economic shock effect. However, the policy makers' dilemmas about the functioning of the economy or preventing the spread of the virus showed their impact most during the lockdown. Because the isolations and the cessation of working life created psychological pressure on the households, and as a result of this intimidation,

consumption expenditures were cut as much as possible, while the confidence and expectations of the consumers became seriously pessimistic (Brodeur, et al., 2021).

3. 1. 2. Theoretical Approaches of Expectations

Theoretical explanation of expectation has been discussed for a long time in the economics literature. Essentially, it provides perspectives on how economic agents can predict and interpret future economic indicators. As a result of these predictions, it is interested in how the economic units will take action. In this direction, scholars from various thoughts have put forward different approaches. Considering its historical development, three basic theories can be mentioned. These are static, adaptive and rational expectation hypotheses. In macro sense, initially, economists put a static framework to expectations in the formation of consumption and investment decision. Later, with the support of various schools, expectations gained a dynamic dimension and became a vital economic variable adopted by many economic units after the defining of the notion of rational expectations. Since in contemporary works, the role of expectations in the decisions of economic parties such as consumption, savings and investment are evaluated at the point of shaping the economic policy. Therefore, it is crucial to discuss the authenticity of these theories, as expectations are an important criterion for evaluating the behaviour of economic agents (Yaşar & Ceylan, 2020).

Static expectations propose the most primitive and simple explanation of the process by which the expectation occurs. It expresses the expectation that the situation in any economic indicator will be the same in the future as it is in previous period. However, although the theory constructs a fixed expectation model, it always needs an error term for its application to reality. Because there is a margin of error between expectations and the actuality in the economy that cannot be fully explained by the available information. In this direction, in order to develop this process, the adaptive approach explains the concept of expectation from a broader perspective. In this case, in the formation of the expectation, not only the information from the previous period, but also the information covering a longer period of the past is used (Cengiz, 2007). When the relevant literature is reviewed, it is thought that adaptive expectations theory was first used by Fisher in 1911 to explain economic agent behaviours. However, it was with Cagan's work in the 50s that the model fit into a theoretical framework. Later, this theory gained great momentum and was discussed by economists of the era. Then,

the approach developed to monitor investment and consumption behaviour as well. Particularly, in the consumption dimension, Milton Friedman's study (1957) used the theory as a method of generating permanent income.

The main criticism of adaptive expectations theory is related to how the theory handles the data. It is unrealistic to overlook only at historical data, as economic agents will evaluate not only past signals but also the situation, they are in. Similarly, according to the theory, agents make their expectations against any economic indicator only by using the observations of that data. However, it is more suitable to real cases to examine the other variables that affect that indicator. For this reason, although the theory of adaptive expectations remained a popular topic in the literature for a long time, eventually, the consideration of scholars shifted to other expectation approaches. In a nutshell, the adaptive expectations theory began to be well-known and hardly questioned from the 50s to the late 60s. It was not completely uncontroversial but stayed widely used as a toll regarding the adjustment of inflation expectations and numerous other factors for almost to two decades. In the 1970s, the theory fell out of favour as the research community shifted its focus to other approaches, and rational expectations theory became overwhelming (Mincer 1969; Parkin, 2008; Tunalı, 2009).

The rational expectations approach is an equilibrium concept used in self-referential dynamic economic models. This refers to the type of model that shows that endogenous variables are affected by expectations about future values predicted by economic agents. This concept first entered the economics literature with two articles written by Muth (1960) and (1961). According to this approach, all actors use information effectively and economic actors have full knowledge of all the factors that may affect the indicator when predicting the future value of any economic variable. In addition, individuals use all the information they have in the process of shaping expectations while making their economic decisions. The theory, which is frequently mentioned in the macroeconomics literature, has been studied empirically as the estimation of inflation expectations of individuals (Sargent, 2010). The device that distinguishes the theory from other expectation approaches is the discussion of the existence of rational expectations rather than adaptive expectations. Because actors with rational behaviour will take action against changing economic policies. For this reason, it is thought that economic policies do not affect the expected result. In this approach, since individuals will use their knowledge effectively, they can predict the

possible consequences of an effect that will change the economic functioning and take a position against it. Therefore, economic agent cannot make a systematic error (Aktan, 2010).

Criticisms of the rational expectation approach take shape at this point. Because economic individuals are likely to make systematic errors. Also, the assumptions on which the theory is based are very broad. According to the approach, economic agents are assumed to be more knowledgeable than economists since all individuals have all relevant information (Shaw, 1987). In analogous manner, Gaytancıoğlu (2018) stated that, rational expectations can have devastating effects on stabilization policies. If market participants form rational expectations of policy interventions this can render policy ultimately ineffective. Ultimately, the two major concerns related to the theory are: Initially, it is not possible for economic actors to access all available information while creating an expectation about an economic indicator. Secondly, other criticism is related to economic models. It is very difficult to reach an optimal model, that all literature agrees. Therefore, since the change of all economic indicators cannot be known, agents with incomplete information may build an expectation that are far from the actual. Consequently, like other approaches, rational expectations also have shortcomings.

3. 2. Financial Crisis

Financial crises are phenomena that have occurred many times in economic history. The environment of uncertainty in the future macro situation is one of the biggest sources of crisis. Another important factor is that every crisis can be seen as a pioneer of change in society. Therefore, since the society reacts financial crisis it would lead the scholars to investigate the linkage between the consumer confidence and financial crisis (Allen, et al., 2009). The role of trust in the financial crisis has been discussed for centuries in the literature of economics and sociology. Since trust is known to play a critical role in the functioning of economic life, it is not surprising that confidence is the keyword in financial crises. According to academic research, industry officials or policy makers, the concept of confidence is claimed to be at the centre of current events in the world economy. In fact, market players are so sensitive to this issue that when trust in a company or government is lost, the value of shares or bonds falls drastically. Therefore, one of the most fundamental goals of economic actors is to allocate

confidence to citizens (Swedberg, 2012). In particular, the crisis experienced in last decades is an example in explaining the place of trust in the time of recession and the effect of crises on consumer confidence. In advanced economies after the war years, the biggest events that shocked the global economy were the financial crisis. When we consider the crisis in 2008, the crisis first started in countries with great economic impact and then spread to other countries. The slow pace of economic activity experienced all over the world primarily affected consumer confidence. Since, in 2008 the slowdown in economic activity has left its place to a great uncertainty, especially with the declaration of Lehman Brothers' bankruptcy. Under these unstable conditions, the consumer side gave the first reaction and the households reduced discretionary spending, particularly, manufactured good demand decreased. Also, during the time of great recession, the main view put forward in order to make sense of the general sudden economic deterioration experienced throughout the world in 2008 is the confidence-shattering events that happened consecutively. The loss of confidence and sudden turmoil in the financial markets were reflected in the economic indicators and consumer confidence indices of developed countries (Edey, 2009). It is possible to read a similar situation via OECD (2021). The data announced as OECD Total BCI, CCI & CLI covering all member countries show the connection between financial crises and confidence. CLI, it is an indicator calculated with the aim of predicting the growth and contraction levels that will develop outside the ordinary course of the economy. Thus, signals of fluctuations around the potential level of the economy are anticipated. This indicator naturally decreased in 2008. However, the confidence levels of consumers and businesses have also decreased due to the economic stagnation and uncertainty in that year. It is possible that advances in communications and the faster transmission of financial news have contributed to this swing of confidence being more synchronized. Figure 1 and 2 display the correlation between these indicators during the time of great recession.
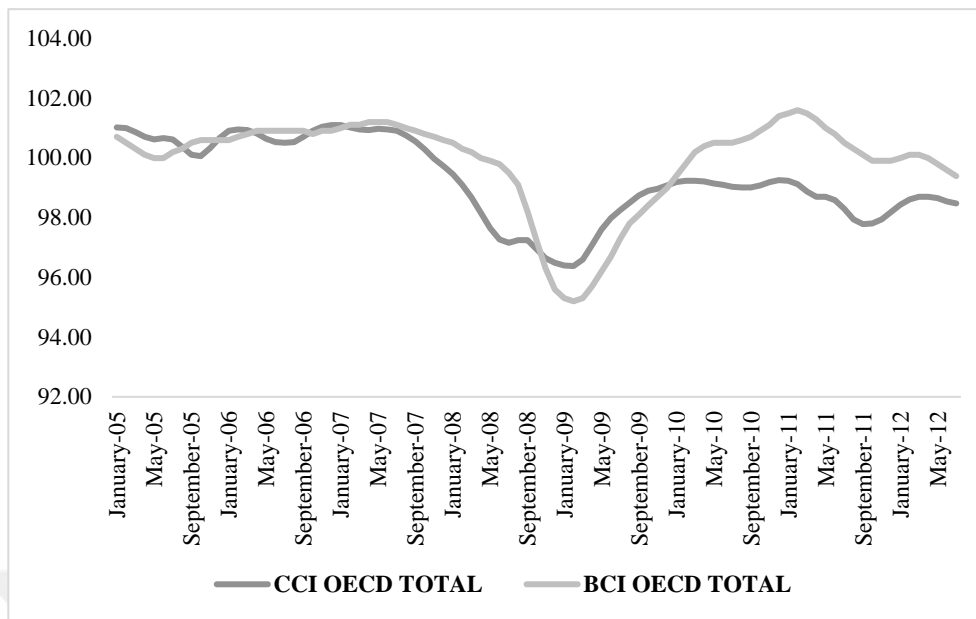
Figure 1. Timeline Graph of CCI and BCI of OECD During 2008 Crises
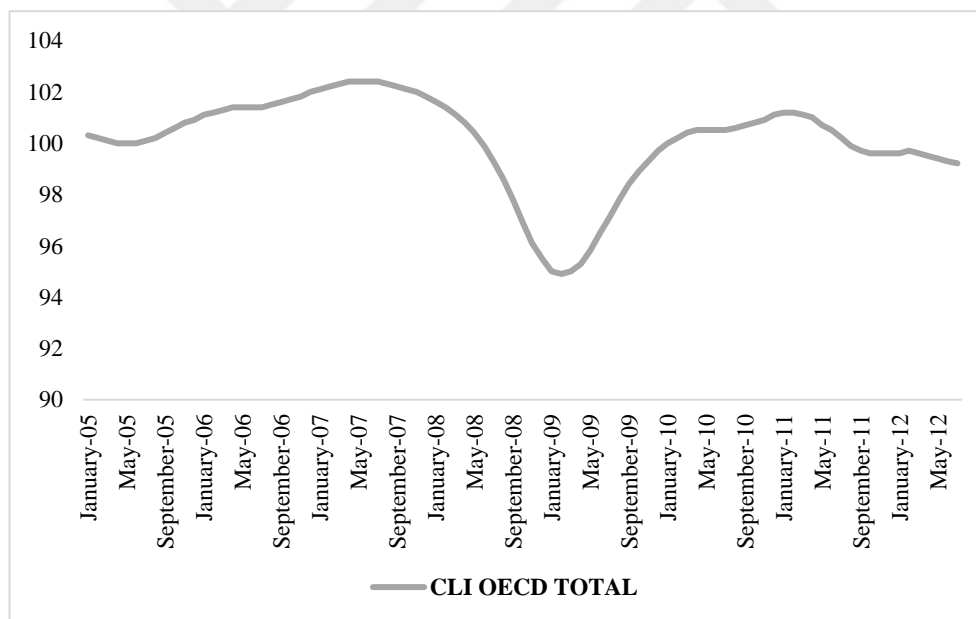
Figure 2. Timeline Graph of CLI of OECD During 2008 Crises

Comparably, when the case of Türkiye is examined, it is noticeable that the CCI fluctuated before 2008 in parallel with the OECD Total and followed a decreasing trend towards the end of 2008. After the effects of the crisis diminished in the world, the leading indicators and confidence indices continued their normal course in Türkiye. However, the fact that the fluctuation movements before the crisis showed

similar pattern to Garner's (1991) study constitutes a subject worthy of discussion. Because the study revealed that the CCI in the US was a signal for consumption expenditures during periods of over-fluctuation. Therefore, consumer confidence can play a leading role for the next periods, especially if it is very volatile. The reason for this is that the CCI has been found to give better results in predicting future consumption during periods of high volatility. Thus, since there are intense fluctuations in the CCI during financial crisis periods and the index is a leading indicator for future consumption expenditures, it can give a signal for other macroeconomic indicators.

In similar vein, another study through Turkish case shows that; the trends of data on consumer confidence change and consumption expenditure growth are similar. Therefore, there can be inferences that consumer confidence can be a leading indicator of consumption expenditures in many periods (Özdemir, 2013). In the light of previous studies and OECD data, it is seen that consumer and business confidence has fallen during times of crisis. However, particularly if sudden changes in consumer dimension are followed, it has a potential of being a leading indicator of the trajectory of other economic variables, especially future consumption expenditures and other related indicators. Figure 3 indicates the change of CLI, CCI and BCI during the 2008 financial crises in Türkiye.

Although the 2008 crisis, one of the most recent financial crises, has been frequently investigated in the literature, there are studies that explain the relationship between financial crises and confidence in general. As a precedent, Roth (2009) has examined the trust of households from different angles after the 2008 financial crisis. The study conducted on Europe shows that in the post-crisis recovery period, most of the citizens feel a serious distrust of international institutions. The time range after the crisis is the period when the European society's confident in the ECB is at its lowest. But despite low confidence to the ECB at a time when the effects of the crisis are beginning to wane, the public still relies on their own government. The trend of citizens' trust in European institutions, as opposed to national government trust, highlights the importance of instilling national concerns and systemic trust in financial crises. In the post-crisis period of insecurity, it has become particularly essential to give consumers the confidence to push them to spend. The governments that successfully manage this

incident by giving confidence to the consumers are the countries that are least affected by the negative economic situation created by the crisis.
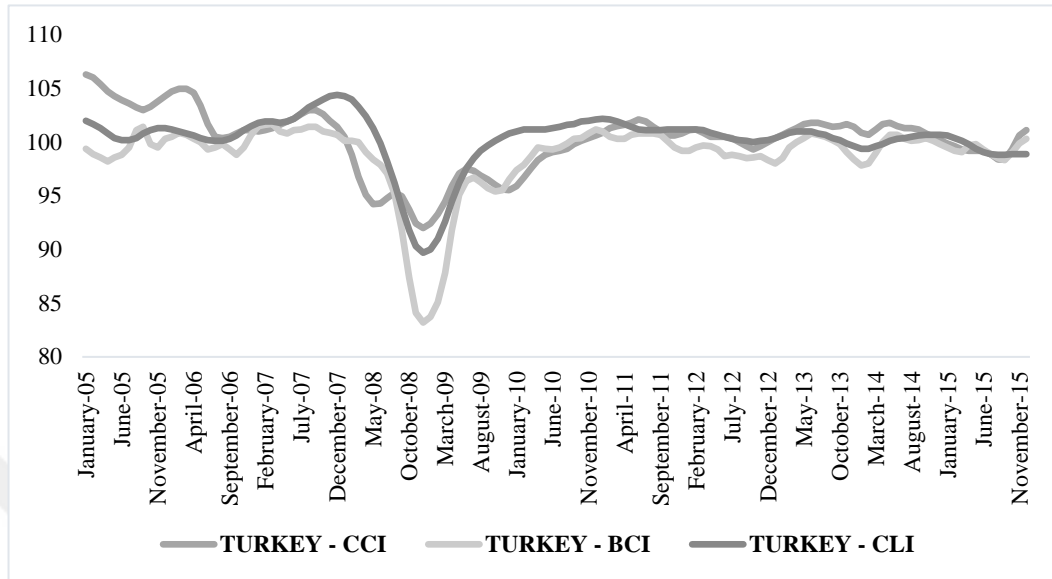
Figure 3. Timeline Graph of CCI, BCI and CLI of Türkiye During 2008

Based on this context, the way societies perceive the situation during the time of crisis is also considerable. Considering that there are different social groups in the society, the way various communities perceive the economic crisis may change. For instance, the indicators that sectoral experts take into account and the macro indicators that concern ordinary citizens are different. As a result, the economic confidence of people from different occupations and socioeconomic groups changes. In psychological economics framework, based on the theory of social representations, the thoughts of the communities on the 2008 financial crisis were examined. It has been identified that social representations have different views on three different psychological determinants. These are a bias based on identification, knowledge about the economy and sentiment of negative thoughts and attitudes. In light of the study, it was found that economic indicators to determine confidence are meaningful but not important for regaining confidence. Instead of directly conveying to the public that the economy is improving with indicators, household feelings and economic information about the crisis should be addressed. Because, as the economic knowledge of individuals increased, it was seen that the predictions of a post-crisis economic recovery increased. Similarly, economic information, as well as the belief in laypeople that policy makers are moral and competent, is highly effective in regaining economic confidence.

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Apparently, in an economy affected by a financial shock, trust in politics also affects public confidence in the economy. It is understood that this is a fundamental factor creating optimism in the economic recovery, also positively effects consumption and investment trends (Gangl, et al., 2012). By considering these studies, it is obvious that the impact of investor and consumer confidence was frequently discussed, especially in the recovery processes after the financial crises. The precursors of the crisis, such as the decrease in overall trust and low confidence that occurred with the crisis, have been frequently investigated in the literature as well. However, it should not be ignored that overconfidence can also lead to financial crises. As Scheinkman & Xiong, (2003) elucidated that, speculative movements in financial markets have been estimated to depend on the overconfidence of investors. The researches stated that investors' tendency to interpreting the value of an economic asset causes excessive trading volume in the markets. Thus, the excessive confidence in the investors or consumers towards the market also gives the opportunity to the formation of bubbles. As a result, the concept of confidence in the economic agent, whether high or low, drives speculative moments to the economy, and the link between overconfidence and investment can cause financial bubbles, as the bubbles occur market failure, financial crisis occurs. In particular, researchers have observed that economic bubbles, which are created by the confidence, are tools that harm the functioning of the financial system.

Ultimately, when the results of academic research, the thought of ideologist and the views of policy makers were compiled, it was understood that they agreed on the view that the feeling of no confidence in the market lies at the root of financial crises. Indeed, it is a very popular idea that the global financial crisis is actually a crisis of confidence. Because in recent years the market has experienced many times that the drop in confidence caused a financial shock. Therefore, contemporary approaches claim that confidence is the basis of economic functioning. It was claimed that the effects of the crises lasted longer due to the decline in confidence during the recession. Thus, in the economic context, confidence is important not only for the guarantee of interpersonal transactions, but also for the healthy functioning of the macroeconomic structure in any state (Tonkiss, 2009).

3. 3. Political Events

Confidence, as argued in the economic literature, is a very popular concept in other social sciences. To exemplify in psychology and political science scholars widely studied social trust & political events. In one article scholars discussed the economic and political aspect of consumer confidence. De Boef & Kellstedt (2004) stated that; election periods are times that infuse hope and confidence in the society. For this reason, it is observed that future expectations in various communities shift to an optimistic perspective. The increasing optimism of the people during election emerges particularly during the pre-election periods when the economy stagnates. Because policy makers' campaign promises are filled with speeches that include actions or laws designed to stimulate the economy and aim to change consumers' perspectives. Also, the wave of optimism is continued by the partisans of the elected politicians after the election. Because confidence in elected public officials determines the household's perception of economic management. The tendency to positively position the expectations and confidence of consumers who think that the economy management is competent is a result of this. In addition to the elections, extraordinary political conditions also affect consumer confidence. But examining the impact of these events is more complicated. Because the evaluation of extraordinary political movements such as war or administrative shocks is made individually. Therefore, the sources that consumers receive these news significantly change the inquiry process. Fundamentally, political events occurring throughout the country are reported to the public through the media and people examine the events with their subjective evaluations. Hence, although the impact of political events on consumer confidence is clear, it is difficult to analyse the relationship since it is difficult to obtain the direct impact.

Throop (1992), who studies consumer sentiment, defends the argument that political events affect consumer behaviour in their article. While the economy is running its normal course, consumers' spending decisions can be explained by standard economic theory. Under these conditions, the assumption is valid that households determine the amount of their spending and savings depending on the income and wealth effect. However, in situations of political shock, spending decisions are not so smooth. For instance, after Iraq's invasion of Kuwait in the 1990s, the US sent troops to these

regions to intervene in the war. That's why uncertainty in American society plus discomfort among individuals under these extraordinary circumstances affected consumer confidence. It is possible to observe this from both the decrease in expenditures and the results of the consumer confidence surveys. Therefore, in the US, the MCSI hit its lowest levels in its history from August to October in the year 1990 just due to the Gulf War with no significant economic background. In fact, this result is in line with Katona's (1968) views. The researcher, who connects the cognitive processes of economic actors to various variables such as the decision to make consumption expenditures, argues that individuals are not only limited in the micro field, but also that the general economic structure of the country and the political events that affect the system influence the psychological decision-making processes by changing the emotions of the individuals. Such as, the negative effects and uncertainty occurred by political and financial incidents create pessimistic fluctuations in consumer behaviour. Therefore, consumers take precautionary measures due to large-scale events in the country.

Particularly, Bloom (2009) attributed the consequences of political events that had great repercussions in the country, such as market volatility and insecurity, to uncertainties. Political movements such as the oil crisis and terrorist attacks, which have a sudden and unexpected effect in the country, cause an increase in unemployment and a decrease in the total amount of output. Therefore, it is clear that uncertainty shocks have negative effects on the real economy. The main reason for this is that high uncertainty has caused companies to temporarily diminish production due to the risk and also lay off workers as an additional measure. That's why changing real economic conditions as a result of political shocks affect consumer expenditures and psychological state of individuals. Thus, uncertainties are embedded in the consciousness of the consumer and affect their confidence in the economic structure about the country.

When confidence viewed from a broader perspective, out of the context of consumer, it is understood that there is a link between the trust of societies in political institutions and the democratic management of the state. Citizens governed by a democratic system approach political event more participatively. Since well-governed citizens have high political participation in a democratic country, their confidence in political institutions is high. Therefore, trust in policy makers and institutions creates a cycle

that will provide life satisfaction. The existence of such a cycle is important as it will not create a sudden feeling of insecurity in a possible political shock (Zmerli, et al., 2007). In similar perspective study of Olson (1993) based on politics explained that: Countries governed by democratic regimes are advantageous in terms of economic growth. Therefore, the emphasis on individual rights necessary for democracy is also important for the protection of rights and the implementation of agreements. Hereby, when political systems and all political events are also examined, it is seen that overall confidence in a state and CCI includes information beyond just economic indicators. Sentiment to political status that have no economic basis also changes consumer confidence (Neisingh & Stokman, 2013).

CHAPTER 4

CONSUMER CONFIDENCE INDEX

One of several variables used to predict the future direction of economic output is the CCI. Basically, the researchers tested how strong the confidence data were. The first studies used the CCI to estimate total consumption, as well as other macroeconomic data starting from the idea of economy shaped by psychological factors, which was put into the theoretical framework after Mueller and Katona around 1960**.** In addition, theorists from the Keynesian school have suggested that consumer confidence data can be used as an estimator in the consumption expenditures of individuals according to the answers given by the individuals in the subsequent surveys, if personal responds are taken into account. Various indices developed in this context were used to measure the spending tendencies of the participants and to learn the expenditure decision also basically their expectations in line with the general economic situation as well as personal economic conditions of the participants. At last following researchers used the index results obtained from the surveys within the framework of macroeconomic research (Dominitz & Manski, 2004). Consumer survey results have also been used by macroeconomic model builders, as they have the opportunity to predict crises with forecasts. For instance, Batchelor & Dua (1998) stated that the economic recession can be predicted in the light of fluctuations in the CCI. In addition, it is thought that it may be appropriate to use so called indices in estimating stock markets, which are determined to contribute to estimating economic changes.

When global studies are compiled, it is seen that consumer sentiment and comparison of especially major economies are frequently made. To explain this sentiment point, the researchers used the confidence indices of the countries. Because, confidence indices, particularly CCI are very valuable to make sense of the discomfort in general economic and socio-political conditions. That's why government agencies and private researchers in all developed countries conduct confidence surveys and make

comments on the economic trend. In the literature, the number of studies using EU and US-based data is quite high (Golinelli & Parigi, 2003). Not only foreign literature, but also researchers in Türkiye have worked on consumer confidence. Three indices stand out among the indices used in the country. These indices are used as data sets in articles. Basically, TURKSTAT, CNBC-e and Bloomberg indices were used to compute consumer confidence in Türkiye. Regardless of country, the questions used to calculate consumer confidence are similar. Although the most obvious difference between the questionnaires is the number of questions, the final result wants to reach out is same (Alkaçar, 2016). From this point of view, the indices used in the literature in Türkiye and abroad will be explained in the following parts of the thesis.

4. 1. TURKSTAT Consumer Confidence Index

Studies to evaluate consumer confidence in Türkiye started with the signing of the Consumer Survey Protocol in 2003. As a result of this agreement, the modules to be jointly managed by the CBRT and TURKSTAT were planned and attached to the annexes of Household Labour Force Survey. Testing studies to shape the survey design were carried out from April 2003 until December 2003. During the pilot test period, trials were conducted on the selected sample, a questionnaire was applied with different methods, and at the end of the 8-month period, it was decided to publish the tendency survey on a monthly basis. In the first tests, the questionnaire was designed in such a way that consumers answered questions under various headings with a Likert scale. The consumer survey, the outlines of which were shaped as a result of this process, started to be implemented in order to determine monthly consumer trends and expectations in the short term. Broadly, TURKSTAT tried to ascertain the consumers views on the general economic situation and households' financial situation through monthly consumer tendency surveys by considering propensity of spend and save. Thus, since 2004, the results of consumer confidence have been shared with the public (Oral, 2005).

The confidence index calculated by TURKSTAT takes a value between 0 and 200. If the index result falls below 100, it can be interpreted that consumer confidence is relatively low, and it also indicates the pessimistic situation among consumers. If it is greater than 100, it can be asserted that optimistic mindset prevails through consumers. The sample size of the questionnaire applied is 4884 households on a monthly basis,

and the participants can be any member of the family over the age of 16 in the sample. The individual who will participate in the survey on behalf of the family is selected randomly with a data entry program. In the computation of the data, it is done according to the balance method, which is also used by the EU as the calculation method. Balance coefficient for each question that represents tendencies is calculated by taking the difference of the percentage of those who gave positive responses from the percentages of those who gave negative responses. Later on, diffusion indices acquired by for every inquiry with plus 100 to the balance value. Finally, the TURKSTAT CCI is calculated by taking the of the arithmetic means of diffusion indices of the selected questions. In addition, the monthly TURKSTAT CCI takes its final form in the light of the data colleting from the 4 sub-indices of the CCI, including the economic situation and future expectations of the households, as well as the spending and saving trends. However basically, the sub-indexes contain the data that make up the three main pillars of the CCI. Because, as TURKSTAT stated in the analytical framework and scope, only some of the main issues can be explained with sub-indices. Therefore, TURKSTAT gathered the survey under three headings in order to reach the optimal index value. These classified as: *Personal Financial Standing, General Economic Situation and, Expenditure and Saving Tendencies* (TURKSTAT, 2021). As defined at analytical framework the major classification component listed below:

i. Personal Financial Situation

Evaluations on personal financial situation start from the information about the financial situation of the consumer's household in the previous 12-month period and go up to the financial situation expectation of the household for the next 12-month period. In addition, information about the general economic situation of the household and the possibility of the consumer to use credit in the next 3 months are also collected in this section.

ii. General Economic Situation

This section is generally designed to be similar to the personal financial situation. However, it was desired to learn the opinions of consumers about the financial situation of the country rather than their individual financial situation. In this section, the participants' views on Türkiye's financial performance for the last 12 months and the consumers' expectations for the next 12 months' general situation are measured. In

addition, expectations regarding macroeconomic indicators are also required to be measured. For instance, this section includes particular question upon several indicators such as unemployment, wage rate and inflation. The participants are asked about their expectations about unemployment in Türkiye in the next 12 months and their views on the consumer price change between the past year and the next year. Consumers' outlook on their future income is measured by their expectations of at what rate wages might change over the next 12 months. There are also specific questions about consumption such as, suitability of the current period to buy durable consumer goods asked in this part also.

iii. Expenditure and Saving Tendencies

The main topics examined to measure consumer tendency in Türkiye are linked the future spending. These expenditures include large-scale expenditures, as well as the possibility of spending on various goods. For example, under this heading, consumers were asked about their expectations of buying a house or car in the next 12 months. Similarly, consumers were also asked for their views on the possibility of having their homes repaired or built in the next 12 periods. In addition, the purchase expectation of semi-durable goods in the next three months and the purchase expectation of durable goods in the next year were also wanted to be measured. Finally, consumers were asked how much they would save in the next 12 months (TURKSTAT, 2021).

4. 2. Bloomberg Consumer Confidence Index

Bloomberg Consumer Confidence Index (BCCI) is a kind of confidence index prepared by the media organization called Bloomberg HT, operating within Türkiye, based on economic data and agenda items. Five questions, each of equal weight, are used to calculate this index. Among the questions asked to the participants, two are about the personal financial situation and expectations of consumers, one is about their consumption trends, and the other two are about their expectations about the Turkish economy. Sub-indexes were also calculated using these questions. Within the BCCI, there are indices calculated under the concept of Consumer Expectation Index (CEI) and Consumption Tendency Indices (CTI). In the CEI, the two questions that make up the confidence index are used by evaluating them equally in order to more accurately characterize the future perspectives of consumers. With similar logic, the CTI aims to

measure the consumption tendency of the participant in the current period. It is calculated based on the question of this confidence index about purchasing tendencies. The methodology of the data is described on the Bloomberg HT website. According to the statement on the website, The BCCI is a modified index based on the characteristics of Turkish consumers, inspired by the MCSI. Indices can take a value between 0 and 200, as in the TURKSTAT example. The base year of the index, which has nearly nine million records in the database, was determined as 2013, and the mean value of both the confidence, expectation and tendency indices for the base year was determined as 100. Participation to the BCCI is made through phone calls through call centres. The sample of the survey consists of 720 people per month selected according to certain criteria to reflect all consumers' segment. While a total of 500 participants from the three largest cities of the country participated in the survey, the remaining 220 participants were selected from other cities. The gender distribution of the participants in the survey is half, with a distribution of 288 people between the ages of 18-35 and 432 people between the ages of 36-55. In order for the survey to be statistically safe, the participants are completely changed every three months. To ensure this, half of the 720 people included in the survey change, and 30% of the participants selected by the software can participate in the next survey. Thus, the remaining 20% is randomly selected from among those who meet certain criteria from the previous months and included in the survey. Ultimately, BCCI is a reliable and widely accepted resource for those who want to follow confidence studies, especially the finance sector, with its results in accordance with the general conjuncture structure (Özakarlı & Küçüksille, 2020; Bloomberg HT, 2021).

It is possible to interpret surveys in common since these two data sets, which are announced in certain periods every month, are applied to the sample population in the same country. When both index values are compared on a monthly basis, it is understood that while TURKSTAT data follows a flatter trend, Bloomberg's index values show a fluctuating chart. Figure 4 has been created to present comparatively the CCI values, which are frequently used in empirical research in Turkish case.
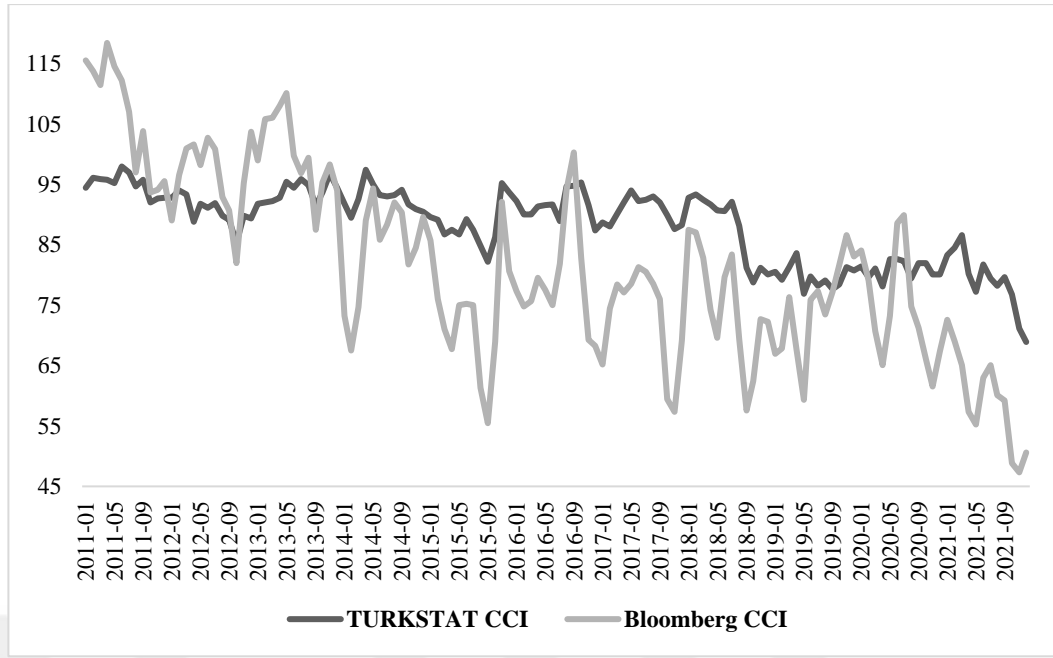
Figure 4. Comparative Graph of BCCI and TCCI

Also, in the literature, another index used in the country can be mentioned. The CNBC-e Consumer Confidence Index (CCCI) is exactly the same as the BCCI used today, the index seems just changed the name however it differs in some features. The number of participants, the distribution of participants and the questions asked are the same, and there is only a base year difference between BCCI and CCCI. While the base year of Bloomberg is 2013, the base year of the CNBC-e index was 2002. But, in fact The CCCI is one of the indexes often cited as a data source in the early articles that empirically analyse confidence indices and various macroeconomic and financial indicators within Turkish case (Kandır, 2006; Korkmaz & Çevik, 2007; Görmüş & Güneş, 2010; Çelik, 2010; Güneş & Çelik; 2010). The most considerable property that distinguishes the CCCI from other indices is that; it was also published on daily frequencies. For example, Çelik, et al. (2010) used the CCCI for that feature in their study and stated that CCCI has a correlation coefficient of 0.9 with the index of TURKSTAT. However, currently it is not possible to obtain CCCI results even from the references of the aforesaid studies. Because the results of the surveys have been removed. Thus, since CCCI is invalid now, today, there are two confidence indexes that can be actively reached to emphasise the consumers' tendency and expectation in Türkiye. In this direction, in the next part of the thesis, indices outside of Türkiye will

be explained. Although there are hundreds of indexes, the following are the most discussed in the international literature.

4. 3. Consumer Confidence Indices Conducted Outside of Türkiye

4. 3. 1. University of Michigan Consumer Sentiment Index

Scholars such as Herbert Simon and Daniel Kahneman, who have an important place in the economics literature, claimed that people cannot act rationally as in the assumption in economics and that the views that adopt only rationally acting economic agent are ineffective. Basically, they argued that human motives cannot be independent of any activity and that individuals' expectations and attitudes shape their economic behaviours. Similarly, George Katona defended these views. He made several publications in 1944 to highlight the importance of consumer behaviour in saving and spending decisions, eventually their effort persuading the Federal Reserve Board to include questions about attitudes in consumer surveys. Subsequently, the survey was then carried out by a group of researchers led by George Katona of the University of Michigan, with the aim of collecting relevant data and demonstrating the apparent correlation of consumer tendency with behaviour. This pioneering survey evolved into the Michigan Surveys of Consumer, used to calculate consumer sentiment. Thus, the basis of the Michigan Index of Consumer Sentiment was emerged (Kellstedt, et al., 2015). While the aforementioned survey was administered three times a year in the 1950s, it was administered quarterly from 1960 until 1977. Since 1978, the results of the survey are published on a monthly basis.

The created questionnaire contains approximately 40 questions in the initial design, each of questions were created to represent different consumer sensitivities. But in general, three basic inquiry sections mentioned. The questions are categorized as business, individual finance, and purchasing conditions. However, the variety and number of questions have changed over the years. Currently, the number of questions goes up to 50. But the nature of the questionnaire has been the same for decades and has been shaped for similar purposes since the mid-40s. The main aim of the survey from the past to the present built upon; to observe the household reaction of national economic policies by examining consumer attitudes at the micro and macro level. In addition, predicting the future economic outlook in line with expectations and sub-

indices is one of the main objectives as well. Additionally, the survey has both qualitative and quantitative elements, as it highlights that consumers in the US tend to be optimistic or pessimistic. Therefore, sample selection is very crucial due to the aim of presenting the general economic view of consumers. In terms of sample and participant section, surveys are made monthly by telephone interview with at least 500 people. Participants are reached randomly by calling numbers. Also, people from previous months can be surveyed again after six months. Therefore, there are two main groups of participants. The first are those who randomly selected with random digit dialling and the second are those who surveyed again. In fact, even though the selection process seems so simple and random, the university states that; the sample is chosen to represent households living in the United States. Participants from all states can be attend in the survey except Hawaii and Alaska. Eventually, MCSI has a critical place in the literature because it is one of the early studies that started the concept of CCI, and the question type is quite comprehensive by providing linkage between attitudes, expectation and consumer behaviour in the long and the short-term (Curtin, 1982; University of Michigan, n. d.). The figure below shows the ten-year change in monthly MCSI from 2011 to the present.
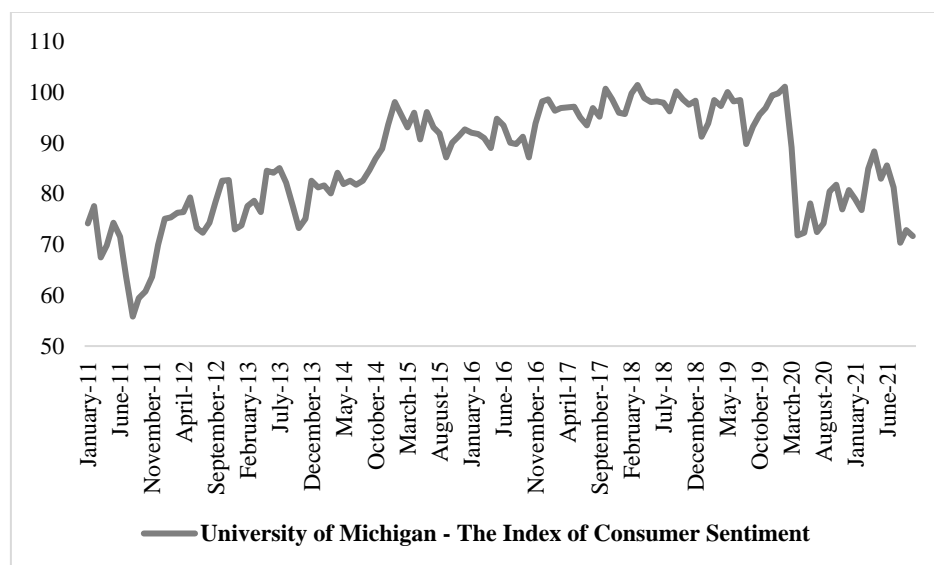
Figure 5. Timeline Graph of MCSI

4. 3. 2. Conference Board's Consumer Confidence Index

CBCCI is the another frequently cited index in the articles, based on the consumer attitudes' in the US. The survey of the index first began in 1967 with letters sent to households in the US. Index was organized every two months until 1977, and then it is carried out by conducting a monthly survey. Although CBCCI and MCSI are based on surveys conducted to measure consumer confidence in the same country, they may yield two separate signals due to differences in question setting (Bram & Ludvigson, 1998). The figure below presents the results in both confidence indices. The obvious differences in some months are particularly remarkable.
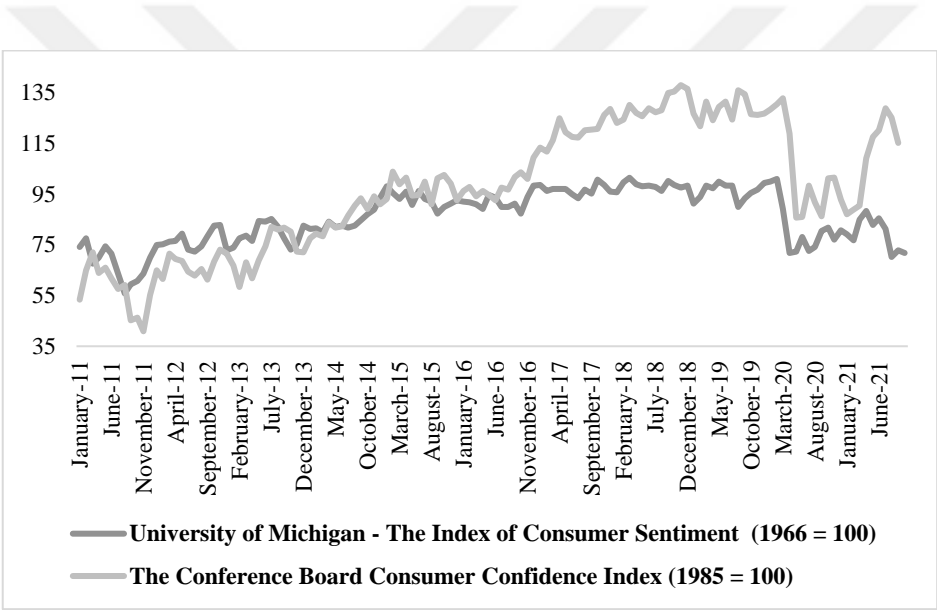
Figure 6. Comparative Graph of CBCCI and MCSI

In terms of sample design like MCSI, CBCCI also aimed to represent all households in the US and determined sample section accordingly. Researchers mail the questionnaire to 5000 addresses and respondents' feedback generates approximately 3500 mailings. The survey intends to deal with consumer confidence with different components as in the Michigan instance. Questions on the expectation component are measured by three inquiries. The expectations questions ask about participants own income in the next six months, their expectations about job conditions and employment opportunities. In another question type, responses about current situation are expected. Questions about the 'present condition' are asked to respondents in two different ways.

The present conditions inquiries in the CBCCI relate to the current business conditions in the participants' regions and the number of jobs available. Thence, the index determined by responses given to five different questions in a positive-neutral-negative scale (Fisher & Statman, 2003). In fact, although the consumer attitudes approach shaped by the expectations and current conditions, which the survey focuses on, is similar to the Michigan case, the CBCCI also includes job availability and family income in the respondents' region to the scope of its questions. For this reason, the results in the sub-indices produced by the Conference Board using the consumer confidence survey questions may differ from the result of Michigan's sub-indices. Since CBCCI, like MCSI, creates two separate indexes regarding current and expected economic conditions. Briefly, the idea of establishing a sub-index, which is formed by evaluating the component questions as expected conditions and present condition in separate groups, is also applied in this survey (Garner, 2002). While composing the Present-Situation Index, questions covering the evaluation of business and ease of finding job are asked and the answers given to these questions are used. The Expectation Index, on the other hand, is formed by assessing the results obtained by compiling the expectations regarding the future oriented tendencies in terms of economic conditions in a broad scale (Croushore, 2005).

4. 3. 3. European Union Consumer Survey

According to the survey user guide prepared by the European Commission General Directorate of Economic and Financial Affairs (2007), which intends to inform the public about the surveys applied in Europe, survey studies to keep businesses and consumers under economic supervision in the continent were initiated in 1961 with the decision of the commission. As a result of this decision, it has been put into practice within the scope of *'The Joint Harmonised EU Program of Business and Consumer Surveys'* (BCS). The surveys are administered by the relevant institutions in accordance with the conditions determined by the commissions. Currently, BCS is managed within the framework of the legislation announced in the commission decision of 15 July 1997 and on 12 July 2006. Essentially, the program consists of surveys conducted by local institutions from member and candidate states. Thus, BCS prepared by harmonized surveys conducted by government agencies or private affiliates in various countries. It is prepared according to a common methodology

consisting of a common timetable. Therefore, as the cyclical conditions change, the geographical scope of the surveys is updated. Because it stated as critical to update the survey in accordance with EU enlargement program in order to observe the economic situation in candidate countries or in countries that become new members. For instance, in January 2007, the BCS contained the member states of the EU plus the candidate state Croatia, while another candidate Türkiye was included in the program in May of the same year. The institutions that will carry out the survey are selected between 3 and 4 years upon the call of the commission. The European Commission provides the necessary financial support to carry out the surveys in the countries. In that manner, the commission provides financial grants in two ways. It either provides grant support not exceeding half of the costs incurred in conducting harmonized surveys of the relevant institution, or if the conducting the survey does not have any obvious national interest in the state, the surveys are carried out under the protection of the commission by paying all of the research cost. Thus, in both cases, the commission retains the ownership of the copyright of the surveys. The number of samples in the surveys differs for each member state due to population and heterogeneity. Within the scope of consumer surveys, approximately 40,000 consumers are surveyed every month. Finally, the data obtained from the surveys are collected in the form of 'balances'. The balance is formed according to the percentage difference between the positive and negative responses among the participants. The commission then prepares the relevant separate data for all member states and for the Eurozone at last, EU presents the relevant seasonally adjusted surveys to the public.

In addition, changes made to the surveys are published in the form of guidelines which are revised by the commission. Therefore, it is possible to observe newly reorganized samples or newly added methodologies. In this context, the difference in the number of samples by country is remarkable. Because the sample size decision of both the commission and the local institution that will implement the survey may change between periods. Table 1 shows the current number of respondents in monthly consumer surveys by state, according to the guideline updated in 2021. Also, Table 2 indicates when the member states participated in the surveys for the first time in the guideline updated in 2007.

Table 1. Number of Participants from Member States Per Surveys

MEMBER STATE	SAMPLE SIZE	MEMBER STATE	SAMPLE SIZE	MEMBER STATE	SAMPLE SIZE
Türkiye*	3 930	Italy	2 000	Portugal	1 300
Bulgaria	1 010	Cyprus	600	Romania	NO DATA
Czechia	1 000	Latvia	1 000	Slovenia	940
Denmark	1 100	Lithuania	1 110	Slovakia	1 200
Germany	2 020	Luxembourg	510	Finland	990
Estonia	800	Hungary	1 000	Sweden	1 500
Ireland	1 000	Malta	1 050	Poland	1 000
Greece	1 500	Netherlands	1 140	France	1 670
Spain	2 020	Austria	1 500	Belgium	1 850
Croatia	1 000	Albania*	1 200	Montenegro*	1 000
Serbia*	1 020	N. Macedonia*	1 000		
EU TOTAL	31 810	**EUROZONE TOTAL**	24 200		

*****Candidate states **Source:** European Commission services (2021)

Table 2. Start Date of Consumer Confidence Indicator by Members

MEMBER STATE	STARTING DATE	MEMBER STATE	STARTING DATE	MEMBER STATE	STARTING DATE
Belgium	JAN - 1985	Italy	JAN – 1985	Portugal	JUN - 1986
Bulgaria	MAY - 2001	Cyprus	MAY - 2001	Romania	MAY - 2001
Czechia	JAN - 1995	Latvia	MAY - 2001	Slovenia	MAR - 1996
Denmark	JAN - 1985	Lithuania	MAY - 2001	Slovakia	APR - 1999
Germany	JAN - 1985	Luxembourg	JAN - 2002	Finland	NOV - 1987
Estonia	JUL -1992	Hungary	FEB - 1992	Sweden	OCT - 1995
Ireland	JAN - 1985	Malta	NOV - 2002	The UK	JAN - 1985
Greece	JAN - 1985	Netherlands	JAN - 1985	Poland	MAY - 2001
Spain	JUN- 1986	Austria	OCT - 1995	France	JAN - 1985
EU	JAN - 1985	**EUROZONE**	JAN - 1995		

Source: European Commission services (2007)

4. 3. 4. China Economic Monitoring and Analysis Centre Consumer Confidence Index

Studies on the monthly CCI in China were initiated at the end of 1997 by the National Bureau of Statistics (NBS) trough CEMAC affiliated to the Chinese government. The fact that the consumer effect is the driving force in growth, especially in the large-scale economic rise of China in the recent period, has increased the examination of consumers on the Chinese case, and it has been stated that the effect of economic changes on consumer confidence is critical. However, the fact that the NBS is late compared to other countries in starting studies on consumer confidence and that the measurement of confidence is qualitative rather than quantitative methods in China creates debates about the accuracy and clarity of the data (Xie, et al., 2014). Besides,

since the criteria for sample selection or the basic elements of the survey, such as survey design, are not accessible, studies on this subject only provide an overall assessment of consumer confidence in China. According to the survey results, the index, which is clearly inspired by the Michigan study, has two components. These components are related to the current situation and future. CEMAC examines present by satisfaction index and uses expectation index for future. The general CCI is determined by taking the average of these two components with a specific weight. CEMAC, which published the actual value of the data directly until 2009, adjusted the data after that year by determining June 1996 as the base period and announced the index score accordingly. In terms of other specifications, the range of values that the index can take is between 0 and 200, like previous studies. The monthly survey has over 3400 participants and is conducted with a sample group from 70 of China's largest cities. However, since the rural population is ignored and only the urban population is included in the survey, it is thought that the survey has a homogeneity problem in the sample section (Li, 2010).

4. 3. 5. Cabinet Office of Japan Consumer Confidence Survey

The Cabinet Office is responsible for conducting and developing surveys to measure consumer tendency in Japan. Survey studies on consumer confidence in Japan began in 1957. It has undergone many changes since then. In this direction, Japanese CCI documented with time series was calculated for the first time in 1982. The survey has been applied monthly since April 2004. However, in this process, various data collection methods such as telephone surveys and face-to-face direct surveys were implemented. The current method is in the form of email and online surveys, which have been used since October 2018. According to the surveys' explanation of the Cabinet Office (2021): Since the concept of confidence that the survey seeks to measure covers only Japanese people living within the borders, foreign students or expats in the country are not included in the surveyed group. In this context, the sampling is made to the households from various regions of the country to represent the local population. Participants were randomly selected and a total of 8400 households participate in these surveys. Households participating in the study continue the survey for 15 months. For these reasons, 1 in 15 of the participants monthly in each questionnaire are newly included. The index is shaped by the variables which included

household situation, the price expectation for the next year and the perception for the next six months, measured monthly. In addition, once a year in March, respondents are asked for their opinions on purchasing durable consumer goods. The values to be measured in the surveys are calculated as a result of respondents' answers to each question scaled between 1 to 5. Based on the variables in the applied questionnaire, two indices are produced. While one of them is an index for consumer perception, the other is basically CCI. Confidence index is composed by averaging the responses given to perception indices in total. These are the general livelihood, employment, income growth and willingness to buy durable goods measured under the perception scenario, the final CCI emerged as a result of the seasonally adjusted perception indices with the ARIMA model. Ultimately, if the confidence value obtained is above 50, it includes the positive evaluation in the general economy. If the value is below 50, it indicates dissatisfaction among consumers.

In this part of the thesis, detailed information is given about the indices used in Türkiye, and various CCI cases from the USA, Europe and the Far East are presented. A summary table of all the indices mentioned is available in the Table below. This table has been prepared as of January 2022 and does not include the index values published after that period. Some data sources are taken directly from the institution that publishes the indices, and indices for which access to data is exclusive or restricted are taken from tradingeconomics.com website.

Table 3. Summary of Selected Consumer Confidence Data with Compilations from
Different Sources

Name of The Indices	Based Country	Monthly Number of Participants	First Published Date	The Range of Values	The Highest Value	The Lowest Value
TURKSTAT Consumer Confidence Index	Türkiye	4884	JAN-2004	between 0 to 200	106,085 as of JAN-2004	68,913 as of DEC-2021
Bloomberg HT Consumer Confidence Index	Türkiye	720	JAN-2002	between 0 to 200	142,085 as of JAN-2005	47,320 as of NOV-2021
University of Michigan Consumer Sentiment Index	The United States of America	Minimum 500	JAN-1978*	between 0 to 200	112,00 as of JAN-2000	51,70 as of MAY-1980
The Conference Board Consumer Confidence Index	The United States of America	3000	JUN-1977*	between 0 to 200	144,70 as of MAY-2000	25,30 as of FEB-2009
European Union Consumer Confidence Survey	European Union Member States	31810	JAN-1985*	between -100 to 100	-1,40 as of MAY-2000	-22,70 as of MAR-2009
NBS-CEMAC Consumer Confidence Index	People's Republic of China	Approximately 3400	DEC-1997*	between 0 to 200	127,00 as of FEB-2021	97,00 as of N0V-2011
Cabinet Office of Japan Consumer Confidence	Japan	8,400	APR-2004*	<50 negative >50 positive	50,1 as of FEB-2006	21,3 as of APR-2020

*It is based on the date the survey started to be applied on a monthly basis.

CHAPTER 5

EMPIRICAL LITERATURE

In this part of the thesis, empirical studies on consumer confidence in general are mentioned. Especially when it is examined with a comprehensive approach, it is seen that the confidence term is the subject of articles in different dimensions in social sciences. The relationship between the CCI and economic data has been investigated many times, and this issue has influenced many researches around the world. Similarly, it is seen that CCI is used as an explanatory variable in many areas from explaining consumer behaviour to deviation of financial indicators. Thus, consumer confidence has been examined from different perspectives by various academics. In the context of empirical studies, there are two general reviews of consumer confidence in the literature. The first is to study the predictive power of the CCI especially the estimation of expenditures for consumption in the future periods in the light of index value, and the second is to figure out the macroeconomic indicators that affect the CCI. Particularly in Türkiye and globally there are numerous studies in the literature within these scopes.

One of the most emphasized topics in the literature is the expectations and irrational behaviours of consumers. To exemplify; Van Raaji & Gianotten (1990) under the light of Katona's psychological economics perfective that contributing consumer sentiment analysis to the literature; they conducted an empirical study of how consumers' emotions affect purchasing behaviours. At the end of their modelling, they came to the conclusion that the CCI could be explained by two factors. One of these factors is the income of households, while the other is the general economic situation in the country. This modelling has been much discussed in the literature after the introduction of two factors affecting consumer spending. Which leads the scholars to examine the causes and effects of consumer confidence. For instance, by using error correction models this phenomenon analysed. The findings show; statistically change in consumer sentiment effects the expenditure on durable goods. However, expenditures on

necessary consumer goods and services are not associated with sentiment at any time (Throop, 1992). In this context, the importance of consumer confidence and the impact of their behaviour on the economy is emphasized. It has been understood that consumer sentiment both facilitates the analysis of consumer spending trends on a micro basis and affects the general economy of the country at a macro level. Therefore, studies focus on these two aspects (Fuhrer, 1993).

From this point of view, in the empirical literature section of the thesis, it is aimed to review the consumer confidence analysis methods and studies to explain consumer behaviour in the relevant literature. In addition, in this section, the articles that deal with the relationship between CCI and economics in the macro dimension are also examined. In order to sequence the subject according to its relevance, first of all, in the context of literature review, discussion of the factors that emerge consumer confidence and studies on the predictive power of indices will be included. Then, the interaction with macroeconomic indicators within the framework of CCI will be discussed.

In order to explain the effect of consumer's position on the economy with the concept of CCI; the confidence index, which is calculated based on the theory put forward by researchers at the University of Michigan, which was mentioned while introducing various indices, has been the subject of many studies. One of the pioneering studies was conducted by Mishkin (1978) and MCSI was used as the variable in the correlation between expenditure on durables and consumer sentiment. The researchers argued that based on the confidence index, consumer sentiment can be explanatory in durable goods purchasing decisions. Because it is statistically significant that societies that are in a financial bottleneck avoid expenditure by reducing their demand for durable goods due to negative expectations for the future. In fact, when consumers have negative financial expectations, their tendency to buy easily liquefied goods does not change. However, purchasing decisions for durable consumption goods or illiquid assets are directly affected. In this context, CCI can be an effective criterion in macroeconomic terms with its effect on durable goods. However, when other financial criteria are included in the analysis, it is revealed that this relationship is invalid. In equivalent manner, in the time series analysis of some states affiliated to the European Economic Community, no relationship was found between the consumer sentiment index and demand for discretionary consumption. In other words, the use of CCI as an estimator

of some expenditures is not significant. The results of the study were created with the sales of passenger cars in the European market. The researcher presents this as a finding that supports earlier studies which criticizes CCI in terms of estimating consumption for future periods. Basically, the way the research proceeds as a method is two-stage. Initially, sentiment index is modeled with various economic indicators. Within the results, it has been determined that the change in economic indicators can be explained by consumer sensitivity. But CCI is only one of the marginal variables in explaining the passenger-vehicle purchasing behaviour, which is considered as a discretionary expenditure (Abeele, 1983). However, the article written by Kamakura & Gessner (1986) supplies results that are completely opposite to the aforementioned study. Because they stated that consumer confidence can only predict the consumption of a few durable products such as housing and car. The researchers analysed both MCSI and CBCCI using new methods for that era in time series analysis such as ARIMA. In their estimation method, since two different indices were used, the convergent validity of these series was evaluated first. It was concluded that both indices caught consumer attitudes. Then, leading indicators were determined for both data. As a result, it has been determined that there is a relationship between the individual income of consumers and their purchasing tendencies for certain goods. Then, attitude variables to explain changes in consumer spending are included in various economic functions. As a result, it has been revealed that the purchasing behaviour of cars and houses can be predicted with CCI. Another considerable and widely cited study supporting and improving this result belongs to Garner (1991). The researcher argued that consumer expenditures can be explained with confidence, especially focusing on the amount of consumption. These consumptions such as for durable goods, which are defined as discretionary expenditures that may occur under adverse economic conditions, depend on both consumers' willingness to buy and whether they are in a financial position to purchase. In this context, the researcher presented new empirical evidence and stated that CCI is a useful factor in estimation under certain conditions. Therefore, it has been said that the CCI can affect not only the demand for durable goods, but also the economic and perceptual dimensions of consumption in a broader framework. That's why it may affect macroeconomic variables as a whole. The study modelled this concept economically. At this point, it is mentioned due to consumption the entire economic structure may be affected. Additionally, based on CCI's estimation ability, Carroll, et al. (1994) and Acemoğlu

& Scott (1994) conducted studies with different samples that yielded matching results. However, although the CCI is significant in estimating consumption expenditures, as mentioned in other empirical studies, some academics have approached this view with scepticism. For instance, according to the article by Carroll and their colleagues based on the US data set, empirically they found consumer confidence plays a role only as an independent variable in estimating consumption expenditures. Many different variables are effective in determining consumption expenditures in the long run. However, it has been emphasized in their studies that consumer confidence has the power to predict and explain consumption expenditures to a certain extent. On top of it, Acemoğlu and Scott draw attention in the economics with their studies that develop and strengthen previous empirical results. Because they included the relationship between consumer confidence and rational expectations in their articles. In the study, which was carried out based on consumer confidence surveys collected in the UK, financial and economic variables were also included in the empirical analysis. Based on the results in the article, consumer confidence is compatible with the REPIH, as an outcome, it helps to predict consumption. In other words, under this theory, it has been determined that consumer confidence allows to predict future income. They also concluded that higher confidence and positive expectation in consumers were associated with greater optimism about the level of consumption, which increases estimation variance. In similar vein, in the name of estimation ability of CCI, Batchelor & Dua (1998) have shown that tracking consumer confidence in certain time can be useful in forecasting recession periods. But unlike the other empirical works they added another framework to the literature. Because, by using MCSI they examined how much the consumer confidence score improved macroeconomic forecasts by comparing results gathered from a macroeconomic forecasters database in the US by retrieving Blue Chip Economic Indicators. In the analysis, which was conducted using monthly data from 1978 to 1993, the GNP estimates of the macroeconomic estimators were used. The rationality of the estimates was evaluated using two different methods. First of all, the correlation of the error differences between the estimates and the actual value and the CCI value was examined. Then, a regression analysis of the estimated GNP errors value in a certain time interval and the CCI value was performed, but no significant results could be found. In addition, in the same study, the researchers made a repeated estimation to test whether consumer confidence is a data that can be used to predict GNP growth in the 10-year period from 1978 until 1988. When the

estimation of the estimators, whose rationality level was found to be low in the initial analysis, was combined with the MCSI in the repeated estimation method, it was stated that there was a certain improvement in the estimations, but this did not occur at the desired level.

Vuchelen (2003) also contributed to the empirical literature by focusing on forecasting the impact of CCI to macroeconomic variables. By using regression analyses, the aim of the study is investigating the variables that allocate consumer confidence that will affect further macroeconomic data. The results explained that; the average expected growth rate of Belgian consumers is tested in regressions for the distribution of estimates and also sensitivity of consumers. Both variables significantly show the relationship. Another similar result also occurred in the study of Ludvigson (2004). The researcher examined the relationship between consumers' expenditures and confidence. As the previous literature focused on macroeconomic measures, this study combines all approaches. To exemplify; regression analyses between consumption and CCI clarified; even though there is a significant relationship between spending on the durable goods and confidence. However, spending, including confidence indicators for some categories, actually weakens the statistical relationship between concurrent indicators and future consumer spending. Likewise, data collected from questionnaires applied to individuals and institutions have been especially important in understanding the economic situation in the country. Therefore, consumer and business expectations are a vital tool to forecast future macroeconomic events (Claveria, et al., 2007). For that reason, Claveria and the others analyse the change of developing estimates for selected macroeconomic variables for the Eurozone using the information provided by these surveys. At the end of their models, the efficiency of the expectation survey used for businesses and consumers has increased and its estimation has become statistically significant.

In another study, Al-Eyd et al. (2009) were particularly influenced by the US based granger causality test used articles on the relationship between consumer confidence and consumption in the short run. Accordingly, a two-stage empirical study has been carried out for developing previous efforts. Researchers first tested whether there was a direct predictive relationship as in previous studies, using long-term data for five different countries with developed economies. Then, it examined whether the forecast relationship tends to change over time and whether it is compatible with structural

developments in the economy. According to the researchers, if there is a relationship between CCI and consumption, and the sensitivity of this relationship to structural changes over time is detected due to their article, they stated that the result would provide critical output for policy makers. However, the result showed that contrary to the expectations of the academicians, the information content of the indices is quite small, also in terms of forecasting consumption, focusing too much on this criterion is not really dependable for the short-term future. Because while a single variable does not make much difference for forecasting, it is more important to investigate the factors that can affect economy as a whole. In the same year that this study was published, Bovi (2009) investigated the causes of forecast-errors in their study based on monthly data from ten different European countries. Using the consumer confidence surveys conducted by the European Commission, the researcher evaluated the economic and psychological aspects for forecast. When analysed on the basis of economic unit, it was emphasized that lay people did not actually carry out systematic and impartial cognitive processes in their decisions, and it was found that this fact increased the estimation error for CCI. Because it has been determined that the long lasting and extensive psychological biases of economic factors affect the retrospective interpretation of future events. However, if shocks can be added to the system that will enable people to interpret economic events more objectively, this will reduce the errors of the forecasted variables.

In another empirical study analysing the relationship between consumption and consumer confidence, researchers both supported the previous literature and added new interpretations to consumption patterns. In the study, Adrangi & Macri (2011) evaluated various short-term and long-term spending types with the MCSI. Using a large data pool from 1970 to 2004, the researchers used the US-Macroeconomic Model for the short-term relationship, and the Johansen cointegration tests for the long-term. When all consumption types are examined, it has been reported that the CCI is only competent to explain durable consumption, as in the early literature. Plus, the independent role of CCI in explaining consumption is also in line with the former literature. Adrangi and Macri's results also discussed the lack of consumer confidence variable in widely used consumption models and suggested that life cycle or permanent income theories could be developed with further empirical studies in the future. In the same line, Dees & Brinca (2013), in one of their widely cited empirical

work, stated that, if the consumer division had acted within the framework of the permanent income hypothesis (PIH), the knowledge of the period in which consumption was made would not matter, because it would not be possible to produce predictions about how consumption will change in the future. To clarify this statement, in their paper, which includes both the US and the Euro region, they found that various CCI work as estimators of consumption in certain situations without any problems. It is noteworthy that the results obtained in the section where they studied the euro area, yielded opposite results in particular from the work of Al-Eyd et al. (2009). However, the researchers stated that this might be because they regressed the euro area according to the aggregate method instead of evaluating the data individually by country, additionally they stated that the selection of variables in the models might contribute the outcome. Besides, in terms of developing consumption models the results illustrate that in periods when uncertainties increase and households' savings tendencies increase, consumption cannot be explained by the PIH, along with situations such as liquidity problem. Consumption will be predictable with any CCI, as this will be the periods when the aforementioned consumers behave outside of the PIH framework.

Another perspective that should be mentioned in the literature is the efforts done to improve the quality of forecasts of estimators using consumer confidence. Bruestle & Crain (2015) aimed to develop models by controlling the CCI in a statistically significant way in their study. Because some changes in CCI are pointless within the model, they give noisy signals and mislead the estimator. That's why, using all the MCSI values announced from 1967 to 2013, the researchers stated that the predictive power of consumers' spending models increased within the framework of both significant and insignificant changes by controlling all modifies. In order to contribute to the explanatory power, this article first questioned the statistical significance of the change in a period of CCI. Although the researchers emphasized that different indicators apart from CCI are required for predicting future household consumption, they explained that their statistical inferences improved their consumption estimates by 150%. Again, in terms of forecasting Lahiri et al. (2016) examines the role of CCI on real consumption spending alongside with many predictors. Researchers emphasized the importance of the concept of consumer confidence in estimating real individual consumption and contributed to the literature with three different approaches. First, estimates prepared with quarterly data in the previous literature were

re-estimated on a monthly basis. Second, consumption expenditures were analysed using inflation-adjusted prices. Finally, different combinations were created with various arrangements in the estimation therefore CCI was added to some of the models created, and the extent to which this addition changed the estimation was analysed. The dynamic factor model, which was created using more than 160 explanatory variables, led to a more realistic compilation of the models in the preliminary studies. Set models are estimated in order, and the results in the most realistic model are particularly striking, not only for durable consumption, but also for service expenditures. In this context, the results of the analysis give findings that personal expenditures can be estimated with CCI in a broader framework. Additionally, changes in consumer confidence cause long-term effects on variables. The last but not the least, analysis from Türkiye which used CNBC-e and TURKSTAT indices that conducted in Türkiye to figure out the effect of the CCI for the Turkish economy on future private consumption discovered that the CCI has an explanatory power on future consumption expenditures and expenditures in its sub-indices. Examining the effect of consumer confidence on private consumption expenditures for the Turkish economy, taking into account the consumption expenditures of durable and non-durable goods, together with total consumption expenditures, is the most important feature of this article, apart from other studies. When several macroeconomic variables are added to their model, CNBC-e and CEI for consumption expenditure on durable goods and CEI and CTI for non-durable goods expenditures maintain their strength in explaining the increase in consumption in the future (Karasoy Can & Yüncüler, 2018).

Ultimately, at this stage of the literature review, empirical studies on the relationship between consumption and consumption forecasting with CCI, which took place in the literature in Mishkin's work, were first included, starting from Katona's point of view of economics based on psychological behaviour. Although the studies generally yield findings in the context of the USA case, it is understood that the CCI is a variable that strengthens the estimation for consumption estimation, as studies on the indices and spending tendencies in the UK and Europe give similar results. In addition, as the literature progresses and the applicability of different econometric methods increases, the fact that not only durable consumption but also all consumption types are significant with CCI by various data sets has been a concise summary of the developing literature. Plus, studies that gave contradictory results due to the

importance of presenting empirical studies by scholars who were sceptical of earlier research were also included at this stage. In the next literature review, studies examining the relationship between CCI and macroeconomic indicators will be included, and studies like the previous review will be explained by considering the connections with each other.

The first studies on CCI in the literature are based on the development of the index methodology, as well as the consumption estimation models, as stated before. Then, in addition to these relationships, studies with the concept of economic and financial indicators that CCI or wise versa can affect have found a significant place in the literature. The preliminary findings that should be mentioned about these studies are the study on economic determinants that will explain the movement in the consumer sentiment indices. The study conducted by C. Alan Garner in 1981 with various macro and financial indicators constitutes the pioneering findings on this subject. The researcher stated that consumer spending is not only dependent on household incomes and current wealth, but also on how consumers interpret uncertainties in future financial situations. It has been argued that households interpret the future financial conditions with many different instruments such as business status, household indebtedness, expected stock returns, so on. Especially in periods of political instability, the decline in durable consumption without any feedback is presented as an example. In the empirical research, analysis of the residues did not reveal the neglected systematic determinants, but political events impacted consumer sentiment. The causal relationships between CCI and selected economic variables were found to be consistent with the hypothesis. The tests supported the exogenous evaluation of financial and economic indicators in CCI's regression models. Thus, the researcher has concluded that several economic variables are at the root of causing all CCI fluctuations (Garner, 1981).

Another important article examining economic fluctuation and consumer confidence was prepared by Matsusaka & Sbordone (1995). The scholars suggested that; it has been seen in many studies that consumers who are unhappy with the economic situation of their countries are more pessimistic. Based on this interpretation researchers tried to understand the linkage between consumer confidence and real economic growth by performing vector autoregression based on the data set they used for the US economy. For this, MCSI and GNP were used. According to the empirical

results obtained from the article, there is no Granger causality relationship between CCI and real GNP. Also, CCI is able to explain only 26% of the changes in GNP at most. Thus, according to this model consumer confidence does not have a significant effect on macroeconomic performance. However, in another study conducted by Danthine, et al. (1998) researchers who dealt with consumer confidence and expectations in the context of the business cycle mentioned the existence of the relationship between economic growth and consumer confidence. The purpose of this article is to seek answers to different questions about productivity, consumer confidence and growth in the context of a dynamic general equilibrium model. The findings obtained as a result of the model showed that the change in the economic growth expectation of the consumer section combined with the technological developments and macroeconomic variations, the change in the consumption series creates business fluctuations. Another finding is it does not lend support to the idea that autonomous shifts in consumer confidence are the main culprit of recent recessions in the US and Europe. Because, in this comprehensive model, it is claimed that consumer reactions affect components such as productivity and labour supply, and these concepts constitute the stagnation. Therefore, changes in behaviour in the consumer and animal spirits cannot be the main cause of the economic dysfunction, but they had an indirect effect. On the other hand, in the analysis of Bram & Ludvigson (1998) used MCSI and CBCCI data to find out how consumption expenditures are shaped. Then, they added stock price data and interest rate data to their models to perform the linkage between financial indicator and consumer confidence. Theoretically, in their analysis a relationship from stock prices to consumption and thus to economic activity is proven through consumer confidence. Accordingly, an increase in stock prices causes the consumer to spend more by increasing their confidence in the future, otherwise when stock prices decrease the opposite happens. Researchers have found that rising stock prices encourage consumption growth in the short run by making consumers feel positive about the future. They also concluded that CBCCI is superior to MCSI in disclosing future expenditures. In this context, the CCI, whose compatibility with financial indicators has become clear, also gives information about the future consumption for the USA case, if the right survey is used. Similar outcome to this result is also included in the article of Otoo (1999), which was created based on the stock market and consumer confidence. In the study examining the relationship between MCSI and stock prices, a strong positive relationship was

found where the increase in stock market increased the consumer sentiment in a positive way. In their empirical effort, the researcher regressed the values in the Wilshire 5000 index with the monthly consumer confidence data by applying OLS and VAR. The researcher ultimately concludes that increases in stock market returns cause an increase in the CCI in the US. Another study deals with the general macroeconomic situation. Researchers have examined consumer tendencies and some basic macroeconomic variables in the context of cause-effect relationships with empirical studies. For this purpose, cointegration and error correction techniques were used, and modelling was shaped accordingly. As a result of the data analysis, long-term equilibrium between the variables was determined in the data from the 1970s to the 1990s. Researchers also show that there is a relationship between the CCI and macroeconomic indicators. Thus, at the same time, it was stated that CCI gives signals for future macro indicators (Chopin & Darrat, 2000).

Jansen & Nahuis (2003) focused on various European countries in their research. Using a dataset covering the years 1986 to 2001 in their articles, the academics wanted to examine the short-run relationship between consumer confidence and stock market movements in 11 different European states. According to the empirical findings obtained from the article, in which various econometric methods were used, it was seen that there is a positive relationship between the consumer confidence level and positive returns on stock market for European countries except Germany. In addition, in the light of the granger causality test, stock returns increase consumer confidence for a noticeably short time. In the opposite case, the opposite of this causality relationship was not observed. Researchers attribute this result to the effect of general economic conditions rather than individual return expectations within the framework of stock market and consumer confidence. Therefore, consumer confidence, which measures household expectations, cannot predict the individual wealth effect. But it provides information about general expectation. This situation, which has been examined in the example of Europe, has been the subject of research in the USA. Fisher & Statman (2003) used CBCCI, MCSI and index for investor sentiment in their empirical modelling to investigate consumer confidence and stock market returns. As a result of the analysis, the change between consumer confidence and stock market returns was found to be positively correlated and statistically significant. In addition, a positive correlation was found between US investor sentiment and consumer

confidence. Consumer confidence increases with investor confidence, and this increase is due to the positive movement in the stock market. Likewise, while the stock market is in a negative direction, consumer confidence is also decreasing. For this reason, the relationship between indices of consumer confidence and S&P 500 was found to be robust. These results gave similar results in causality to the study conducted in the European field, and also pointed to an inverse causality relationship. In similar vein analysis of Christ & Bremmer (2003) elucidate that stock prices may change based on the expected changes in consumer confidence, however the changes that come with unexpected shocks are not reflected in a statistically significant path. Contrary to previous studies (Otoo, 1999; Jansen & Nahuis, 2003), the effect of unexpected changes was determined differently. The researchers used MCSI for consumer confidence in their study, which they conducted in the context of the USA, using both various macroeconomic variables and different stock markets. However, the research yielded results similar to the work by Jansen and Nahuis (2003) on causality tests. The causing of high consumer confidence in positive stock fluctuations in both Europe and the USA has concluded in common framework.

Dominitz & Manski (2004) developed their research with a unique perspective from the general literature, and instead of observing indices and macroeconomic effects, they investigated how these effects could be used most effectively in CCI. In other words, how to develop indices to provide clear, further information about the general economics. Essentially, for the conclusion part of their articles, they examined the questions in the Michigan Consumer Survey and offered solutions on how they could be improved. The suggestions of the researchers can be summarized under three headings. These; quantitative questions should be supported by better-defined statistical questions, reporting according to different income and social class should be added, and the way consumers are asked about broadly defined phenomena should modify. Because researchers have observed that the large fluctuations in the CCI occur as a result of the answers given to the questions questioning a general phenomenon. Therefore, creating the survey with a smoother and specific questions gives a more accurate result in terms of measurement. If the consideration goes back to the root of consumer confidence and macroeconomics, there is research examining the global consumer confidence and the variability in economic activity. Using a quarterly dataset from the seventies to the early 2000s, the researchers examined consumer

sentiment in various countries. The time series analysed with the VAR method showed that in some countries, several macroeconomic indicators are sensitive to consumer confidence. Similarly, with more different statistical techniques, the impact of changes in consumer sentiment on macroeconomic indicators was examined with impulse response and granger causality tests. The primary finding that emerged as a result of empirical analyses is that CCI has a quantitative and significant effect on the change in GDP. In addition, CCI was determined as the premise of GDP rather than other variables. However, in some countries, consumer confidence cannot be explained only by macroeconomic indicators. Consumer sentiment has been found that it depends on the characteristics of the economic system and the culture of the nation (Golinelli & Parigi, 2003). Another study that differs from other studies in the literature is the study of Lemmon & Portniaguina (2006). Because, although academics actually examine investor sentiment, they explain the concept through consumer confidence. Because, as a result of the increase in the number of households investing in the stock markets recently, consumer confidence can be used as a criterion as investor sentiment. Therefore, in the analysis the scholars used MCSI and CBCCI as measures of investor sentiment. The research evaluates investor sentiment with the return of stocks of small and large firms in the market within the USA. In the empirical findings of the study, it is stated that consumer confidence has an important place in the estimation of returns and macroeconomic activities, especially in small stocks. In addition, while there was no statistically significant relationship between the CCI and stock returns in the data before 1977, a positive and significant relationship was found from 1977 until the beginning of the 2000s thus, researchers state that consumer confidence and expectation are useful predictors of business cycle troughs and peaks. After 2006, it is observed that the number of studies on Türkiye has increased in the literature. In this context, one of the primary and foremost studies based on the Turkish data set belongs to Kandır (2006). The researcher empirically analysed the forecasting ability between stock returns and consumer confidence by using the ISE financial companies index as a dependent variable. In the study, monthly data between 2002-2005 were used with regression analysis. As a result of the empirical effort, CCCI found significant and positive effect on stock returns in ISE financial stocks. Thus, the researcher stated that monitoring the changes in the CCCI will enable to forecast most of the financial sector stock returns for Turkish market.

Afshar et al. (2007) examined the relationship between stock returns and consumer confidence, as in previous studies. However, the feature that distinguishes their study from other empirical works in the literature is that they added not only consumer confidence but also investor and business confidence to the model they established, plus they also included economic fluctuations as well. In this direction, using VAR and error-correction methods, they studied the USA sample from 1980 until 2005, based on quarterly data sets. The most estimable findings from their study are as a result of the granger causality test, CCI is relating to GDP. Based on the data supported by various macroeconomic variables standing for economic fluctuations, it has been determined that the CCI is affected by economic fluctuations. Lastly the most fundamental outcome is confidence indicators play an influential role in economic fluctuations. With similar methods, Bremmer (2008) also studied the MCSI and stock market, but the inclusion of different stock market indices for the USA in the data set they used distinguishes their empirical effort from other researches. A some of outputs, which are evaluated in the conclusion part of the article, also offer a distinct perspective to the literature. Because, like Jansen and Nahius (2003) working in the European sample, it has been determined that there is causality between MCSI and stock market indices in the USA in the short run, but reverse causality has not been determined. The article developed Otoo's (1999) work which used only one stock market index by using various stock markets. The findings also support that, similar to previous studies, unexpected CCI changes also affect the stock market. However, the empirical study by Schmeling (2009) determined the relationship between stock returns and investor sentiment differently from the examples in the literature. The scholar used data from 18 industrially developed countries in their article, and as a result, they found that investor sentiment, which is used as a proxy for consumer confidence, is one of the important predictors of stock market returns. The remarkable findings can be listed as: There is the negative causality relationship between consumer confidence and stock market. Accordingly, it is predicted that stock values will decrease after the periods when CCI is measured high. That indicated that while the sentiment is high, stock returns will decrease in the future. In addition, it has been stated that the sensitivity and return relationship is more intense in the stock markets of nations that may have less market integrity and culturally overreacting. Finally, it is noteworthy that the estimation power of the sentiment calculated slightly weak in some industrial countries. Moreover, the study of Görmüş & Güneş (2010), one of the

articles examining the Turkish case on similar issues, focused on the relationship between consumer confidence, Turkish stock market returns and real exchange rates. While macroeconomic indicators were obtained from the CBRT database, the data set of CNBC-e covering the monthly period January 2002-December 2008 was used for CCI. In the findings section, it is observed that financial and economic indicators have significant effects on the CCI. However, in the Granger causality test, it is also found that consumer confidence is the cause of stock market returns and real exchange rate, on the other hand exchange rates and stock returns do not have a significant effect on consumer confidence. Thus, these results create robustness problem for their analysis. At this point, for deepen the empirical structure another study, which analyses both the Turkish case also other countries by covering the CCI and macroeconomic indicators, belongs to Özerkek & Çelik (2010). Researchers examining a varied of emerging economies, including Türkiye, analysed the link between private consumption, public spending and the CCI. The researchers designed their study to reveal the possible effects of public spending on private consumption. In this context, they initially examined how the change in consumer confidence would affect the government, and then whether private or public expenditures were the determinants of consumer confidence. According to the findings obtained from the study, in which many econometric techniques such as FM-OLS and panel cointegration were used, it was revealed that there is a long-term relationship between the so-called three variables. In addition, considering the effect of consumer confidence on government expenditures, it is stated that consumer confidence has a representative power of private consumptions. The same researchers have another paper in which they empirically examine the relationship between private consumption and CCI for 9 EU states using the panel cointegration method. The research, which also includes various macroeconomic data, tries to explain the effect of changes in personal consumption expenditures on consumer confidence. As a consequence of the analysis, the study elucidated the existence of a long-term relationship. Subsequently the article stated that increasing consumer confidence will provide economic growth through the consumption channel (Çelik & Özerkek, 2009).

In a different structure, study conducted by Chen (2011) which focused on instead of examining the linear effects of changes in consumer confidence, the scholar pointed out market fluctuations based on confidence, clarified that, rather than the effect of

stock returns on consumer confidence, the change in consumer confidence affects the underlying processes of economic activities such as purchasing decisions, consumption accordingly, even the production. Hereby in this case, the effect of the consumer sentiment on the economy has been examined, not the economic events on the consumers. Since the study is based on the US sample, monthly US macroeconomic indicators, S&P 500 index and MCSI are used as the source of the data. Emphasizing the importance of asymmetric shocks because of the empirical analysis, the researcher has reached the findings that consumer confidence, which gives pessimistic signals or lack of confidence, has a negative impact on the markets, and that situation affects more than optimistic consumer confidence to the stock prices. In this direction, an empirical study was conducted with the similar assumption that there may be a two-way causality relationship between stock prices and consumer sentiment in Türkiye. For the analysis purpose monthly data from December 2003 to January 2009, including the CCI and ISE100 index obtained via the CBRT database, were used. However, unlike similar studies, the researcher found that the CCI is the Granger cause of stocks and this relationship is not bidirectional. Thus, the result found contrary to the beginning assumption (Topuz, 2011). However, each country may have different results. In one study, researchers used monthly data for a panel data analysis covering 21 countries from 1999 to 2007 to analyse the causal relationship between the CCI and stock indices. A result derived from the Granger causality test indicates there is a significant relationship from stock market prices to CCI. Also, in terms of future if consumers have a positive expectation, this expectation ensures that the increase in share prices is maintained (Hsu, et al., 2011). In another research based in Turkish market focused on: Relations between confidence indices reflecting the expectations of consumers and producers about the future of the economy and the stock market. This research used 2 different VAR models. The empirical analysis based on VAR models showed; there is a significant relationship between CCI and consumption decision. Similarly, CCI also effects investors, investment decision in Türkiye (Arısoy, 2012). On the other hand, study of van Aarle & Kappler (2012), which is one of the empirical studies examining the larger sample, investigated the relationship between economic fluctuations and economic sentiment for both the US and the Eurozone. Researchers working on VAR model formation and examined the relationship between economic sentiment shocks and various macroeconomic indicators. As a result of the empirical evidence, shocks on economic confidence were

found to be significant for the Eurozone due to its effect on unemployment, production and consumption expenditures. Likewise, US macroeconomic data was also found to be affected by sentiment shocks after robustness tests. In addition, Özdemir (2013)'s study, working on the Turkish case, revealed results similar to the international literature on macroeconomic indicators and consumer confidence. In terms of data collection, the researcher converted the CCI, which was announced monthly, to quarterly data by taking its average. Data for macroeconomic indicators such as consumer price index, total consumption spending and so on was also arranged in the same format. The researcher designed the analysis to cover the first quarter of 2004 until the first quarter of 2012. For this reason, the partial-least square method is used to overcome the number of observations constraint. The empirical analysis justified inclusion of CCI increases the predictability of consumption expenditures represented by the consumption function. Because, the researcher, who aims to predict consumption expenditures and sub-expenditures, which are the dependent variables, with various macroeconomic variables, stated that the predictive power of the model increases with the addition of CCI to the independent variables. Further, there is another study on the sensitivity of macroeconomics to consumer confidence. Benhabib, et al. (2015) have demonstrated in their studies that even in cases where the producer and consumer divisions are completely rational, since both sides are not sure of the behaviour of the other party, the equilibrium point is affected by sentiments or Keynesian animal spirits. For doing that the scholars constructed a simple model in their study and claimed that the study could be used in comparison with complex equilibrium models. The action they followed in reaching this statement was the natural discordance of the information. Because even if companies can estimate the demand for their goods with full precision, they cannot define fluctuations depending on consumer sentiment separately from the level of aggregate demand. Thus, consumer sentiment which is linked with confidence is crucial because the notion is correlated among consumers, and they affect aggregate demand and other macroeconomic output.

Another study focusing on the relationship between a series of macroeconomic indicators and CCI in the Turkish literature belongs to Beşel & Yardımcıoğlu (2016). Since the topic that the researchers particularly emphasized in their articles is the effect of the CCI on macro indicators, they determined the data set in this context. Basically,

the monthly CCI obtained via TURKSTAT and the data between 2005:01-2014:10 obtained from the CBRT system were used in the empirical effort. Toda Yamamoto causality analysis was performed on the variables determined to be cointegrated in the Gregory Hansen cointegration test. According to the results of the analysis, the CCI in Türkiye can only be linked with fluctuations in the exchange rate. Although the researchers state that the most important and valid policy that will increase consumer confidence may be related to the exchange rate policy, it is also stated that the limited time interval of the variables used in the article is the most considerable constraint for econometric analysis. For this reason, the researchers pointed out that the results may change with the data announced in the following years. On the other hand, research by Gürgür & Kılınç (2015) revealed that CCI of Türkiye has more interaction power with macroeconomic and financial indicators both in the short and long term. The researchers obtained their data from the CBRT and TURKSTAT, using a data set ranging from 2004:01 to 2015:04. Finally, the existence of a long-term relationship with the cointegration test was determined by applying various econometric tests. In the short run, the coefficients were also determined by the error correction model. In the empirical analysis, it has been determined that consumer confidence is affected by indicators such as exchange rate, unemployment, inflation and interest rate. The effects of consumer price index and exchange rates are especially significant in short-term CCI fluctuations. Another study focusing on consumer confidence in Turkish case was conducted by Kale and Akkaya (2016). By using 2004:1 - 2015:06 dataset in the analysis, it has been examined within the framework of stock returns. Although the time range of the variables used in the analysis is limited like the previously cited articles, the contribution of the study to the literature is adding different indexes and variables to the estimation model. In addition to the consumer confidence indices prepared by TURKSTAT and Bloomberg, stock indices of four different sectors were used together with the aggregate ISE100 in their data. Besides, the researchers included the MCSI and CCI for Germany as exogenous variables. Lastly, they also added sectoral confidence indices. In the light of the data analysed empirically with the VAR method, no significant relationship was found between the CCI and stock returns. Also, so-called variables have no causality relationship. But, in fact results of causality test made over the VAR revealed that the increase in stock revenues causes an increase in the CCI. Instead of these results, a two-way causality relationship between real sector confidence index and stock returns was determined in the analysis.

However, another study using variables like aforementioned research found slightly different results with the data set from January 2004 to January 2019. Çağlı (2019) studied, the causality between investor confidence and stock returns for Turkish economy, in fact the researcher used TURKSTAT CCI as a proxy of investor sentiment. Therefore, in essence the paper investigates causality of CCI and ISE100. Variables analysed with Granger causality determined that there is a causality from ISE100 to CCI. In addition, significant causality periods were also determined from CCI to ISE100 towards the end of the data set from 2017:04 until 2018:09. Consequently, researcher stated that the findings from the analysis emphasized the importance of nonlinear potential causality variation between months.

Ultimately, in the previous paragraph by considering the progress in the literature, some of the studies in Türkiye are mentioned. For last, the empirical literature review will come to an end with two studies on CCI and macroeconomic fluctuations, which are examined in the US and global scope. Benhabib & Spiegel (2019) in their paper, they examined the effect of consumer sentiment on aggregate demand by using the MCSI and the sub-components of this index, taking into account its influence on economic growth and future economic activities for the states in the US. Quarterly MCSI data retrieved from 2005 to 2016 for their analysis. In addition, they used the political impact on confidence, which many scholars suggested, as an instrument. In their future oriented analysis, they assumed that local confidence would be more optimistic in states that voted the most for the current president. As a result of the examination, it has been revealed that this instrument is robust and is related to the future economic conditions of the states. Because, based on the instrumental variables estimation they conducted, the high confidence to the political authority, which the researchers describe as partisanship, and the national expectations of the state are compatible. Then, a statistically significant relationship was found between the next year's economic performance of that state and the instrumental variable at the first stage. Finally, the study of Nowzohour & Stracca (2020), which includes data from 27 developed economies, examined macroeconomic fluctuations in terms of uncertainties and confidence. Panel data analysis was conducted using comprehensive variables such as consumer confidence, economic policy uncertainty, stock market fluctuations, geopolitical risks and so on from 1985 to 2016. One of the prominent outcomes of the empirical analysis is consumer confidence is overly sensitive to economic and

financial variables. Because consumer confidence acts jointly with economic and financial variables. Naturally, the scholars stated that there is a correlation relationship between CCI and macroeconomic indicators.

All in all, as a result of the empirical analyses of the scholars in the field of estimation with CCI in the literature, they seem to agree on the significance of the consumer confidence estimating consumption expenditures. In addition, it has been discussed many times in the literature that CCI and macroeconomic indicators are factors that affect each other. However, although the articles examining the causal relationship between financial and economic indicators with CCI generally detect a significant relationship, it has been understood that there is no consensus in the literature on the direction of the causality relationship. In this direction, we are trying to build the basis of our empirical analysis of the following parts of the thesis by using the issues mentioned in various empirical studies in the literature. Because, when the articles examined for the sample in Türkiye, it is seen that the researchers emphasize the limitations of observations due to deficiencies. Since cyclical conditions are known to affect CCI and some macro indicators as well, we designed scope of our empirical effort to combine both various economic indicators and the interaction of financial variables such as stocks and commodities to CCI with more observations than peer studies. The last but not the least, the continuation of the discussion in the direction of interaction in Türkiye and in other countries' literature makes the subject still attractive. Because economic indicators can have an impact on consumer confidence, and consumer confidence can also affect macroeconomy. In order to examine the effect of the consumer confidence on macroeconomic indicators, the data we used and the econometric methods to be applied will be explained in detail in the following chapter.

Table 4. Summary of Selected Empirical Studies on Consumer Confidence Index

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
F. S. Mishkin (1978)	1954-1976 Based on the US	MCSI, household liabilities, financial-asset holdings, real per-capita net worth, price variables, consumer durables spending.	Time series analysis: OLS	Consumer sentiment can be explanatory in durable goods purchasing decisions made by consumers. Because it is statistically significant that societies that are in a financial bottleneck avoid expenditure by reducing their demand for durable goods.
D. Acemoğlu & A. Scott (1994)	1974-1991 Based on the UK	UK – Gallup Consumer Surveys, gross labour income, capital income, housing wealth, inflation, unemployment, real interest rates.	Time series analysis: Granger causality, testing for excess sensitivity, consumption capital asset pricing model.	The fact that consumer confidence can forecast future income does not refute REPIH. Also, when consumers behave rationally, consumer confidence can be used as an estimator.
C. D. Carroll, J. C. Fuhrer, D. W. Wilcox (1994)	1955-1992 Based on the US	MCSI, total household spending, vehicle and goods and services expenditures, unemployment, labour income, SP500 index, 3-months treasury bill rate.	Time series analysis: Reduced form regressions.	It has been determined that there is a high positive correlation between consumer confidence and consumption expenditures.

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
M. W. Otoo (1999)	1980-1999 Based on the US	MCSI, CBCCI, Wilshire 5000 stock index return.	Time series analysis: OLS, VAR.	Stock returns create the perception that future economic conditions will be more optimistic in individuals. Accordingly, a strong correlation was determined between Wilshire 5000 index and MSCI.
J. Dominitz & C. F. Manski (2003)	2002-2003 Based on the US	MCSI, sub-indices of MCSI, survey of economic expectations.	Time series analysis: Spearman rank correlations linear autoregression, interpretation of descriptive statistics.	While the statistical definition and calculation methods of CCIs are simple, the individual responses and perceptions of consumers are too complicated to be explained by specified survey questions.
R. Batchelor & P. Dua (1998)	1979–1993 Based on the US	MCSI, CBCCI, real GNP growth, Estimated GNP growth by Blue Chips Economic Indicators.	Macroeconomic forecast: recursive forecasting, rationality tests.	CCIs can be used to forecast recessionary periods. However, the addition of the CCI by the estimated models does not make any major changes in the forecast.

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
S. C. Ludvigson (2004)	1968-2002 Based on the US	MCSI, CBCCI, expectation indices, total household spending, income of households spending on vehicles, durable goods expenditures except vehicles. S&P500, treasury bonds	Time series analysis: Numerous regressions on CCI, OLS	There is a significant relationship between spending on the durable goods and confidence. However, spending for some categories, actually weakens the statistical relationship between expenditures and CCI.
S. Y. Kandır (2006)	2002-2005 Based on Türkiye	CCCI, ISE financial sector returns, ISE government domestic debt securities, size premium, value Premium	Time series analysis: OLS	CCCI score has a significant on the share values of financial companies traded in the Turkish stock market. Thus, majority of the stocks effected by CCCI.
A. Al-Eyd, R. Barrell, E. P. Davis (2009)	1973–2005 Based on the US, the UK, Germany, Italy, France	Confidence indicators, net financial wealth, consumption, real personal disposable income, real house prices	Forecasting ability of CCI: Granger causality, ARMA	The information content of confidence indices is quite small for future models. Focusing too much on CCI in terms of consumption forecasting is not very reliable for the short-term future.

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
Ş. Görmüş & S. Güneş (2010)	2002-2008 Based on Türkiye	CCCI, the World stock market index, CPI, industrial production index, ISE, difference of Türkiye and the U.S. in some macro variables	Time series analysis: OLS, Granger causality, GARC-M, ARDL-ECM	An increase in CCI effects the demand of foreign currencies negatively also due to wealth effect increase in stock prices increase confidence as well.
İ. Arısoy (2012)	2005-2012 Based on Türkiye	TURKSTAT CCI, industrial production index, employment rate, ISE, consumption spending, real sector confidence index	Time series analysis: Two distinct VAR models, Granger causality, impulse response analysis	Confidence indices provide information about the general course of the economy. Consumer and producer confidence affect the behaviour and expectations of economic agents.
B. van Aarle & M. Kappler (2012)	1990-2011 Based on EU	EU Commission's economic sentiment indicator, industrial production, retail sales, unemployment	Time series analysis: Business cycle analyses, VAR model, impulse response functions and variance decompositions	Consumer sentiment shocks in the euro area are influential on key macroeconomic variables such as production, unemployment and retail sales.

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
S. Dees & P. S. Brinca (2013)	1985-2010 Based on Eurozone and the US	Real consumption expenditures, real disposable income, wealth, real equity prices, short-term interest rates, unemployment rate, real oil price, foreign confidence	Out-of-sample forecasting and time series analysis: OLS, VAR, Granger causality, non-linear modelling	The predictive power of the CCI increases during periods of great fluctuations in the consumer confidence. By measuring the consumer confidence, it is possible to explain the changes in economic activity.
K. Lahiri, G. Monokroussos & Y. Zhao (2016)	1982-2014 Based on the US	MCSI, CBCCI, Total Consumption: total personal consumption expenditure, expenditure on durable goods, expenditure on non-durable goods, services and numerous macroeconomic variables	Forecasting models: factor model; in-sample exercise, out-of-sample / pseudo real time exercise, real-time exercise	Personal expenditures can be estimated with CCI not only for durables but also for other expenditures. Additionally, changes in consumer confidence cause long-term effects on macroeconomic variables
F. Beşel & F. Yardımcıoğlu (2016)	2005-2014 Based on Türkiye	TURKSTAT CCI, exchange rate, OPEC oil prices, unemployment	Time series analysis: Zivot-Andrews unit root test, Gregory-Hansen cointegration test, Toda-Yamamoto causality test	It has been determined that there is a one-way causality relationship from exchange rate to CCI and unemployment rate.

AUTHOR(S) AND STUDY YEAR	TIME RANGE OF THE DATASET AND BASED REGION	VARIABLES	RESEARCH METHODOLOGY	CONCLUSION
H. G. Karasoy Can & Ç. Yüncüler (2018)	2002-2014 Based on Türkiye	TURKSTAT CCI, CCCI, private consumption, real stock prices, real interest rate, real labour income, exchange rate	Forecasting ability of CCI: Regressions, out-of-sample forecast	CCIs examining the case of Türkiye have an explanatory power about future consumption expenditures.
J. Benhabib & M. M. Spiegel (2019)	2005-2016 Based on the US	MCSI, the sub-components of MCSI, growth at the state level, responds depending on state; income, education level, share of investment holders, national output gap	Time series analysis: OLS, regressions, instrumental variables, sample and estimator sensitivity test	A positive relationship was found between sentiment and expectations for future economic conditions and consumption expenditures. In states that trust on political authority, the perception of economic condition is good is high.
E. Ç. Çağlı (2019)	2004-2019 Based on Türkiye	TURKSTAT CCI, ISE 100 Return Index	Time series analysis: Unit root tests, VAR, Granger causality	The leading indicator channel can explain the observations that ISE-100 Granger caused CCI. Plus, changes in stock prices have a huge impact on consumer confidence.

CHAPTER 6

EMPIRICAL ANALYSIS AND RESULTS

In this section of the thesis, it is aimed to make an empirical analysis by using the Turkish data. In this direction, the main subject of the study shaped into CCIs which published by polling the tendencies of Turkish households. Thus, in the broadest sense it is aimed to investigate the interaction between the CCI and macroeconomic indicators by using CCIs as response variables. Therefore, the empirical implementation of the study built on to examine the impact of the macroeconomy on consumer confidence. However, before proceeding to the analysis, firstly, the data to be used are introduced in this section, and then the econometric techniques that will be used in the empirical study are explained briefly. Then in the last part the econometric techniques will be applied to the data and the empirical result section will be organised based on the outputs. In other words, in the empirical analysis and results step of the study, data will be introduced, methods that can be used in line with the data will be discussed, and finally, comments will be made on the econometric analysis results.

In addition, possible situations that may arise during the data analysis phase are mentioned in the figure below. In this direction, first of all, the obtained data will be subjected to the stationarity test, and then the data analysis will continue as a result of tests' outcomes. The figure below will guide in the empirical results section and data analysis will be shaped according to the results of the testing procedures:
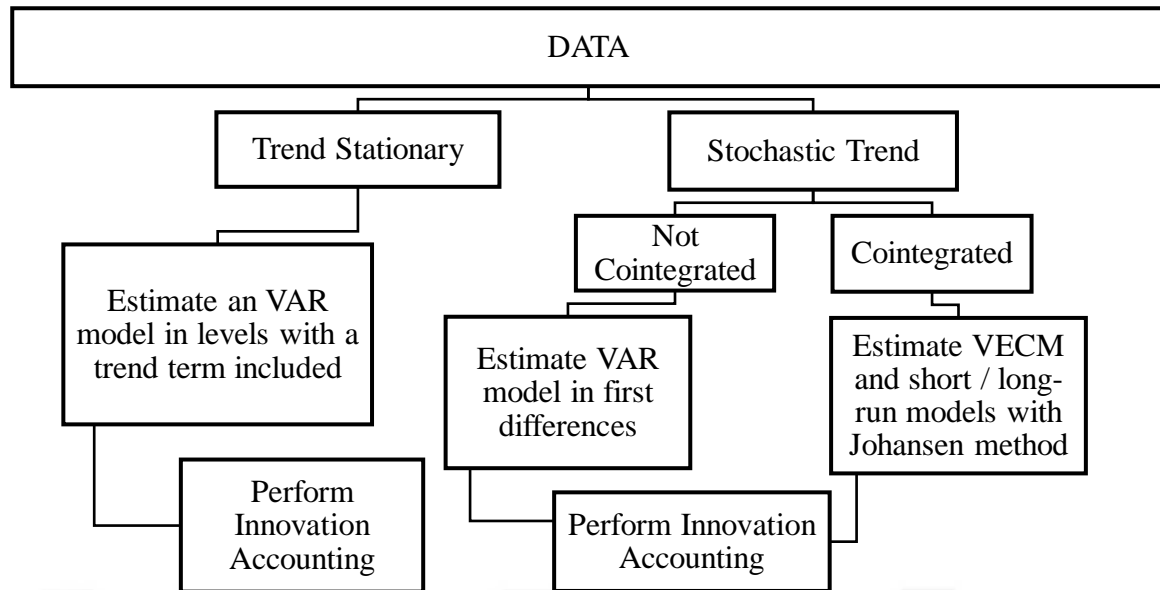
Figure 7. Proposed Empirical Strategy

Source: Modified from Principles of Econometrics (Hill, et al., 2011).

6. 1. Research Aim and Data

The main purpose of this thesis is to analyse the relationship between CCI and macroeconomic variables by using Turkish data. In this context, the main subject of interest is the effect of macroeconomic variables on consumer confidence. The data on the methods to be applied in the empirical plan of the research were collected monthly, considering this purpose. Thus, the dataset contains 204 observations on a monthly basis from 2005:01 to 2021:12 for each variable. The main sources used for gathering the series are TURKSTAT, CBRT Electronic Data Delivery System (EDDS), Bloomberg HT and OECD. Also, very meticulous attention has been paid to the selection of data set. Because some of the variables selected from a wide range of macroeconomic indicators were not included in the analysis. There are two main reasons for this:

The first is to identify the indicators that are important for Turkish consumers. In order for the analysis to be meaningful, the Turkish consumer structure should not be ignored. Because both TCCI and BCCI survey participants aim to reflect the sample of Türkiye in a balanced way. For this reason, the selected variables should not be based only on specific market and sector or price of few items. Therefore, the selected

series should allow us a general interpretation. With this in mind, it is well shown to choose the variables that might be most inclusive. The second is to determine which variables are or are not processed in the literature dealing with the subject. For these reasons before starting the data analysis, variables that may affect consumer confidence were discussed and screened. Besides, variables that are not included in our analysis but are thought to have an impact are variables such as PPI, gold price per gram, nominal exchange rate, unemployment and loan-deposit rates. Since also there are the data which widely used in the previous studies, however, these variables were excluded from the model because they showed a high correlation with some of the data already in our equation or it was determined that they did not create a significant relationship. For this reason, as a result of screening process, the simplest version of the equation was formed to include two confidence index variables and five macroeconomic variables. The table below contains the names and descriptions of the data used in the analysis.

Table 5. Data

VARIABLES	EXPLANATION	DATA SOURCE
BCCI	Bloomberg Consumer Confidence Index	Bloomberg HT
INF	Inflation Rate based on CPI	TURKSTAT
IPI	Industrial Production Index	TURKSTAT
ISE100	Borsa Istanbul-100 (XU100) Closing Price	CBRT Statistical Database (EDDS)
ON	Overnight Interbank Interest Rate of Türkiye	OECD
REERCPI	Real Effective Exchange Rate based on CPI	CBRT Statistical Database (EDDS)
TCCI	TURKSTAT Consumer Confidence Index	TURKSTAT

Also, time-line graphs of selected variables in level form are given below in the following figure:

BCCI

TCCI

REERCPI

ISE100

IPI

ON
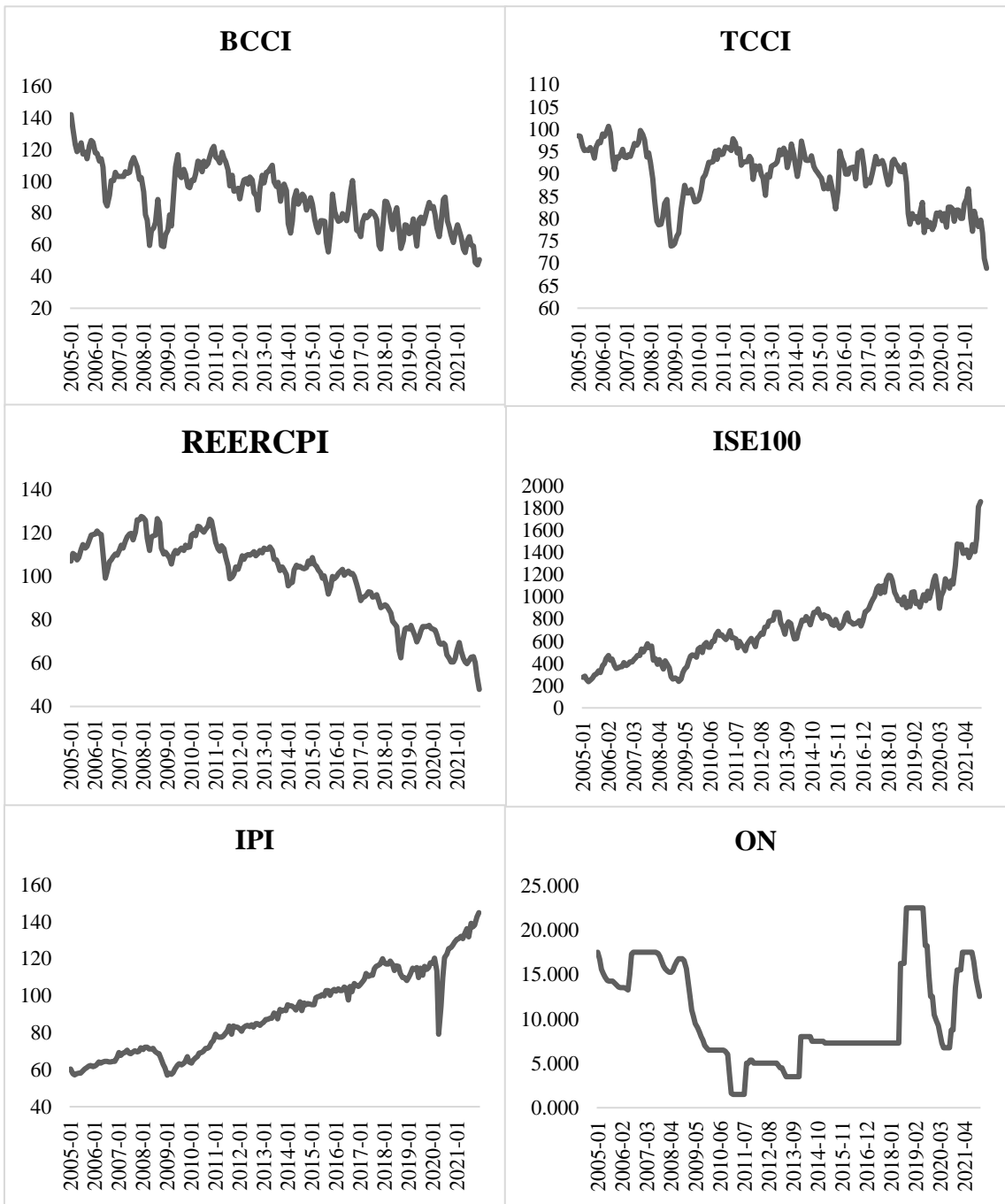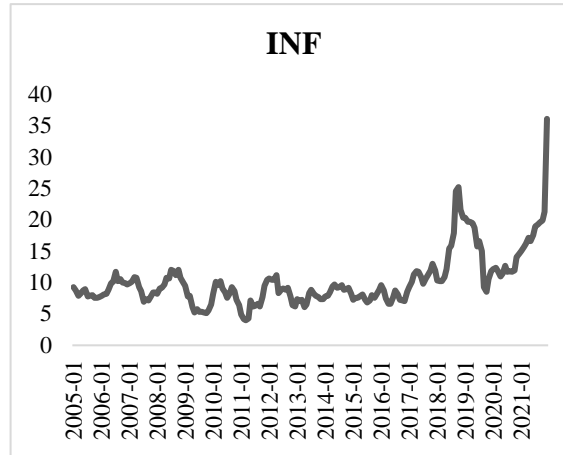
Figure 8. Timeline Graphs of Macroeconomic Variables

As can be observed from the charts above, some events in the time period caused fluctuations in the graphs. Top among these are the 2008 financial crisis and the 2020 coronavirus pandemic. Especially during the pandemic and economic crisis, the sharp decrease in IPI and ISE100 are quite explicit. Such events, which have adverse effects particularly on macroeconomic indicators, can intrinsically affect consumers as well. For instance, it is intriguing that the CCIs of Türkiye discussed and graphed in the previous parts of the thesis followed a similar pattern with these indicators in the same years. In addition, the annual inflation rate, which has increased in recent years, and the decrease in confidence indices are other remarkable points. Therefore, it is crucial to examine the relationship between these macroeconomic variables and consumer sentiment to understand the tendency of household during the time of phenomena that have profound effects.

6. 2. Methodology

In this section of the thesis, econometric methods and methodology used in empirical approach are explained. First of all, since the time series will be studied, in this framework, initially, stationarity and unit root tests, VAR and VECM methods, then cointegration tests and finally the impulse analysis and variance decompositions are discussed.

6. 2. 1. Stationarity and Unit Root Tests

The empirical study of the thesis, which will be created in the style of time series analysis, requires the explanation of the methodologies to be used. For this reason, the basic framework of unit root tests, which is the most fundamental time series subject, is mentioned in this section. Since the data containing the time series require stationarity detection, a group of tests can be performed to reveal the series without a unit root. The stationarity of the variables following the stochastic trend process requires the existence of time-independent, finite variances and autocovariances. There are several methods that test data by using regression models. The most used ones in the literature are Dickey & Fuller (1979) and KPSS (Kwiatkowski et al., 1992) and extended variations of these unit root tests such as ADF (Verbeek, 2017). For this reason, researchers working on time series initially check whether the data they included in the analysis is stationary or not. From a broad perspective, it is stated that the stochastic process of the data is stationary if the arithmetic average and variance are constant over time and the covariance value between two time periods does not depend on actual time, but only on the interval or lag between two time periods when the covariance calculated. Stationarity has been defined in various ways in the time series literature such as *weakly stationary*, *second-order stationary* and so on. Besides, there is also a non-stationary stochastic process in the literature. For instance, researchers have mentioned random walk models in this context. This is especially valid for variables containing data on financial markets. In studies conducted in this area, it is observed that asset prices such as stock values or exchange rates follow a random walk. Thus, such variables are not stationary. To explain the unit root stochastic process through notations consider:

$Y_t = \rho Y_{t-1} + u_t$, and $-1 \leq \rho \leq 1$.

If the ρ value in this equation is equal to 1, it is known that Y_t is not stationary and there is a unit root. Since the phenomenon that causes the unit root is $\rho = 1$, researchers discussing this issue in the literature have considered the terms of unit root, random walk, non-stationary and stochastic trend as a synonymous. All in all, examining the unit root properties of the time series is a required as a prior condition for the analysis of cointegration, many causality tests and other related empirical

applications. There are test methods such as ADF and KPSS, which are the most widely used in the literature, and the visual detection method used by creating a correlogram. In short, the visual detection method is based on the autocorrelation function of the series. The autocorrelation function can determine the size of the relationship between some values and lagged values of the series (Gujarati & Porter, 2008).

For this section, the explanations used by Enders (2015) to present their methodology for both methods can be used. Initially for the Dickey-Fuller test: In order to present the unit root test at the first place Enders used the $y_t = a_1 y_{t-1} + \varepsilon_t$ model. Then they subtracted y_{t-1} from the model and present another equivalent equation. Which formed as; $\Delta y_t = \gamma y_{t-1} + \varepsilon_t$ where $\gamma = a_1 - 1$. It seems that testing hypothesis $a_1 = 1$ is the conjugate of testing hypothesis $\gamma = 0$. This transformation is necessary to make sure that the dependent variable of the test model is stationary under the null hypothesis. Thus, Enders refers to three different regression models created by Dickey & Fuller (1979) to test the unit root, based on this equation and hypothesis. These regression equations can be listed as:

$$\Delta y_t = \gamma y_{t-1} + \varepsilon_t,$$

$$\Delta y_t = a_0 + \gamma y_{t-1} + \varepsilon_t$$

$$\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \varepsilon_t.$$

The reason for establishing three different regressions is related to the existence of the terms a_0 and $a_2 t$, which are deterministic elements. Ultimately, the first equation expresses the random walk model, the second adds an intercept either a drift term to the equation, and the last includes both a linear time trend and a drift. Regardless of the equations, the only parameter of interest in the composed formulations is γ. Because, if $\gamma = 0$, it is understood that the series $\{y_t\}$ contains a unit root. In essence, the technique used is to obtain the γ, value and the relevant standard error in the model whose unit root will be questioned for one or more of the mentioned equations, by using the OLS method. Comparing the t-statistic obtained with the proper value shown in the Dickey-Fuller tables allows the researchers to specify whether to reject the null hypothesis of $\gamma = 0$ or not. Also, the methodology used in the procedure does not change depending on which of the three equations is used. However, the critical values of the t-statistics value to be analysed differ depending on the regression because it

changes whether it contains a time trend or an intercept. Plus, in another study by Dickey & Fuller (1979), it was determined that the critical values for $\gamma = 0$ depend on the sample size and the structure of the regression model. Researchers stated that the statistics called τ, τ_μ and τ_τ are proper for use $\Delta y_t = \gamma y_{t-1} + \varepsilon_t$, $\Delta y_t = a_0 + \gamma y_{t-1} + \varepsilon_t$ and $\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \varepsilon_t$ respectively.

In addition, in order to remove possible autocorrelation in the error term of the test equation, there are augmented variants of the Dickey-Fuller test. When lagged values of the dependent variable are added to the test equation, the test is called an Augmented Dickey-Fuller (ADF) test. The same statistical values such as τ, τ_μ and τ_τ are all used to test the same null hypothesis of $\gamma = 0$. The ADF test models are:

$$\Delta y_t = \gamma y_{t-1} + \sum_{i=2}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t$$

$$\Delta y_t = a_0 + \gamma y_{t-1} + \sum_{i=2}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t$$

$$\Delta y_t = a_0 + a_2 t + \gamma y_{t-1} + \sum_{i=2}^{p} \beta_i \, \Delta y_{t-i+1} + \varepsilon_t$$

Here tests on the significance of the deterministic components can be tested jointly with the unit root hypothesis using F- tests. F-tests follow the ordinary F-statistics formulation for ϕ_1, ϕ_2, ϕ_3. After calculating the Phi value, the significance level is determined by comparing it with the appropriate value determined by Dickey and Fuller (1981). Accordingly, if any calculated phi value is smaller than the critical value reported by Dickey and Fuller (1981), the null hypothesis is not rejected. However, if the calculated phi value is greater than that stated by Dickey-Fuller, the null hypothesis is rejected. The table below is directly cited from Enders (2015).

Table 6. Summary Table of Dickey-Fuller Tests

MODEL	HYPOTHESIS	TEST STATISTIC	CRITICAL VALUES
$\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \varepsilon_t$	$\gamma = 0$	τ_τ	$-3.45\ \&-4.04$
	$\gamma = a_2 = 0$	ϕ_3	$6.49\ \&\ 8.73$
	$\gamma = a_0 = a_2 = 0$	ϕ_2	$4.88\ \&\ 6.50$
$\Delta y_t = a_0 + \gamma y_{t-1} + \varepsilon_t$	$\gamma = 0$	τ_μ	$-2.89\ \&\ -3.51$
	$\gamma = a_0 = 0$	ϕ_1	$4.71\ \&\ 6.70$
$\Delta y_t = \gamma y_{t-1} + \varepsilon_t$	$\gamma = 0$	τ	$-1.95\ \&\ -2.60$

Source: Applied Econometric Time Series – (Enders, 2015).

Another test that should be mentioned is the KPSS test. In the unit root tests cited above as well as most of the tests, the null hypothesis claims that the statistical process contains a unit root. Therefore, it's valid idea to apply a test that used stationarity as the null instead of the alternative hypothesis. For this reason, in the literature dealing with time series, KPSS is applied as a complementary test to confirm and strengthen the reliability of the unit root tests. The test initially was developed by Kwiatkowski et al. (1992) and then takes the name as "KPSS" from the initials of the surnames of the authors of the article. The KPSS test separates a time series variable into the total of random walk component, deterministic trend and stationary error.

$y_t = \beta t + r_t + e_t$. Where the random walk component is $r_t = r_{t-1} + u_t$ and stationary error is e_t. The intercept is represented by the initial term in the random walk sequence. The random walk component's error terms (u_t) are assumed to be independent and identically distributed $(0, \sigma^2)$. If u_t's variance is zero its value is at all times equal to zero. Thus, $r_1 \dots r_n = r_0$. As a result, r_t is no longer in the form of a random walk and y_t has simple trend stationary pattern: $y_t = \beta t + r_0 + e_t$. Ultimately KPSS test is a Lagrange multiplier test of whether the random walk component has zero variance. In the application of the KPSS test, the model is estimated first and then the rolling sum of the residuals $\hat{e}_t$ is calculated as:

$$\hat{S}_t = \sum_{t=0}^{t} \hat{e}_t$$

Then the long-run error variance of the regression is estimated using the Bartlett kernel as:

$$\hat{\sigma}^2 = \sum_{t=0}^{T} \hat{e}_t^2$$

The test static is:

$$LM = \frac{\left(\sum_{t=1}^{T} \hat{S}_t^2\right)}{\hat{\sigma}^2}$$

In essence the test statistic is the ratio of two different residual variance estimates. Although the calculation involves rather sophisticated statistical methods, KPSS can be used easily because it is a test method that is frequently supported by software (Levendis, 2018).

6. 2. 2. Vector Autoregression and Vector Error Correction Models

In this part of the thesis, the interaction of variables and dynamic properties, which are another important issue in time series, will be examined. In particular, the methodology for VAR and VECM models will be discussed. To show general explanation of VECM and VAR model Hill, et al. (2011) notations will be used. For this, first of all, the scholars defined two equations with dynamic properties.

$$y_t = \beta_{10} + \beta_{11}y_{t-1} + \beta_{12}x_{t-1} + v_t^y$$

$$x_t = \beta_{20} + \beta_{21}x_{t-1} + \beta_{22}x_{t-1} + v_t^y \quad (6.1).$$

The two models here constitute a system in which each of the two variables is a function of both its own lags and the lags of the other variable in the equation. The variables mentioned in the example are x and y. For instance, in this case, for y_t and x_t, both variables have their own lag. These are y_{t-1} and x_{t-1}, respectively. Also, these variables make up the other variable lags of the other system because these variables are included in y_t and x_t as well. Therefore, the equations form a system known as VAR. In this case, there is a VAR(1) since the maximum lag is in the first order. If x and y are stationary, the least squares method can be applied to both models.

If they are cointegrated a VECM model can be constructed. If they are not stationary and there is no cointegration, a VAR model can be estimated. In this context, the standard model formed for first-difference stationary variables which are not cointegrated is as follows:

$$\Delta y_t = \beta_{11}\Delta y_{t-1} + \beta_{12}\Delta x_{t-1} + v_t^{\Delta y}$$

$$\Delta x_t = \beta_{21}\Delta x_{t-1} + \beta_{22}\Delta x_{t-1} + v_t^{\Delta x}$$

In this formulation, the first differences are stationary and are suitable to be estimated by the OLS method. In a nutshell, VAR is a generic framework for describing how stationary variables interact dynamically.

Introducing a cointegrating relationship suitable for these equations leads to a model known as VECM. The VECM is a specific form of VAR for cointegrated non-stationary variables. Thus, based on the previous equations the VECM emerges as:

$$\Delta y_t = \alpha_{10} + \alpha_{11}(y_{t-1} - \beta_0 - \beta_1 x_{t-1}) + v_t^y$$

$$\Delta x_t = \alpha_{20} + \alpha_{21}(y_{t-1} - \beta_0 - \beta_1 x_{t-1}) + v_t^x \quad (6.2)$$

where the right-hand-side term in parentheses is the cointegration relation.

When (6.1) and (6.2) are compared, the VECM model is like a VAR in which the first-difference stationary variables (y_t and x_t) are associated with the lagged variables (y_{t-1} and x_{t-1}). Plus, both equations have the common cointegration relation. α_{11} and α_{21} in the formulation are called error correction coefficients. Because they specify the response of Δy_t and Δx_t to the cointegrating error; $y_{t-1} - \beta_0 + \beta_1 x_{t-1} = e_{t-1}$. The thought that the error will lead to a correction arises from the conditions set on α_{11} and α_{21} to provide stability. Which is $-1 < \alpha_{11} \leq 0$ and $0 \leq \alpha_{21} < 1$. In the case of a positive error $e_{t-1} > 0$ in the last period, the first equation's negative error correction coefficient leads Δy to decline, while the second equation's positive error correction coefficient causes Δx to increase, thus correcting the error. In addition, the fact that the error correction coefficients are less than 1 in absolute value ensures the regular functioning of the system (Hill et al. 2011). The authors also add that VECM has become widely used because its interpretation is instinctively appealing.

6. 2. 3. Cointegration Tests

Numerous methods have been developed to implement cointegration tests in the econometrics literature. The most popular and standardized methods of these tests are the Engle-Granger test (1987) and the Johansen cointegration test (1988; 1990). The Engle-Granger test, which is one of the first studies to be applied based on cointegration, uses the OLS method to estimate the cointegration vector, which has been criticized by literature for being limited to the two-variable case. The Johansen method which uses the maximum likelihood framework is an improvement over the Engle-Granger method, because it can handle a wider range of cases. The Johansen technique allows for multicointegration. In addition, it is seen that the approach developed by Johansen and Juselius is accepted as the default tests in applied VECM studies (Levendis, 2018). For this reason, Johansen method will be used in the empirical analysis here. To demonstrate the procedure the VECM needs to be written in matrix form. As in Brooks (2019), consider a vector of g I(1) variables thought to be cointegrated (z_t), a VAR of k lags and the VECM can respectively be written as:

$$z_t = \beta_1 z_{t-1} + \beta_2 z_{t-2} + \cdots + \beta_k z_{t-k} + u_t$$

$$\Delta z_t = \Pi z_{t-k} + \Gamma_1 \Delta z_{t-1} + \Gamma_2 \Delta z_{t-2} + \cdots + \Gamma_{k-1} \Delta z_{t-k-1} + u_t$$

where $\Pi = \left(\sum_{i=1}^{k} \beta_i\right) - I_g$ and $\Gamma_i = \left(\sum_{j=1}^{i} \beta_j\right) - I_g$

The matrix of long run coefficients (the cointegration matrix) symbolised as (Π) is used to perform the Johansen cointegration tests. The tests examine the rank of the Π matrix using its eigenvalues. Leaving the underlying linear algebra aside, there are two test statistics for cointegration:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln\left(1 - \hat{\lambda}_i\right)$$

$$\lambda_{max}(r, r+1) = -T ln(1 - \hat{\lambda}_{r+1})$$

Where, r denotes the number of cointegrating vectors hypothesized in the null, and the ith ordered eigenvalue from the Π matrix has an estimated value of $\hat{\lambda}_i$. Inherently, the greater $\hat{\lambda}_i$ is, the larger and more negative $ln(1 - \hat{\lambda}_i)$ will be, and therefore the larger

the test statistic will be. Every eigenvalue will also have a different cointegrating vector, which will be an eigenvector, associated with it. Also, a significant cointegrating vector is indicated by a non-zero eigenvalue. The test statistic trace, λ_{trace} is a joint test that compares the null hypothesis that the number of cointegrating vectors is fewer than or equal to r against the alternative hypothesis that there are more than r. The test statistic, λ_{max} performs separate tests for each eigenvalue, with the null hypothesis being that the number of cointegrating vectors is r, as opposed to $r + 1$ in the alternative hypothesis. These are sequential tests. Critical values for both tests are provided by Johansen and Juselius (1990). The critical values are determined by the number of non-stationary components, the value of $g - r$ and the presence of deterministic elements in each equation. As for testing the hypotheses, if the calculated test statistic is greater than the critical value stated in the table by Johansen and Juselius (1990), the null hypothesis is rejected. The null hypothesis means that there are r cointegration vectors in favour of alternatives. $r + 1$ for λ_{max} or more than r for λ_{trace}. The test is performed in a sequence under the null hypothesis. For example, hypotheses for λ_{trace} are:

$$H_0: r = 0 \; vs. \, H_1: 0 < r \le g$$

$$H_0: r = 1 \; vs. \, H_1: 1 < r \le g$$

$$H_0: r = 2 \; vs. \, H_1: 2 < r \le g$$

$$\dots$$

$$H_0: r = g - 1 \; vs. \, H_1: r = g.$$

A null hypothesis of no cointegrating vectors is used in the first test. If this null is not rejected, it is assumed that no cointegrating vectors exist, and the testing is finally completed. On the other hand, if the null hypothesis is rejected ($H_0: r = 0$), the consecutive values of r, ($H_0: r = 1$) and many more are tested. The value of r is incrementally increased until the null hypothesis can no longer be rejected (Brooks, 2019).

If these tests reveal the existence of cointegration, an appropriate VECM model can be constructed after estimating the long-run (cointegrating) relation. If there is no cointegration, given that the variables in the z_t vector are non-stationary I(1), a VAR in first-differences should be estimated.

6. 2. 4. Impulse Analysis and Forecast Error Variance Decompositions

Another method frequently used by researchers working in macroeconomic literature is impulse-response functions and forecast error variance decompositions. Most studies have been used to solve problems related to the impact of changes in producer prices on inflation and GDP, or the impact of changes in monetary policy on the general economy. Specifically, the effects of the shocks on the adjustment path of the variables are indicated by the impulse response functions. Forecast error variance decompositions are also a method of examining the effects of various shocks; this approach takes into account the contribution of each shock type to the forecast error variance (Hill, et al., 2011). In order to explain both techniques and then combine them under of innovation accounting, the impulse-response system is explained first, based on Enders' (2015) notations. Impulse-response analysis investigates the effect of a random shock in a variable on other variables in the system. The moving average vector in Sims' (1980) work allowed in this method to plot the time path of the effects of several shocks on variables included in the VAR system. To demonstrate this, let z be a vector of two variables y and x, the bivariate VAR of order 1 can be written in matrix form as:

$$\begin{bmatrix} y_t \\ x_t \end{bmatrix} = \begin{bmatrix} a_{10} \\ a_{20} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ x_{t-1} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix}.$$

Or it can be written using the vector moving average notation, in this case

$$\begin{bmatrix} y_t \\ x_t \end{bmatrix} = \begin{bmatrix} \bar{y} \\ \bar{x} \end{bmatrix} + \sum_{i=1}^{\infty} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}^i \begin{bmatrix} e_{1t-i} \\ e_{2t-i} \end{bmatrix}$$

Although this equation is written in terms of $\{e_{1t}\}$ and $\{e_{2t}\}$, it can also be presented in terms of the errors of the primitive system, ε_t. The relation between the errors of the primitive system (ε) and the errors of the standard VAR (e) is:

$$\begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} = \frac{1}{1 - b_{12}b_{21}} \begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{xt} \end{bmatrix}$$

Thus, when the moving average representation is written for both equations we get:

$$\begin{bmatrix} y_t \\ x_t \end{bmatrix} = \begin{bmatrix} \bar{y} \\ \bar{x} \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} \phi_{11}(i) & \phi_{12}(i) \\ \phi_{21}(i) & \phi_{22}(i) \end{bmatrix} \begin{bmatrix} \varepsilon_{yt-i} \\ \varepsilon_{xt-i} \end{bmatrix}$$

Or even in more compact form:

$$z_t = \mu + \sum_{i=0}^{\infty} \phi_i \varepsilon_{t-i}$$

Above moving average presentation is useful for analysing the interaction between the $\{y_t\}$ and $\{x_t\}$ series. The coefficients ϕ show the effect of the ε_{yt} and ε_{xt} shocks on the entire system. In this example, the four elements of $\phi_{jk}(0)$ called impact multipliers. To explain this with an example, as Enders provided in their work: '*The coefficient $\phi_{12}(0)$ is the instantaneous impact of a one-unit change in ε_{xt} on y_t.*' In a similar vein, the components of $\phi_{11}(1)$ and $\phi_{12}(1)$ each separately indicate one period impact of unit changes in ε_{yt-1} and ε_{xt-1}. This set of coefficients consisting of four terms such as $\phi_{11}(i)$, $\phi_{12}(i)$, $\phi_{21}(i)$, $\phi_{22}(i)$ are called impulse-response functions. The impulse-response functions are plotted graphically as the response of the $\{y_t\}$ and $\{x_t\}$ series to various shocks (Enders, 2015).

On the other hand, forecast error variance decomposition is another important tool for revealing multiple relationships between variables in the VAR. Continuing with Enders' (2015) notation, to conditionally estimate z_{t+1}, we move impulse – response equation one step forward and in general the n step ahead forecast is given by:

$$z_{t+n} = \mu + \sum_{i=0}^{\infty} \phi_i \varepsilon_{t+n-i}$$

Thus, the n-period-ahead forecast error is equal to:

$$z_{t+n} - E_t z_{t+n} = \sum_{i=0}^{n-1} \phi_i \varepsilon_{t+n-i}.$$

When focusing only on the $\{y_t\}$ series, the n-step forecast error is determined to be as follows:

$$y_{t+n} - E_t y_{t+n} = \phi_{11}(0)\varepsilon_{yt+n} + \phi_{11}(1)\varepsilon_{yt+n-1} + \cdots + \phi_{11}(n-1)\varepsilon_{yt+1} +$$
$$\phi_{12}(0)\varepsilon_{xt+n} + \phi_{12}(1)\varepsilon_{xt+n-1} + \cdots + \phi_{12}(n-1)\varepsilon_{xt+1}.$$

And since $\sigma_y(n)^2$ is known to be the forecast error variance of y_{t+n}, the following equation emerges:

$$\sigma_y(n)^2 = \sigma_y^2[\phi_{11}(0)^2 + \phi_{11}(1)^2 + \cdots + \phi_{11}(n-1)^2] + \sigma_x^2[\phi_{12}(0)^2 + \phi_{12}(1)^2 + \cdots + \phi_{12}(n-1)^2].$$

The variance of the prediction inaccuracy grows as the forecast horizon n increases because all $\phi_{jk}(i)^2$ values of must be nonnegative. The first component is the part of the forecast error variance due to "own" shocks and the second component is the part due to shocks to the other variable x. If most of the fluctuations in a variable are due to its shocks, it indicates that the variable is moving exogenously. Thus, variance decomposition also gives information about the degree of causality relationships between variables.

Overall to sum up the two techniques cited above the term *innovation accounting* can be used. This technique which unites impulse-response analysis and variance decompositions, can be valuable for examining the links between many economic relationships. Also, if the correlations between the various innovations are small, similar impulse responses and variance decompositions should be obtained using different orderings of the variables (Enders, 2015).

6. 3. Empirical Results

At this stage of the study, the econometric analysis outputs of the series will be explained by following the methods as we have shown in the proposed empirical plan. Although the data of the study have been explained before, to remind you again, the variables used are BCCI, TCCI, REERCPI, ON, ISE100, IPI and INF. For this reason, two different equations were constructed in the study. Firstly, in Model TCCI, the dependent variable selected from TURKSTAT CCI's data set and the other model called Model BCCI, the dependent variables is BCCI. The aim here is to demonstrate the robustness of the results by taking into account both confidence indices. Plus, as a result of econometric outputs, if a difference is detected between them, the possible reasons for the difference will be discussed. Because, in the confidence index values in Appendix 1, you can see that the two indices give various different results in same months. Therefore, the differences between the two indices may be important as a robustness check. We will apply the same econometric methods to both models respectively.

6. 3. 1. Unit Root Tests

ADF and KPSS unit root tests were applied to the series in order to test the integration orders of the CCIs and the macroeconomic series. The purpose of this is to examine the series under the hypothesis of both being stationary and not being stationary. Because, as explained in the methodology, the basic hypothesis of the ADF test states that the series contains a unit root, while the KPSS test accepts stationarity as the null hypothesis. The related tests are below for both models by using TCCI and BCCI.

Table 7. Augmented Dickey-Fuller Test Results

UNIT ROOT TEST RESULTS TABLE (ADF)

Null Hypothesis: the variable has a unit root

	At Level						
		BCCI	TCCI	INF	IPI	ISE100	ON	REERCPI
With Constant	t-Statistic	-2.5639	-1.8752	0.4429	-0.2330	0.7967	-3.0162	0.4174
	Prob.	0.1023	0.3435	0.9843	0.9307	0.9938	0.0351	0.9833
		no	no	no	no	no	**	no
	At First Difference						
		d(BCCI)	d(TCCI)	d(INF)	d(IPI)	d(ISE100)	d(ON)	d(REERCPI)
With Constant	t-Statistic	-12.6929	-13.1833	-7.2829	-14.9746	-13.6650	-4.7689	-10.9931
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
		***	***	***	***	***	***	***

a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant

b: Lag Length based on SIC

c: Probability based on MacKinnon (1996) one-sided p-values.

Table 8. Kwiatkowski-Phillips-Schmidt-Shin Test Results

UNIT ROOT TEST RESULTS TABLE (KPSS)

Null Hypothesis: The variable is stationary

	At Level						
		BCCI	TCCI	INF	IPI	ISE100	ON	REERCPI
With Constant	t-Statistic	1.3367	0.6862	0.9766	1.7591	1.6757	0.3226	1.5282
	Prob.	***	**	***	***	***	no	***
	At First Difference						
		d(BCCI)	d(TCCI)	d(INF)	d(IPI)	d(ISE100)	d(ON)	d(REERCPI)
With Constant	t-Statistic	0.1130	0.1001	0.3425	0.2032	0.2745	0.0886	0.3190
	Prob.	no	no	no	no	no	no	no

Notes: a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%; and (no) Not Significant

b: Lag Length based on SIC; c: Probability based on Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1)

First of all, to clarify why only the test results with a constant are presented: Since no non-linear movement is detected in our variables, only the constant term will be sufficient in unit root tests. Therefore, it is not necessary to add a trend to the test of each variable. The results with only the constant show that the first differences of the series are stationary in both the ADF and KPSS tests for $\alpha = 0.01$. Thus all series are I(1).

6. 3. 2. Descriptive Statistics

Before proceeding in the data analysis process of the series, the descriptive statistics between the level values of the variables and their first difference values are presented in the tables below. After unit root tests, it was concluded that all data were first-difference stationary. The tables below indicate the individual descriptive statistics of each variable after testing by ADF and KPSS. Since it can be stated that all series are I(1), first differenced series showed by adding D letter for all variables and visualised by the figure below.

Table 9. Descriptive Statistics of the Dataset

	BCCI	INF	IPI	ISE100	ON	REERCPI	TCCI
Mean	88.79028	10.20828	90.35834	739.1628	10.48398	99.69686	89.07287
Median	87.92050	9.125000	87.80377	734.2927	7.500000	104.7000	91.26026
Maximum	142.0850	36.08000	144.8673	1857.650	22.50000	127.7100	100.7189
Minimum	47.32000	3.990000	57.00147	235.9164	1.500000	47.87000	68.91328
Std. Dev.	19.41512	4.273610	22.85805	321.1863	5.539941	18.85282	6.702547
Observations	204	204	204	204	204	204	204

Table 10. Descriptive Statistics of the First Differenced Dataset

	D(BCCI)	D(INF)	D(IPI)	D(ISE100)	D(ON)	D(REERCPI)	D(TCCI)
Mean	-0.450419	0.132217	0.417048	7.804663	-0.024532	-0.291429	-0.146018
Median	-0.581000	0.110000	0.456294	9.489300	0.000000	-0.100000	-0.040020
Maximum	23.14400	14.77000	15.54514	287.6100	9.00000	7.550000	8.924582
Minimum	-22.24100	-5.750000	-34.02110	-163.4994	-4.250000	-11.74000	-7.047820
Std. Dev.	7.605070	1.532648	3.595617	56.31488	1.156405	3.008592	2.382952
Observations	203	203	203	203	203	203	203
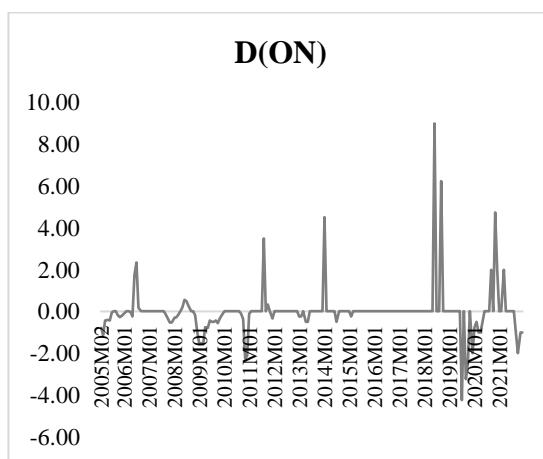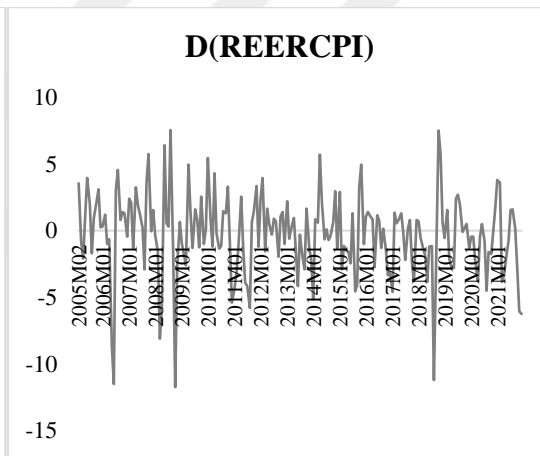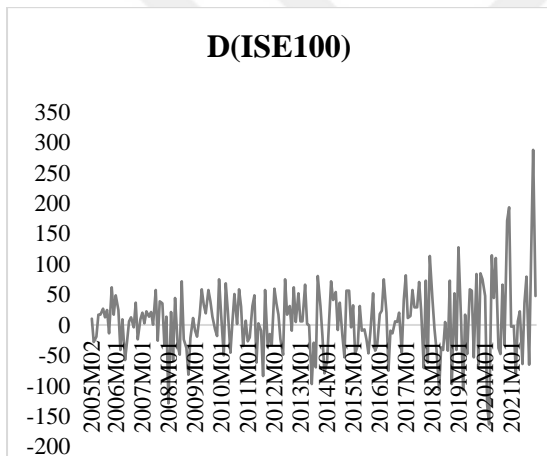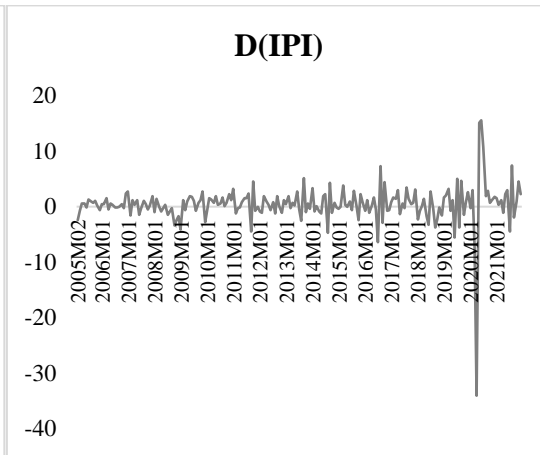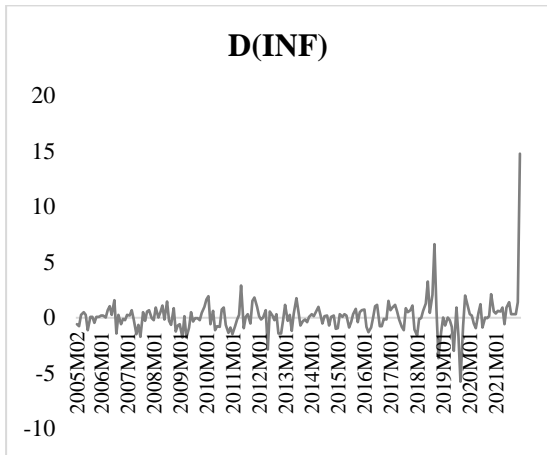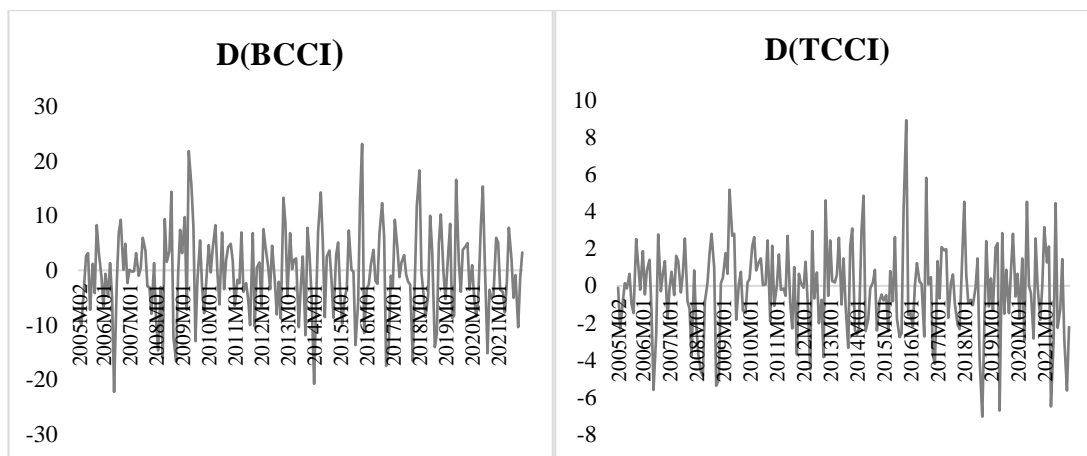
Figure 9. Graphs of the First Differenced Variables

In the first differentiated series created by the loss of the first observation, the timeline graph creates contradictory observations in moments such as the pandemic and the 2008 crisis in macro indicators, as expected. Also, the fluctuations of CCIs' graphs show similar pattern.

6. 3. 3. Lag Order Selection

Unit root tests allowed us to move on to the next steps of the empirical analysis. Therefore, the lag length of the data should be checked before the models are subjected to further analysis. In determining the lag length, Schwarz, Hannan-Quinn and Akaike information criteria, which are the most used tests in the relevant literature, will be applied. These processes will be done for two models and their lag lengths will be compared to build cointegration in the further stages.

Table 11. Lag Order Selection Criteria for Model TCCI

Endogenous variables: TCCI REERCPI IPI
ISE100 INF ON
Exogenous variables: C
Sample: 2005M01 2021M12
Included observations: 196

Lag	AIC	SC	HQ
0	44.90377	45.00412	44.94440
1	32.18604	32.88849*	32.47042
2	31.93751*	33.24207	32.46566*
3	32.07549	33.98215	32.84740
4	32.08168	34.59044	33.09735
5	32.21812	35.32898	33.47754
6	32.26564	35.97860	33.76882
7	32.24838	36.56345	33.99533
8	32.00736	36.92453	33.99806

Endogenous variables: BCCI REERCPI IPI
ISE100 INF ON
Exogenous variables: C
Sample: 2005M01 2021M12
Included observations: 196

Lag	AIC	SC	HQ
0	46.55960	46.65995	46.60023
1	34.33994	35.04240*	34.62433
2	34.02484*	35.32940	34.55299*
3	34.13598	36.04264	34.90789
4	34.14237	36.65113	35.15804
5	34.27652	37.38739	35.53595
6	34.35269	38.06566	35.85588
7	34.37191	38.68698	36.11886
8	34.20098	39.11815	36.19169

* indicates lag order selected by the criterion
AIC: Akaike information criterion, SC: Schwarz information
criterion, HQ: Hannan-Quinn information criterion

The fact that all the variables in our equations are not stationary in the 99% confidence level and that they pass all unit root tests when the first difference is taken gave us the opportunity to apply the cointegration test. For this reason, at this point, the information criteria created with the level values of the series are examined. As can be seen from the tables, two different lag lengths have been determined for both our models. Thus, when methods such as the cointegration test or VAR are applied in the following stages, the most selected lag lengths will be used for these series.

First of all, when the TCCI data were examined, two different information criteria showed the same lag length. Therefore, AIC and HQ in Table 11 chose the second lag length. Due to this selection, the second lag length is presumably reasonable for TCCI model.

Similarly, the same case occurred in Table 12. It's also shows that the AIC and HQ chose the second lag and SC chose the first lag. However, since for both AIC and HQ are securing the same lag length, the second lag for Model BCCI will be used as well.

6. 3. 4. Cointegration

After the unit root tests and the determination of the lag length, the Johansen cointegration test was applied to both models in order to determine the long-term relationship between the variables, and the outputs of this test are tabulated below:

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Table 13. Cointegration Test Results for Model BCCI

Sample (adjusted): 2005M04 2021M12
Included observations: 201 after adjustments
Trend assumption: Linear deterministic trend
Series: BCCI INF IPI ISE100 ON REERCPI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.142803	88.12767	95.75366	0.1491
At most 1	0.109954	57.15598	69.81889	0.3329
At most 2	0.068508	33.74317	47.85613	0.5159
At most 3	0.057186	19.47874	29.79707	0.4589
At most 4	0.030579	7.642709	15.49471	0.5044
At most 5	0.006943	1.400323	3.841466	0.2367

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.142803	30.97169	40.07757	0.3624
At most 1	0.109954	23.41280	33.87687	0.4991
At most 2	0.068508	14.26443	27.58434	0.8040
At most 3	0.057186	11.83603	21.13162	0.5639
At most 4	0.030579	6.242385	14.26460	0.5823
At most 5	0.006943	1.400323	3.841466	0.2367

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 14. Cointegration Test Results for Model TCCI

Sample (adjusted): 2005M04 2021M12
Included observations: 201 after adjustments
Trend assumption: Linear deterministic trend
Series: TCCI INF IPI ISE100 ON REERCPI
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.112488	84.57043	95.75366	0.2288
At most 1	0.107505	60.58437	69.81889	0.2178
At most 2	0.078972	37.72371	47.85613	0.3142
At most 3	0.057396	21.18838	29.79707	0.3460
At most 4	0.031701	9.307457	15.49471	0.3377
At most 5	0.013992	2.832344	3.841466	0.0924

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.112488	23.98607	40.07757	0.8269
At most 1	0.107505	22.86066	33.87687	0.5411
At most 2	0.078972	16.53533	27.58434	0.6200
At most 3	0.057396	11.88092	21.13162	0.5595
At most 4	0.031701	6.475113	14.26460	0.5530
At most 5	0.013992	2.832344	3.841466	0.0924

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

As a result of the tests, it is striking that the trace and the maximum-eigen statistics did not detect cointegration at the 95% confidence interval. For this reason, a long-term relationship was not found between both indices of consumer confidence of Türkiye and our macroeconomic variables. Since the series do not have a long-run equilibrium, the most appropriate way to continue the analysis is to construct a stationary VAR model with the first differences of our series and carry out innovation accounting.

6. 3. 5. Vector Autoregression

At this stage of the study, a VAR model will be established with the variables that we made stationary by taking the first difference. Because since the data are not cointegrated, within the scope of the proposed empirical plan scheme specified at the beginning of the empirical analysis the VAR method is considered favourable. For this reason, first of all, the lag length of the stationary data will be determined and then the VAR analysis will be performed based on these lags.

Table 15. Lag Length Selection for VAR Analysis for Model BCCI

Endogenous variables: D(BCCI) D(INF) D(IPI) D(ISE100) D(REERCPI) D(ON)
Exogenous variables: C
Sample: 2005M01 2021M12
Included observations: 195

Lag	AIC	SC	HQ
0	34.72309	34.82379*	34.76386
1	34.25366	34.95861	34.53908*
2	34.22990*	35.53910	34.75998
3	34.25580	36.16924	35.03053
4	34.39823	36.91592	35.41761
5	34.48013	37.60206	35.74416
6	34.51899	38.24518	36.02768
7	34.43358	38.76401	36.18692
8	34.59891	39.53359	36.59690

Table 16. Lag Length Selection for VAR Analysis for Model TCCI

Endogenous variables: D(TCCI) D(INF) D(IPI) D(ISE100) D(REERCPI) D(ON)
Exogenous variables: C
Sample: 2005M01 2021M12
Included observations: 195

Lag	AIC	SC	HQ
0	32.54290	32.64361*	32.58368
1	32.13644*	32.84139	32.42187*
2	32.15917	33.46837	32.68925
3	32.17298	34.08643	32.94771
4	32.32957	34.84727	33.34896
5	32.40381	35.52575	33.66785
6	32.40199	36.12817	33.91067
7	32.22788	36.55831	33.98122
8	32.26520	37.19988	34.26319

Considering the information criteria of stationary series, both AIC and HQ have chosen the first lag length in the TCCI Model. Therefore, it is quite reasonable to set up a VAR system by choosing the first length. However, for the BCCI Model, information criteria set separate lengths. However, since the model with TCCI saved the first lag and HQ chose the first lag also, it was decided to use the first lag length for the BCCI Model. Actually, this is a fairly reasonable result because the models in levels which were used for cointegration tests had two lags and now the models in first differences have one lag. In the light of these results, VAR analysis of the first differenced variables were made using a single lag. The results are shown in the tables below:

Table 17. Vector Autoregression Estimation of Model BCCI

Vector Autoregression Estimates
Sample (adjusted): 2005M03 2021M12
Included observations: 202 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(BCCI)	D(INF)	D(IPI)	D(ISE100)	D(REERCPI)	D(ON)
D(BCCI(-1))	0.061723	0.012499	0.086080	0.209833	-0.003528	-0.004956
	(0.08033)	(0.01537)	(0.03815)	(0.63365)	(0.03129)	(0.01211)
	[0.76839]	[0.81296]	[2.25638]	[0.33115]	[-0.11276]	[-0.40912]
D(INF(-1))	-0.182168	0.338994	0.133365	-0.464211	0.185036	0.207009
	(0.50536)	(0.09673)	(0.24001)	(3.98650)	(0.19684)	(0.07620)
	[-0.36047]	[3.50469]	[0.55566]	[-0.11645]	[0.94003]	[2.71648]
D(IPI(-1))	-0.149662	0.023859	-0.068720	-1.280458	-0.040359	0.010912
	(0.14138)	(0.02706)	(0.06715)	(1.11527)	(0.05507)	(0.02132)
	[-1.05857]	[0.88169]	[-1.02345]	[-1.14811]	[-0.73289]	[0.51181]
D(ISE100(-1))	0.041883	0.008190	0.018677	0.051409	0.010172	-0.001810
	(0.00924)	(0.00177)	(0.00439)	(0.07288)	(0.00360)	(0.00139)
	[4.53300]	[4.63124]	[4.25642]	[0.70535]	[2.82637]	[-1.29914]
D(REERCPI(-1))	0.150980	-0.170882	-0.090252	-2.258760	0.274592	-0.082231
	(0.20224)	(0.03871)	(0.09605)	(1.59537)	(0.07877)	(0.03050)
	[0.74653]	[-4.41452]	[-0.93963]	[-1.41582]	[3.48583]	[-2.69639]
D(ON(-1))	0.493970	-0.133617	0.013176	-0.642131	0.409423	0.070360
	(0.48802)	(0.09341)	(0.23177)	(3.84967)	(0.19008)	(0.07359)
	[1.01220]	[-1.43050]	[0.05685]	[-0.16680]	[2.15391]	[0.95612]
C	-0.576976	0.001764	0.326304	7.443842	-0.304077	-0.046334
	(0.51849)	(0.09924)	(0.24624)	(4.09001)	(0.20195)	(0.07818)
	[-1.11281]	[0.01778]	[1.32513]	[1.82001]	[-1.50570]	[-0.59263]
R-squared	0.129904	0.219219	0.124620	0.018609	0.154812	0.147749
Adj. R-squared	0.103132	0.195195	0.097686	-0.011588	0.128806	0.121525
F-statistic	4.852216	9.124987	4.626749	0.616248	5.952987	5.634287
Normality	VAR	Joint	Jarque-Bera:	df:	Probability:	
Tests	Residual	Test	18895.11	12	0.0000	
Heteroskedasticity	VAR	Joint	Chi-sq:	df:	Probability:	
Tests	Residual	Test	559.3744	252	0.0000	

Table 18. Vector Autoregression Estimation of Model TCCI

Vector Autoregression Estimates
Sample (adjusted): 2005M03 2021M12
Included observations: 202 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(TCCI)	D(INF)	D(IPI)	D(ISE100)	D(REERCPI)	D(ON)
D(TCCI(-1))	-0.066967	0.052073	0.014711	0.506347	-0.065933	0.003320
	(0.07612)	(0.04619)	(0.11627)	(1.90670)	(0.09402)	(0.03646)
	[-0.87970]	[1.12745]	[0.12652]	[0.26556]	[-0.70125]	[0.09105]
D(INF(-1))	-0.099715	0.349294	0.057740	-0.448063	0.160296	0.213138
	(0.16065)	(0.09747)	(0.24537)	(4.02394)	(0.19842)	(0.07694)
	[-0.62068]	[3.58350]	[0.23532]	[-0.11135]	[0.80784]	[2.77004]
D(IPI(-1))	-0.045996	0.020710	-0.062560	-1.303533	-0.035322	0.010220
	(0.04490)	(0.02724)	(0.06858)	(1.12471)	(0.05546)	(0.02151)
	[-1.02433]	[0.76018]	[-0.91218]	[-1.15899]	[-0.63689]	[0.47519]
D(ISE100(-1))	0.005050	0.008483	0.019858	0.055436	0.009963	-0.001868
	(0.00290)	(0.00176)	(0.00442)	(0.07255)	(0.00358)	(0.00139)
	[1.74323]	[4.82708]	[4.48849]	[0.76408]	[2.78489]	[-1.34631]
D(REERCPI(-1))	0.254433	-0.171541	0.013674	-2.153814	0.290937	-0.089528
	(0.06013)	(0.03648)	(0.09184)	(1.50617)	(0.07427)	(0.02880)
	[4.23116]	[-4.70180]	[0.14889]	[-1.43000]	[3.91725]	[-3.10858]
D(ON(-1))	0.034695	-0.134212	0.016909	-0.643748	0.410758	0.070050
	(0.15372)	(0.09326)	(0.23478)	(3.85018)	(0.18986)	(0.07362)
	[0.22571]	[-1.43906]	[0.07202]	[-0.16720]	[2.16352]	[0.95149]
C	-0.101691	0.001219	0.308249	7.419392	-0.306053	-0.045122
	(0.16325)	(0.09905)	(0.24933)	(4.08888)	(0.20163)	(0.07819)
	[-0.62293]	[0.01231]	[1.23630]	[1.81453]	[-1.51791]	[-0.57711]
R-squared	0.126178	0.221647	0.101839	0.018412	0.156883	0.147053
Adj. R-squared	0.099291	0.197697	0.074203	-0.011791	0.130941	0.120809
F-statistic	4.692936	9.254809	3.685040	0.609606	6.047444	5.603202
Normality	VAR	Joint	Jarque-Bera:	df:	Probability:	
Tests	Residual	Test	18197.34	12	0.0000	
Heteroskedasticity	VAR	Joint	Chi-sq:	df:	Probability:	
Tests	Residual	Test	588.6912	252	0.0000	

In the above, for both models' joint results of the normality and the heteroskedasticity of the residuals tabulated together, alongside with the tests of overall significance. According to these outputs, they are not multivariate normal in the light of Jarque-Bera statistics. This is a frequently encountered result in the VAR literature. Multivariate non-normality can arise from a number of reasons like outlier observations, structural breaks or the fact that individuals series may come from different data generating processes. It is still worthwhile to examine the performance of the model.

In addition, the fact that heteroscedasticity, which is not generally detected in time series analysis, is included in our results can be interpreted as a sign of structural breaks in the data set.

Table 19. Residual Serial Correlation LM Tests for Models

VAR Residual Serial Correlation LM Tests for Model BCCI
Null Hypothesis: No serial correlation at lag order
Sample: 2005M01 2021M12
Included observations: 202

VAR Residual Serial Correlation LM Tests for Model TCCI
Null Hypothesis: No serial correlation at lag order
Sample: 2005M01 2021M12
Included observations: 202

| Lags	LM-Stat	Prob	Lags	LM-Stat	Prob
1	60.48	0.010	1	52.92	0.034
2	63.10	0.004	2	63.73	0.003
3	63.72	0.003	3	59.60	0.008
4	32.65	0.629	4	29.10	0.786
5	54.36	0.026	5	54.02	0.027
6	32.64	0.630	6	44.55	0.155
7	46.82	0.107	7	52.77	0.035
8	48.60	0.079	8	70.62	0.000
9	48.65	0.076	9	51.17	0.048
10	37.15	0.416	10	33.15	0.605
11	43.85	0.173	11	48.29	0.083
12	73.45	0.000	12	81.37	0.000

Probs from chi-square with 36 df.   Probs from chi-square with 36 df.

Information criteria before estimating the VAR showed that the first lag length was optimal. Similarly, as you can see for both model's null hypothesis is rejected at first lag at 1% confidence interval. Although the probability value for the BCCI model is exactly equal to 0.01, since both the information criteria and table of LM tests indicate similar lag orders, it can be said that the 1st lag length was reasonable for our VAR.

Although we have passed only part of the diagnostic tests and it is quite unlikely that these variables are multivariate normal, we will continue with our innovation accounting and see how the models perform. Models that pass the tests of vector normality, serial correlation and heteroscedasticity are already very few in the literature. It is a natural consequence of the data being studied within a limited time frame. Thus, there is no obstacle to continuing the impulse-response analysis for the progress of the study.

6. 3. 6. Impulse-Response Analysis and Forecast Variance Decompositions

The impulse-response analyses that were subjected to our series using Monte-Carlo's standard errors and aligned according to the response to Cholesky ordering are shown in the graphs below. The ordering was created by considering the exogenous variable as the interest rate. This is how the chain of events, starting from ON and extending to consumer confidence, was initiated. This procedure has also been tested with generalised responses, but it gave similar results with the effects we established with the Cholesky ordering. Besides, the Cholesky ordering, which is created the same for each model will be explained in detail in the variance decomposition section since, both analyses are affected by the ordering of the variables.
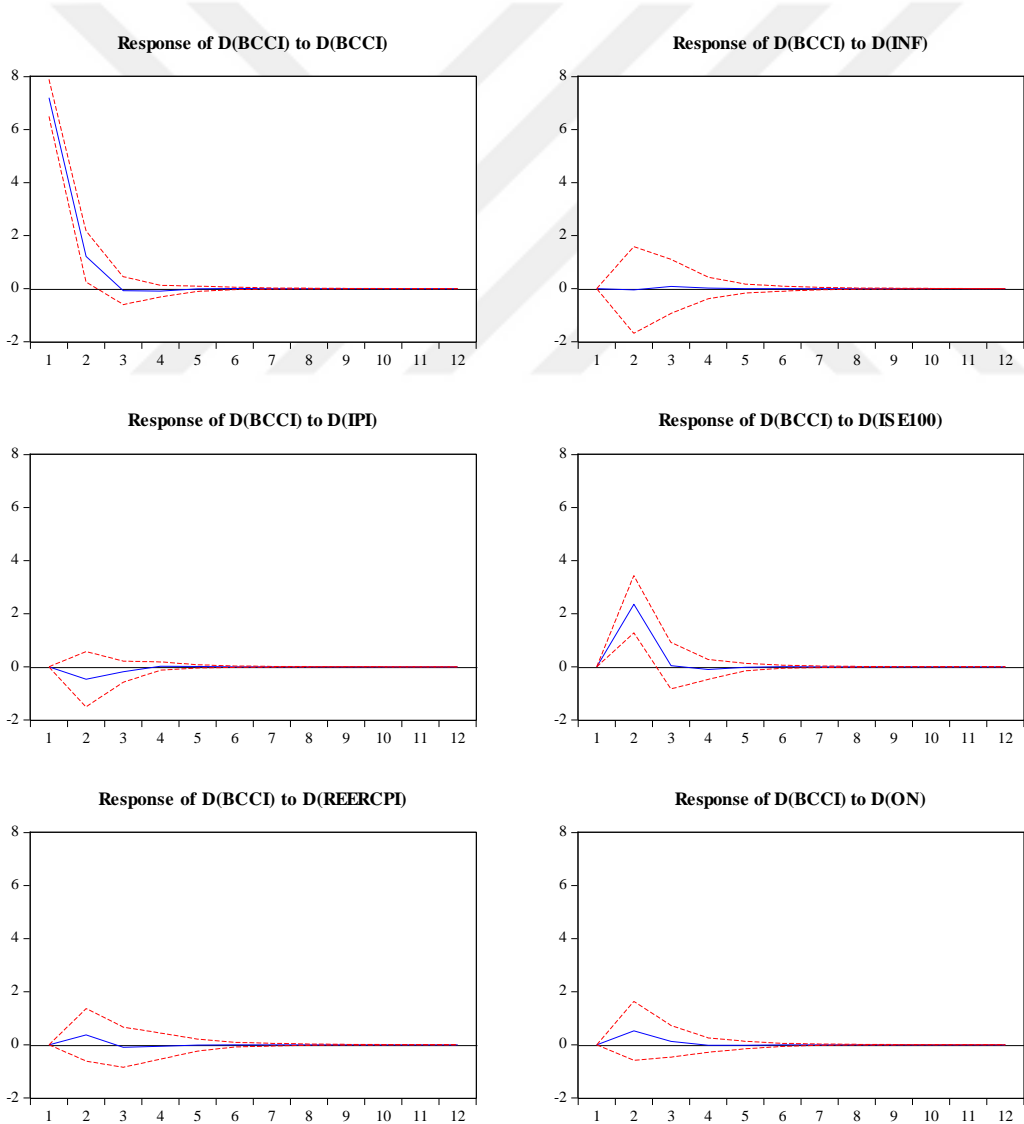
Figure 10. Response of BCCI to Independent Variables

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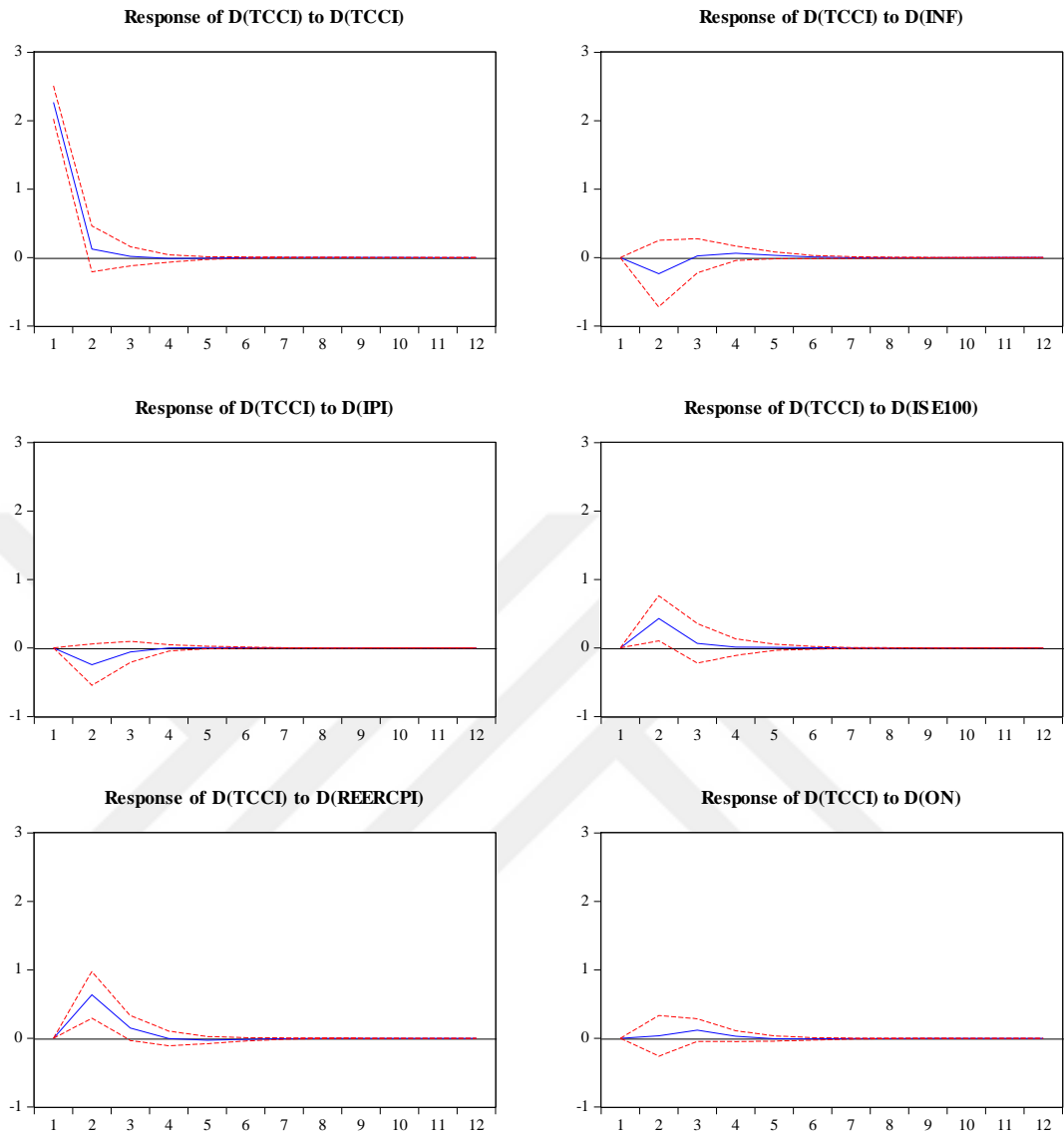
Figure 11. Response of TCCI to Independent Variables

In Figure 10, in the impulse-response graphs created with the BCCI data, a shock to the CCI is presented. It is observed that inflation does not lead to any response. In addition, it is seen that the increase in the stock market index has a great effect on confidence and this effect returns to its normal course in the third month. In addition, it was determined that the exchange rate increase and the overnight interest had a slight effect, but this effect disappeared in the first few months. On the other hand, in Figure 11 graphs created by TCCI, it has been determined that the ISE100 and the real exchange rate have considerable effect on confidence, and a period of 3-4 months has to pass for the effect to disappear. Unlike the case for BCCI, it is seen that interest

effect comes with a delay and the inflation has a decreasing impact especially in the second month. The most adverse result in both figures is the downward direction of the response of confidence to a D(IPI) shock. This may be due to the severe fluctuations may lead unexpected outcomes due to the Türkiye's structural breaks in the cyclical periods that are also evident in the timeline graphs of IPI. Plus, the accumulated response graphs were also examined to illustrate that the selected variables and the two models established accordingly are stable convergent models.
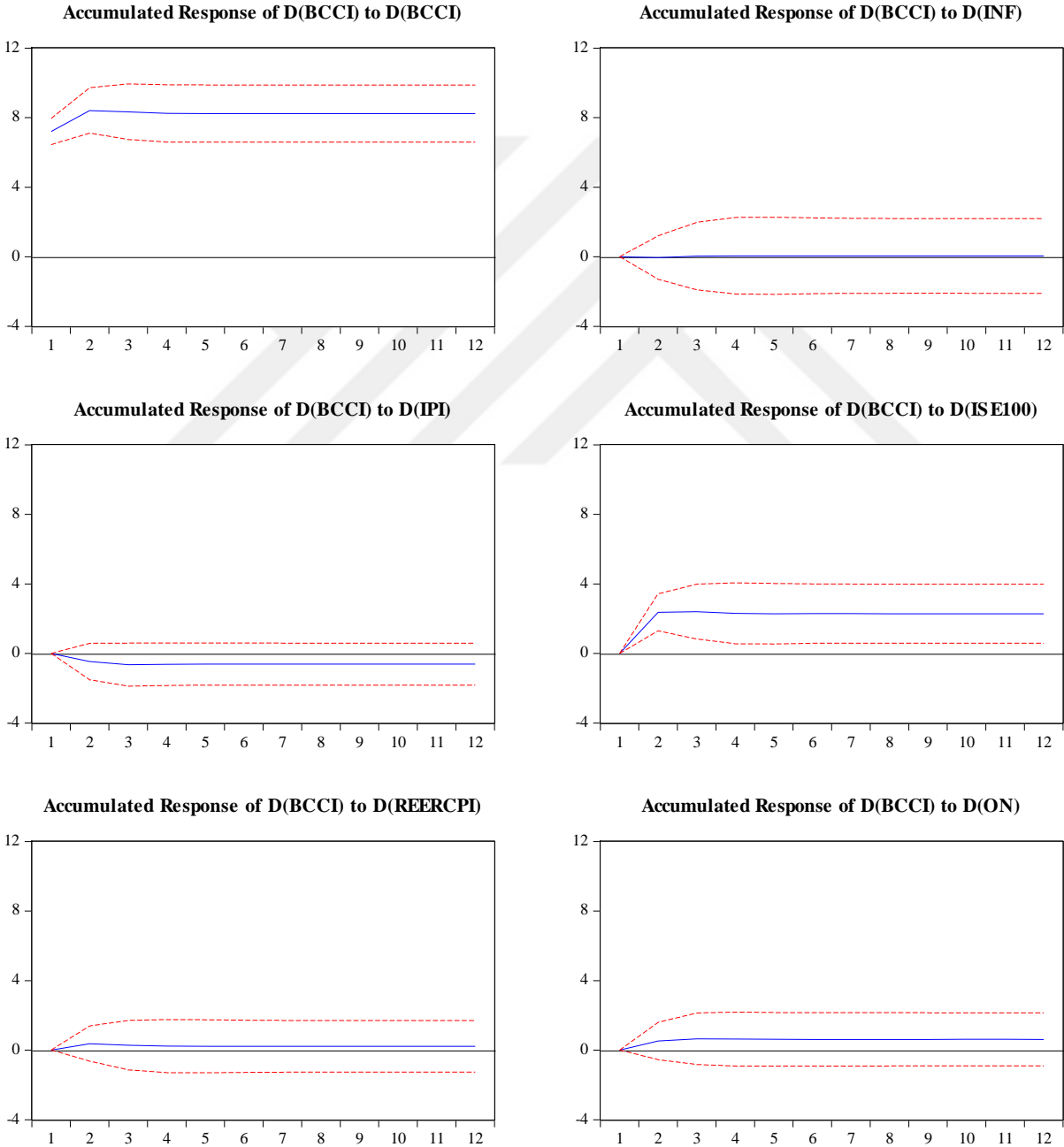
Figure 12. Accumulated Responses of Model BCCI
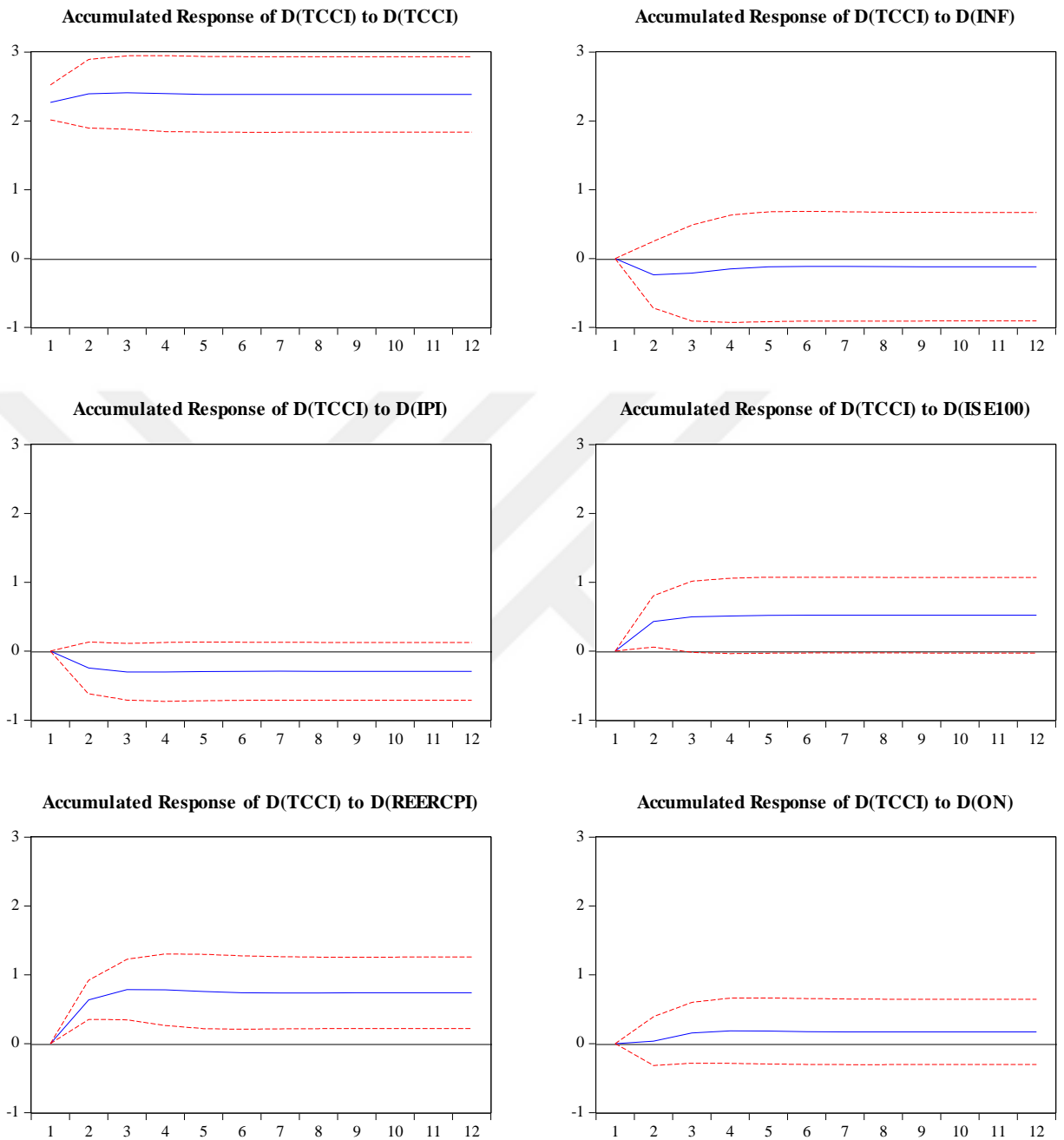
Figure 13. Accumulated Responses of Model TCCI

As can be seen, all of the variables have become parallel to the x-axis in both confidence index models. Therefore, the models are convergent despite the failure of some of the diagnostic tests.

After the impulse-response analysis were interpreted and the convergence of the models was questioned, the forecast error variance decompositions are examined. As in impulse response analysis, Cholesky decomposition was used and the Monte Carlo method with 100 repetitions was applied to get the standard errors. The ordering sequence is as follows: D(TCCI) /D(BCCI) D(INF) D(IPI) D(ISE100) D(REERCPI) D(ON). Ten-period variance decomposition results are tabulated below:

Table 20. Variance Decomposition of D(BCCI)

Period	S.E.	D(BCCI)	D(INF)	D(IPI)	D(ISE100)	D(REERCPI)	D(ON)
1	7.197995	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	7.712204	89.57796	0.004203	0.365824	9.361330	0.234280	0.456402
		(3.79122)	(0.88166)	(1.14399)	(4.06940)	(0.80060)	(1.05760)
3	7.716965	89.47696	0.015766	0.422614	9.352662	0.248111	0.483888
		(4.01475)	(1.23542)	(1.15963)	(4.03690)	(0.82816)	(1.16016)
4	7.718513	89.45628	0.016541	0.423413	9.366929	0.252765	0.484074
		(4.11617)	(1.31109)	(1.15960)	(4.01829)	(0.83703)	(1.16245)
5	7.718569	89.45514	0.016543	0.423681	9.367175	0.253044	0.484420
		(4.14387)	(1.32296)	(1.16058)	(4.01373)	(0.84257)	(1.16701)
6	7.718572	89.45509	0.016574	0.423681	9.367179	0.253045	0.484436
		(4.14955)	(1.32507)	(1.16051)	(4.01277)	(0.84344)	(1.16813)
7	7.718573	89.45507	0.016584	0.423682	9.367178	0.253048	0.484436
		(4.15080)	(1.32556)	(1.16052)	(4.01259)	(0.84349)	(1.16816)
8	7.718573	89.45507	0.016584	0.423682	9.367178	0.253050	0.484436
		(4.15134)	(1.32575)	(1.16052)	(4.01253)	(0.84355)	(1.16817)
9	7.718573	89.45507	0.016584	0.423682	9.367178	0.253050	0.484436
		(4.15157)	(1.32580)	(1.16052)	(4.01249)	(0.84358)	(1.16820)
10	7.718573	89.45507	0.016584	0.423682	9.367178	0.253050	0.484436
		(4.15164)	(1.32581)	(1.16052)	(4.01247)	(0.84359)	(1.16821)

Table 21. Variance Decomposition of D(TCCI)

Period	S.E.	D(TCCI)	D(INF)	D(IPI)	D(ISE100)	D(REERCPI)	D(ON)
1	2.267172	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	2.421487	87.92783	0.948851	1.015770	3.191114	6.893570	0.022863
		(4.42223)	(1.84587)	(1.52398)	(2.22002)	(3.28770)	(0.65769)
3	2.430881	87.25452	0.950695	1.063919	3.241761	7.221611	0.267494
		(4.90369)	(1.91624)	(1.51122)	(2.33113)	(3.39873)	(0.75548)
4	2.431927	87.18318	1.013620	1.063010	3.241353	7.215471	0.283361
		(4.99741)	(1.91083)	(1.51020)	(2.33713)	(3.40306)	(0.78463)
5	2.432317	87.15672	1.029258	1.063439	3.241907	7.225120	0.283557
		(5.02330)	(1.92285)	(1.50950)	(2.33177)	(3.40955)	(0.78916)
6	2.432393	87.15144	1.029902	1.063500	3.241899	7.228687	0.284570
		(5.03146)	(1.92810)	(1.50930)	(2.33115)	(3.41090)	(0.78939)
7	2.432400	87.15091	1.029960	1.063497	3.241882	7.228934	0.284812
		(5.03451)	(1.92934)	(1.50925)	(2.33090)	(3.41176)	(0.78934)
8	2.432401	87.15081	1.030054	1.063496	3.241891	7.228928	0.284822
		(5.03563)	(1.92949)	(1.50924)	(2.33089)	(3.41222)	(0.78955)
9	2.432402	87.15077	1.030071	1.063496	3.241893	7.228944	0.284823
		(5.03595)	(1.92949)	(1.50923)	(2.33092)	(3.41230)	(0.78973)
10	2.432402	87.15077	1.030071	1.063496	3.241893	7.228949	0.284825

| (5.03604) | (1.92952) | (1.50923) | (2.33091) | (3.41231) | (0.78979) |

According to the variance decomposition results for the BCCI in Table 20, it was seen that the variance decomposition does not change much, especially after the second period. It is striking that the effect of consumer confidence between the second period and the tenth period is at the point around of 89%, then it is determined that the effect of the stock market in explaining the error variance of the CCI, respectively, is quite high compared to other independent variables. Therefore, while a large part of the error variance for the BCCI series is due to itself, while the remaining 9,36% of variation is due to stock market series. The effect of other variables is very low, and the rate of this effect has remained constant in various periods. On the other hand, the variance decomposition results for TCCI seen in Table 21 show slightly different results than BCCI. However, although it is possible to explain a significant part of the error variance is due to itself and this effect does not change over time. It is seen that the variance due to itself with a rate of around 87.25%. The most influential one among the macroeconomic variables in explaining the error variance of the CCI is the real exchange rate with 7%. Then, 3,2% of the variation is due to the stock market and the effect of inflation and IPI are around 1%. Lastly, the remaining interest rate variable on explaining the variance is less than 1%.

6. 4. How Did Covid-19 Pandemic Affect Our Models

In the last step of the empirical analysis, the interaction between the pandemic and consumer confidence, which is discussed to be influential in the literature review, will be examined. Because, in the literature, researchers explained the negative effects of the outbreak on expectations and discussed its effects on confidence. Since only the last 20 observations of our timeframe belong to the pandemic period, we will use the model to forecast those and compare the forecasts with the actual observations.

Since the dynamic forecast uses the forecasted values for lagged terms forecasts for both confidence indices reveal the trend in the indices. However, in static forecasting, since the software makes an estimation based on the actual index value for lagged terms, it yields movements more synchronized with the actual series rather than trends. Examining the static forecast, BCCI data reveals more synchronized results than TCCI. Below, you can see the forecast graphs.
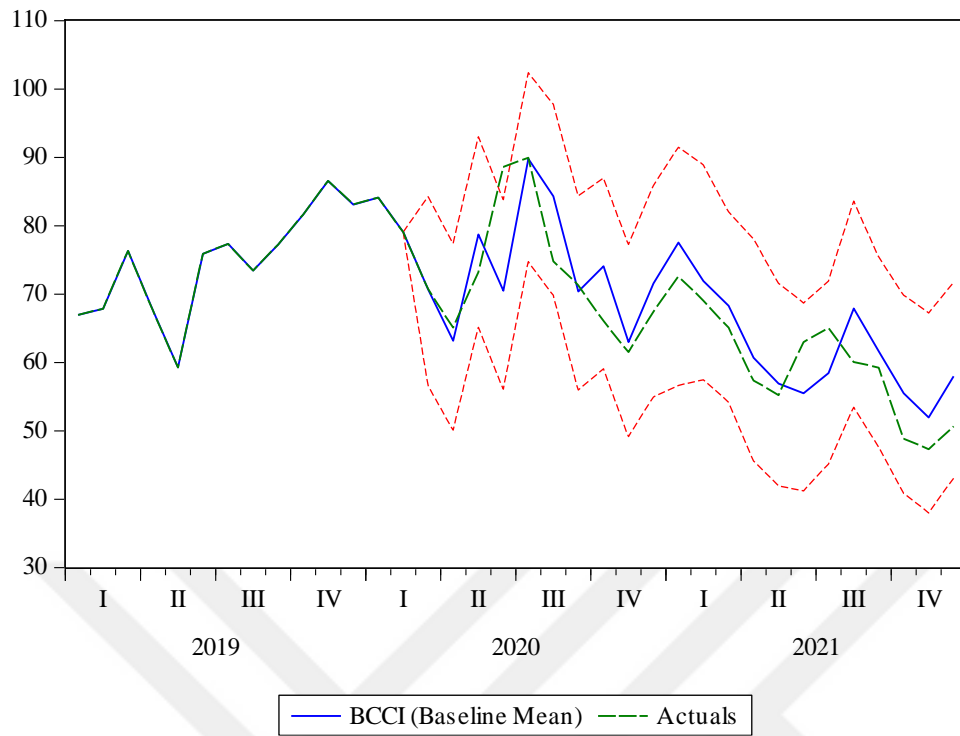
Figure 14. Static Forecast of BCCI
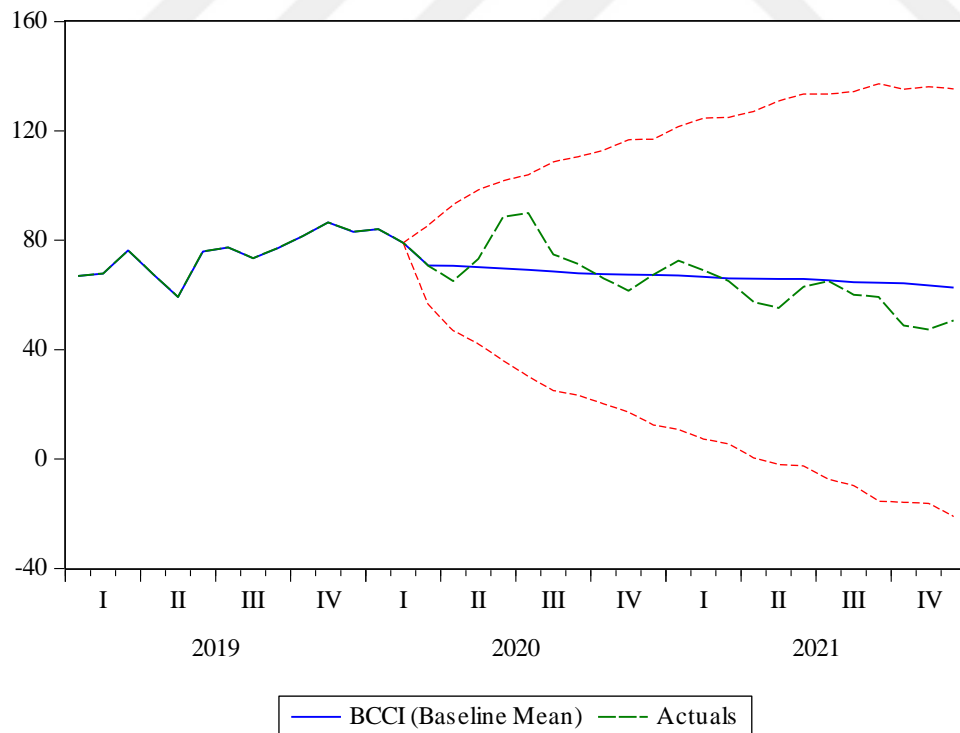
Figure 15. Dynamic Forecast of BCCI
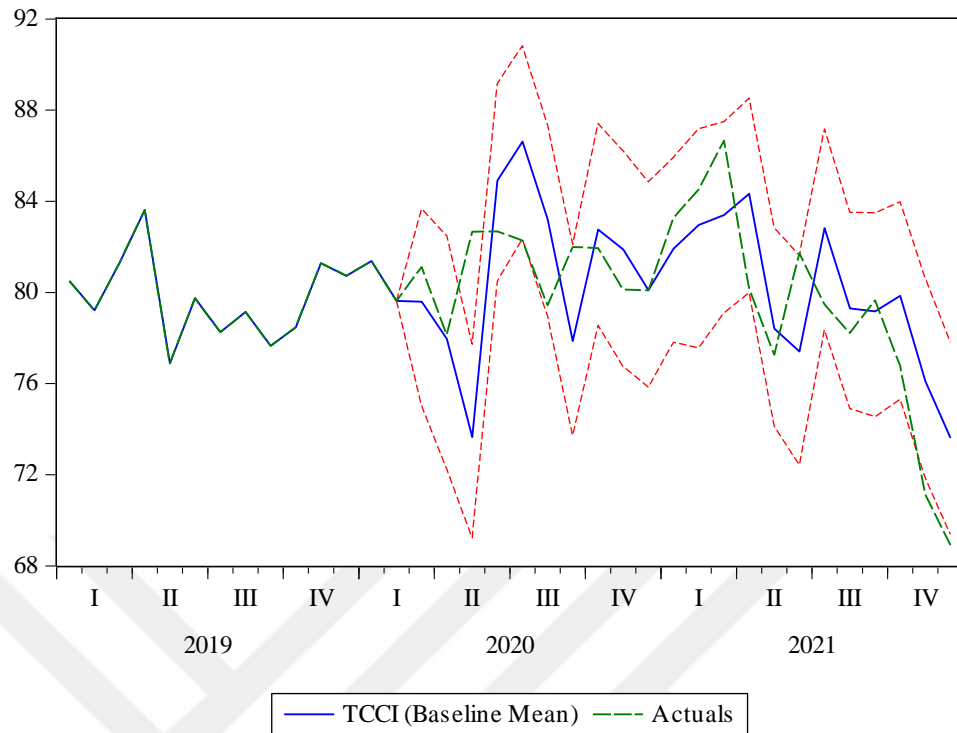
Figure 16. Static Forecast of TCCI

Figure 17. Dynamic Forecast of TCCI

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6. 5. Interpretation of Results

To summarize all the empirical findings discussed in Chapter 6, we must initially mention about our models and empirical research strategy. Since there are two indices measuring consumer confidence in Türkiye, we constructed two VAR models with these indices and the same set of macroeconomic variables. Here, we wanted to see the interaction of the variables 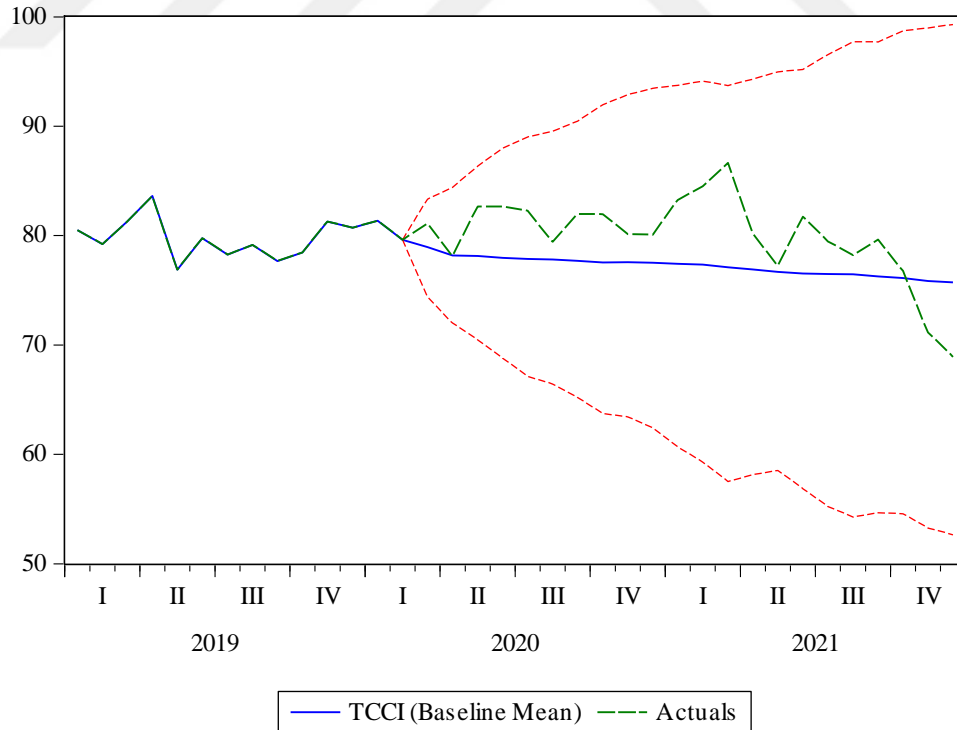with the index and to determine if there is a difference between the two indices. To analyse this; we carried out this study according to the plan, we stated in Figure 7, and we proceeded between the methods according to the results obtained. First of all, we subjected the data we obtained from various institutions to unit root analysis and determined that all variables were stationary when the first difference was taken. But before moving on to analysis with further methods, since our series were detected I(1), we tabulated the descriptive statistics of the data as level and first difference, and examined them graphically. Then, we applied the cointegration test to see whether a long-run equilibrium relation exists. We got the lag lengths here by checking information criteria such as AIC, HQ and SC and used the same lags for both models. However, since no cointegration relationship could be detected between the series, we decided to continue the research with VAR analysis. If the data were cointegrated, the research process would have continued with the VECM and Johansen method.

In order to perform VAR analysis with the first differenced data, we again applied to lag length selection processes. But here instead of the level values, we applied the test with first differenced data. At this point, as expected, the tests that optimally determined the 2nd lag length in the level values chose the 1st lag length when first differences were used. In this direction, we estimated the VAR and presented overall significance multivariate normality and heteroskedasticity tests.

After VAR analysis, we first investigated impulse-response analysis in the context of innovation accounting and presented only graphs related to the responses of two indices to shocks from the macroeconomic variables. Here we actually got the expected results from all variables except IPI and ON. Because we have seen that stock market and real exchange rates increase confidence, while inflation decreases consumer confidence. However, the negative correlation of industrial production with confidence is the perplexing point in the results. We discussed the reasons why we

found a negative association with increases of BCCI and TCCI with IPI. We think that this result may be due to the extreme fluctuation experienced especially during the pandemic period. Similarly, due to the problems experienced in Türkiye's political structure, it can be thought that the relationship between interest and consumer confidence yields different results than expected. We also added the accumulated response graphs as it was necessary to evaluate the robustness of the results. The fact that the graphs move parallel to the horizontal axis after a certain period and that the model errors do not increase over time showed that the impulse-response analysis we established worked correctly. Then, we moved on to variance decomposition. At this stage, we preferred tables instead of graphics while presenting the analysis outputs. Because the effect of many variables, especially in the BCCI results, was exceedingly small and close to each other, it was difficult to see them on the graph. For this reason, it can be interpreted that a large part of the change for both confidence indices is caused by itself and the other small percentage change is due to other variables. Thus, we finalised our empirical plan by completing innovation accounting.

Besides, we added a forecasting to enrich our research. We made this estimation especially on the coronavirus scenario, which is frequently encountered in the current literature. Because, as previous studies have shown, it has been widely discussed that the pandemic has turned expectations into negative and caused a decrease in consumer confidence. Based on the Türkiye case, we estimated the time period during based on the month before the first patient was detected. Because we wanted to examine in which trend the CCIs would follow if there was no effect of the pandemic. Both our static and dynamic estimation performed well and caught most of the changes. It seems rather than the pandemic, the last quarter of 2021 is the period which our models fail to forecast. Thus, we completed our empirical research by using the basic methods of time series analysis and adding forecast to the end. In the next section, the results of the research will be given by connecting our empirical outcomes to the previous studies and spot of the study in the literature will be finalised.

CHAPTER 7

CONCLUSION

It has been stated in the literature that consumer confidence is a determining factor in the macroeconomic field, and similarly, it is a precursor for estimating consumption or changing macro indicators. However, the results of the researchers vary in a particular time. The financial crisis periods and the effects of unexpected shocks in the economy change the results of the analysis. Similarly, even which survey outputs are analysed can affect the results at some point, as there are various institutions in each country that implement consumer confidence surveys. Therefore, although there is a large literature on the subject, it remains an attractive topic for researchers as the time interval analysed and the index used may change the outcomes. Starting from this point; in our study, the relationship between CCIs and macroeconomic variables was analysed for Türkiye. Essentially, indices the macroeconomic variables were symmetrically introduced into a VAR and the dynamic interaction among the variables was investigated with a focus on the response of CCI indices to shocks from the other variables. To perform the analysis the monthly data set between 2005:01 - 2021:12 used with the two CCIs implemented in Türkiye namely BCCI and TCCI. Separate models were set up for the two confidence indices. The macroeconomic variables included in the models, which are INF, ON, ISE100, IPI and REERCPI, were kept common. Thus, both index results were compared, and their robustness was assessed. First, we tested series with unit root tests and decided to use first differenced data to continue the empirical analysis.

In the light of the results obtained, a long-term relationship could not be determined between the selected macro variables and the CCIs. In fact, these results differ from some of the articles working with Turkish data. Although bivariate studies found cointegration relationships between CCIs and the exchange rate and stock market indicators, our multivariate analysis detected no cointegration. The fact that cointegration was not detected for either of the indices suggests our results are robust.

According to the results of the VAR analysis consumer confidence is positively related to the real effective exchange rate and stock market variables because a shock applied to these variables leads to a response of the CCIs in the same direction. However, the more controversial results emerged for inflation and industrial production. In the analysis with TCCI, it was determined that the response of the confidence variable to shocks to the inflation variable is in the opposite direction, while in the analysis with BCCI, there is almost no response. The industrial production variable, on the other hand, gave the opposite results than expected because a positive shock to DIPI leads to a negative response from the confidence variables. Similarly, the response to a shock to the interest variable has an adverse sign. It can be thought that the reason for this is due to political structure in Türkiye.

In forecast error variance decomposition, a major part of the error variance for the BCCI and TCCI are due to themselves. Yet, the indices differ in the distribution of the error variance. Bloomberg's index is especially in interaction with the stock market and the effect of other variables is exceptionally low. Besides the real exchange rate, stock market and industrial production are influential on the forecast error variance of the model with the TURKSTAT index.

Since it is known the effects of major shocks such as the pandemic on the market can affect the nature of the interaction among the variables in our model, the ability of the models to predict the pandemic period was also examined with. In this context, our model caught the general trend and synchronized movements in our estimation, so the coronavirus pandemic does not seem to have had an effect on the interaction among our variables. In fact, in earlier stages of the research dummy variables to represent the COVID-19 pandemic, political and financial crises in Türkiye were considered as part of the models but they turned out to be statistically insignificant.

At this point, it is actually possible to discuss about the differences between the indices. Although the results are similar, there are some distinctions. One of the main reasons for this is the differentiation of the index result depending on the variety of questions. As you can see in the Appendix 2 and 3, there are differences between the two surveys. While TURKSTAT collects data by asking open-ended questions, as well as inquiring various questions on a Likert scale, while Bloomberg creates an index with only 5 questions with 4 choices. For this reason, it can be thought that TURKSTAT makes more detailed measurements and the results diverge for this

reason. In addition, TURKSTAT also includes politically based questions in order to examine the general economy. Considering that there are political factors that affect the confidence index, such questions gain importance.

Essentially, we wanted to include a variable directly representing the political situation in our model to improve our study. However, we could not find a series that was announced on a monthly basis that could provide information about the political situation. Instead, we considered creating a dummy variable to represent the politics. We have created a variable by denoting the political events that might have powerful impact on Turkish citizens. Such as election periods, terrorist attacks, large-scale social events so on specified as 1, and 0 for the otherwise. However, when we included this dummy in our variables, it did not have a significant effect. Although it is observed that the political influence is important in the literature and even in the statements of the institutions that publish consumer surveys put an importance on this subject, we see that it turned out to be statistically insignificant in our research as a limitation of our study. Similarly, the study could be developed by adding more variables to the model. The reason behind this could not be done is the high correlation between the variables. For instance, in order to obtain more comprehensive results, we thought to add variables such as gold and oil prices, loan deposit ratio, and unemployment rate but they turned out to be highly colinear. In the following stages, such variables can be added to the analysis and the results can be examined in extended framework. In addition, the fact that the essence of the subject is very time-dependent and the number of observations on the Turkish case in the following processes will increase, so that the findings of future studies can be broader.

On conclusion: Although the concept of confidence is not an economic tool, it is a phenomenon that fundamentally affects the economy. Our results also showed that consumer confidence is correlated with various macroeconomic indicators and this issue is always open to future developments. Overall, considering the limitations of the study, especially the data-based problems and the fact that the CCI started to be announced in Türkiye just in the 2000s, we think that our econometric analyses can be a basis for future studies in terms of consumer confidence and the evaluation of economic indicators.

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APPENDIX: APPENDIX 1 - Monthly Consumer Confidence Indices for Türkiye

Table 22. TURKSTAT - CBRT Consumer Confidence Index

	January	February	March	April	May	June	July	August	September	October	November	December
2005	98,6	98,5	96,2	95,3	95,5	95,3	96,0	95,0	93,6	96,1	97,3	97,1
2006	98,9	98,5	99,3	100,7	99,3	93,7	91,1	93,9	93,6	94,3	95,6	93,8
2007	93,7	94,4	93,9	95,5	96,9	96,5	97,2	99,7	98,9	97,7	93,9	94,7
2008	92,6	89,0	84,3	79,5	78,6	78,8	80,6	83,4	84,3	78,9	73,9	74,0
2009	74,4	76,2	76,9	82,0	84,7	87,5	85,7	85,8	86,6	85,3	83,8	84,0
2010	84,3	86,5	89,1	89,9	91,2	92,7	92,7	92,8	95,2	93,3	95,5	94,4
2011	94,4	96,1	95,9	95,8	95,3	98,0	97,0	94,7	95,7	92,0	92,7	92,8
2012	92,7	94,0	93,3	88,9	91,8	91,1	91,9	89,9	89,1	85,3	89,9	89,3
2013	91,8	92,0	92,2	92,8	95,4	94,4	95,9	94,9	91,5	93,7	96,8	94,4
2014	91,8	89,5	92,6	97,4	95,0	93,2	93,1	93,2	94,1	91,7	90,9	90,4
2015	89,6	89,1	86,7	87,5	86,7	89,3	87,5	84,8	82,2	86,3	95,2	93,6
2016	92,2	90,0	90,1	91,3	91,5	91,6	88,9	94,7	94,8	95,3	91,6	87,4
2017	88,7	88,0	90,1	92,0	94,0	92,3	92,4	93,0	92,0	89,9	87,6	88,2
2018	92,7	93,4	92,5	91,7	90,7	90,6	92,1	88,2	81,1	78,8	81,2	80,1
2019	80,5	79,2	81,3	83,6	76,9	79,8	78,3	79,1	77,7	78,5	81,3	80,7
2020	81,4	79,6	81,1	78,1	82,7	82,7	82,3	79,4	82,0	81,9	80,1	80,1
2021	83,3	84,5	86,7	80,2	77,3	81,7	79,5	78,2	79,7	76,8	71,1	68,9

Table 23. Bloomberg HT Consumer Confidence Index

	January	February	March	April	May	June	July	August	September	October	November	December
2005	142,09	133,2	123,3	118,54	121,2	124,28	117,08	118,29	114,18	122,4	125,8	124,69
2006	118,1	117,5	112,8	114,11	109,2	86,937	84,519	91,337	100,54	100,7	105,6	103,19
2007	103,25	103	102,9	106,12	105,1	105,54	111,47	115,1	112,2	109,1	101,1	102,52
2008	93,407	78,79	75,73	59,702	69,04	70,629	74,197	88,553	76,313	59,67	58,75	66,153
2009	69,271	78,98	71,76	93,523	109	116,93	103,95	102,2	107,65	104,5	96,77	96,098
2010	100,77	100,4	104,51	112,76	112,2	105,972	112,86	109,37	111,174	115,42	120,27	122,007
2011	115,49	113,8	111,5	118,43	114,5	112,23	107,06	97,032	103,89	93,67	94,17	95,599
2012	89,027	96,6	100,9	101,64	98,22	102,73	100,86	92,858	90,74	81,92	95,26	103,76
2013	98,995	105,8	106	108	110,1	99,756	96,876	99,368	87,5	95,29	98,28	94,017
2014	73,234	67,5	74,7	88,995	94,36	85,786	88,341	91,986	90,412	81,72	84,5	89,571
2015	85,75	76,03	71,05	67,69	75,04	75,196	74,96	61,326	55,478	68,94	92,08	80,616
2016	77,35	74,82	75,73	79,5	77,53	75,04	81,83	94,135	100,33	82,83	69,22	68,281
2017	65,2	74,48	78,44	77,16	78,56	81,333	80,59	78,529	76,006	59,43	57,32	69,153
2018	87,5	87,03	82,8	74,29	69,65	79,65	83,39	69,34	57,596	62,43	72,64	72,206
2019	66,94	67,85	76,32	67,6	59,28	75,88	77,35	73,45	77,22	81,61	86,57	83,08
2020	84,1	79,09	70,71	65,1	73,2	88,59	89,93	74,79	71,27	66,1	61,52	67,44
2021	72,55	69,03	65,1	57,35	55,2	62,99	65,07	60,06	59,22	48,84	47,32	50,65

APPENDIX 2 - Survey Questions of Bloomberg HT Consumer Index

Question 1: We would like to learn your current economic situation. Can you compare your (and your family's) current economic and financial situation with the one 12 months prior to the current month?
Answer Choices:
a) Better b) Worse c) Same d) No Idea

Question 2:
What do you think your (and your family's) future economic and financial situation will be like 12 months from now?
Answer Choices:
a) Better b) Worse c) Same d) No Idea

Question 3:
Can you compare your expectations for the current month about the Turkish economy with respect to the previous month?
Answer Choices:
a) Better b) Worse c) Same d) No Idea

Question 4:
What do you think Turkish economy's situation will be in a year's time?
Answer Choices:
a) Better b) Worse c) Same d) No Idea

Question 5:
Do you think that the current period is a good time to buy durable consumer goods such as a TV set, a refrigerator and furniture or vehicles or residence?
Answer Choices:
a) Good Time b) Bad Time c) No idea

APPENDIX 3 - Survey Questions of TURKSTAT - CBRT Consumer
Confidence Index

How do you think has the financial situation of your household changed in the past 12 months?
Answer Choices:
Got much better 1 - Got a little better 2 - Remained the same 3 - It got a little worse 4 - It got much worse 5 - No idea 6 - I do not want to answer

How will the financial situation of your household change in the next 12 months, what is your expectation?
Answer Choices:
It will be much better 1 - It will be a little better 2 - Will stay the same 3 - It will be a little worse 4 - It will be much worse - No idea 6 - I do not want to answer

How do you think the economic situation of Türkiye has changed in the last 12 months?
Answer Choices:
Got much better 1 - Got a little better 2 - Remained the same 3 - It got a little worse 4 - It got much worse 5 - No idea 6 - I do not want to answer

How do you expect Türkiye's economic situation to change in the next 12 months?
Answer Choices:
It will be much better 1 - It will be a little better 2 - Will stay the same 3 - It will be a little worse 4 - It will be much worse 5 - No idea 6 - I do not want to answer

How do you expect the rate of unemployed to change in Türkiye in the next 12 months?
Answer Choices:
It will increase significantly 1 - It will increase slightly 2 - It will remain the same 3 - It will decrease slightly 4 - It will decrease significantly 5 - No idea 6 - I do not want to answer

How do you think wages will change over the next 12 months, compared to the previous 12 months?
Answer Choices:
It will increase faster 1 - It will increase at the same rate 2 - It will increase at a lower rate 3 - It will stay the same 4 - It will decrease 5 - No idea 6 - I don't want to answer

Compared to the past 3 months, how do you think your spending on semi-durable consumer goods (clothes, shoes, kitchenware, etc.) will change in the next 3 months?
Answer Choices:
It will increase significantly 1 - It will increase slightly 2 - It will remain the same 3 - It will decrease slightly 4 - It will decrease significantly 5 - No idea 6 - I do not want to answer

Considering the general economic situation, is the current month a good time for those who want to buy durable consumer goods such as furniture, electrical and electronic appliances?
Answer Choices:
A good time 2 - Neither good nor bad 3 - Not a good time 4 - No idea 6 - I don't want to answer

Compared to the previous 12 months, how do you expect your spending on durable goods such as furniture, electrical and electronic appliances to change in the next 12 months?
Answer Choices:
It will increase significantly 1 - It will increase slightly 2 - It will remain the same 3 - It will decrease slightly 4 - It will decrease significantly 5 - No idea 6 - I do not want to answer

Considering the general economic situation, is the current period a suitable time to save (Turkish lira, foreign currency, gold, deposits, other financial investment instruments, etc.)?

Answer Choices:
Definitely a good time 1 - A good time 2 - Not a very good time 4 - Definitely not a good time 5 - No idea 6 - I don't want to answer

Is it possible for you to save (Turkish Lira, foreign currency, gold, deposits, other financial investment instruments, etc.) in the next 12 months?
Answer Choices:
Very high 1 - Maybe 2 - I don't think so 3 - No 4 - No idea 5 - I don't want to answer

Which of the following statements describe the financial situation of your household?
Answer Choices:
We save a lot 1 - We save a little 2 - We barely make a living on our income 3 - We turn into cash our savings to make a living 4 - We borrow to make a living 5 - I have no idea 6 - I don't want to answer

How do you think consumer prices have changed over the past 12 months?
Answer Choices:
Increased a lot 1 - Increased moderately 2 - Increased slightly 3 - Stayed the same 4 - Decreased 5 - No idea 6 - I don't want to answer

How much do you think consumer prices have increased/decreased in the last 12 months? Please give an estimated rate.
Answer Choice:
… , … % increased / decreased

How do you think consumer prices will change in the next 12 months, compared to the previous 12 months?
Answer Choices:
It will increase faster 1 - It will increase at the same rate 2 - It will increase at a lower rate 3 - It will stay the same 4 - It will decrease 5 I have no idea 6 - I don't want to answer.

By what percentage do you think consumer prices will increase/decrease in the next 12 months? Please give an estimated rate.
Answer Choice:
… , … % increased / decreased

Are you likely to buy a car in the next 12 months?
Answer Choice:
Very high 1 - Maybe 2 - I don't think so 3 - No 4 - No idea 5 - I don't want to answer

In the next 12 months, are you likely to spend money on housing repairs (expenses for heating system, paint, kitchen-bathroom repairs, etc. by excluding small expenses)?
Answer Choice:
Very high 1 - Maybe 2 - I don't think so 3 - No 4 - No idea 5 - I don't want to answer

Do you have the possibility to buy or build a house (for living yourself, for a family member, for renting, for vacation, etc.) in the next 12 months?
Answer Choice:

Very high 1 - Maybe 2 - I don't think so 3 - No 4 - No idea 5 - I don't want to answer

In the next 3 months, do you have the possibility to borrow money such as consumer loan or other borrowings to finance consumption?
Answer Choice:
Very high 1 - Maybe 2 - I don't think so 3 - No 4 - No idea 5 - I don't want to answer