

# THE RELATIONSHIP BETWEEN CONSUMER CONFIDENCE INDEX AND BIST 50 INDEX

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## ABSTRACT

Decisions made by consumers depending on psychological factors affect the incomes of companies and, accordingly, the financial markets. This study discusses the causality relationship between the consumer confidence index, BIST 50 index, and BIST electricity. The research was conducted assuming there may be a causal relationship between the consumer confidence index and BIST 50 and BIST electricity indices. The causality relationship between the consumer confidence index, BIST 50 index, and BIST electricity index was examined with the Granger causality test covering the period from January 2012 to June 2022. As a result, the performed tests considered the lag lengths determined a one-way causality relationship between the BIST 50 index and the BIST electricity index.

**Keywords:** consumer confidence index; BIST 50 index; BIST electricity index; energy sector

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## INTRODUCTION

Decisions made by consumers depending on psychological factors affect the incomes of companies and, accordingly, the financial markets. There should be a close relationship between consumer behaviour and macroeconomic parameters in this respect. Consumer Confidence Index (CCI) comes first among the indicators that measure the expectations of consumers regarding the economy (Eyüboğlu & Eyüboğlu, 2018a). Garner (1991) states that consumer confidence is related to macroeconomic factors such as national income, commodity prices, and exchange rates. According to Ran Liu et al. (2014), the market evaluation process in China utilizes a combined strategy that can attract different market

segmentations based on global consumer culture positioning (GCCP). Therefore, it is natural to expect consumer confidence to be effective in the stock market, which is another important economic indicator. As a result of globalization, increasing international trade volume, and widespread internet use, people are forced to consume more. Whether in food, textiles, or other areas, they all want to achieve absolute growth. Every country needs energy resources for this expansion (Huseynli and Huseynli, 2022).

BIST 50 index is one of the indexes with high trading volume among the indices traded in Borsa Istanbul. The BIST 50 index includes companies traded in the Star Market and the Main Market, which consists of 50 shares selected among real estate investment trusts and venture capital investment trusts traded in the

Collective Investment Products and Structured Products Market. In addition, the BIST 50 index also includes the shares included in the BIST 30 index. BIST 50 (XU050) refers to the index in which the top 50 companies with the highest trading volume are traded in Borsa Istanbul.

Al-Fayoumi (2009) examined the relationship between oil prices, interest rates, industrial production, and share earnings in a study conducted using monthly data from Tunisia, Jordan, and Turkey from December 1997-March 2008. It was found to be invalid for Tunisia, Jordan, and Turkey. Aydoğan and Berk (2015), on the other hand, examined the relationship between changes in oil prices and stock market gains by using daily Brent crude oil prices and the Istanbul Stock Exchange (ISE)-100 index obtained only a few pieces of evidence that its effect was rationally evaluated. In a study by Gorus, Ozgur, and Develi (2019), using monthly data for the period 1996-2017, the possible effects of changes in oil prices and income on crude oil import demand in Turkey and found that energy conservative policies do not have a negative impact on real economic activity.

In a study by Mercan and Çetin (2019), the financial performances of seven companies in the BIST electricity index were examined. In a study by Topal (2021), the financial performances of 10 electricity-generating companies in the Forbes 500 list in 2019 were evaluated. In a research conducted by Beller Dikmen (2021), a financial performance analysis of companies operating in the electrical energy sector in Turkey between 2015 and 2019 was made.

The discount rate used in determining the price of stocks is a function of macroeconomic variables. It is expected that the direct effect of energy prices will influence stock prices due to the indirect effect of energy prices through its impact on economic activities and the fact that it is the main cost input of enterprises (Özer & Aksoy, 2021). Electricity prices are a factor that directly affects the profitability of electricity generation and/or distribution companies. On the other hand, the electricity sector index reflects the general performance of companies operating in the energy field (Gümüş and Kurt Cihangir, 2022).

Many studies have revealed the relationship between BIST 50 index, consumer confidence index, and electricity index. However, there are

not many studies in which these three variables are combined. From this point of view, this study aims to examine the causal relationship between the consumer confidence index, BIST 50 index, and BIST electricity.

## LITERATURE REVIEW

### Consumer confidence index

Many studies in the literature examine the relationship between confidence indices and stocks. Today, businesses apply various strategies to satisfy and retain their customers (Bozbay & Huseynli, 2016). Customer experience is defined as the customer's perceived overall quality of all interactions and relationships that the customer has with a company's products and services (Huseynli, 2022b). In a study conducted by Fisher and Statman (2003), they examined the relationship between consumer confidence and stock returns in the USA for the period 1989-2002 using LCC.

Jansen and Nahuis (2003) examined the relationship between short-run stock markets and consumer confidence, considering 11 countries (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, and the UK). As a result of the EKK and Granger causality analyses, it was determined that there is a positive relationship between consumer confidence and stock returns in nine of the 11 countries (except Germany and Greece).

In a study conducted by Brown and Cliff (2004), they examined the relationship between the confidence index and stock returns using EKK and VAR analysis. They found a positive relationship between returns and trust. In a study conducted by Asgary and Gu (2005), they examined the relationship between consumer confidence and stock price movements in their study on four countries (USA, UK, France, and Germany) for the period 1986-2001 using regression analysis. They found that stock performance in the US. They determined that it was positively related to consumer confidence in England and France.

In a study by Kandır (2006), the relationship between the returns of the stocks of 28 companies operating in the CCI and BIST Financial sector, by taking the period between 2002 and 2005 with the EKK, was examined. As a result of the study, it was emphasized that CCI is an important factor for most of the financial

sector stocks. In research by Schmeling (2009), he tested the relationship between two variables in 18 countries using panel data analysis for 1985-2005 and concluded that stock returns decrease as consumer confidence increases.

In a study conducted by Görmüş and Güneş (2010), they investigated whether consumer confidence influenced stocks and exchange rates for the 2002-2008 period. As a result of the study, it was determined that there is a causal relationship between stock and foreign exchange markets to consumer confidence. Hsu et al. (2011) examined the causality relationship between TDI and stocks with panel data analysis in 21 countries by considering the period 1999-2007. As a result of the analysis, it was determined that there is a bidirectional causality relationship between stock returns and NDI.

In a study conducted by Topuz (2011), using Granger causality analysis for the period 2004-2009, the causality relationship between the BIST 100 index and CCI was examined, and as a result of the analysis, it was determined that there was a unidirectional causality from stocks to consumer confidence index. In a study conducted by Bolaman and Evrim Mandacı (2014), they examined the relationship between NDI and stock returns for the 2003-2012 period using the Gregory-Hansen cointegration test and stated that there is a long-term relationship between the two variables because of the study.

In a study by Köse and Akkaya (2016), the relationship between the consumer confidence index and BIST 100 index return was examined using EKK and VAR analysis for 2007-2016. In the study, it has been stated that there is a relationship between TDI and stock returns. In a study conducted by Canöz (2018), the causality relationship between the BIST 100 index and CCI for the period 2004-2017 was examined using the Toda-Yamamoto causality test. As a result, it has been determined that there is a one-way causality relationship between stock returns to consumer confidence.

In a study conducted by Eyüboğlu and Eyüboğlu (2018a), the relationship between the Consumer Confidence Index and the 18 Borsa İstanbul index returns for the period 2006:01-2016:11 was examined. As a result of the study, it was determined that there is a long-term relationship between TDI and all indices in the study. In a study conducted by Eyüboğlu and Eyüboğlu (2018b), the existence of a

cointegration relationship between the service confidence index and BIST Services sector sub-indices for the period January 2011 – December 2017 was investigated. In the study, monthly price data of BIST Electricity, BIST Transportation, BIST Tourism, BIST Trade, and BIST Communication indices were used. As a result of the Boundary test, it was concluded that there is a cointegration relationship between the service trust index and only the BIST Tourism index.

### **BIST 50 index**

Jones and Kaul (1996) proved for the USA and Canada that the stock market reaction could be fully explained by the effect of oil shocks on cash flows, but the results for Japan and the UK were still inconclusive. As a result of the study by Sadorsky (2001) found that Canadian market return, crude oil prices, Canada-US exchange rate, and short-term Canadian interest rates influence Canadian energy stocks. Clark and Wójcik (2003) examined stock prices for two German companies, Mannesmann (now Vodafone) and Bayerische Motorenwerke (BMW), which are representatives of two different regional patterns of capital accumulation.

In a study by Chen, Finney, and Lai (2005), the long- and short-term relationships between the crude oil and refinery gasoline spot markets and their future markets were examined. Because of the study, the volatility in energy prices and the information between the energy market and China's international competitiveness proved to have significant implications for their connections. A study by Malik and Hammoudeh (2005) investigated the volatility and shock transmission mechanism between the US stock, the global crude oil market, and the stock markets of Saudi Arabia, Kuwait, and Bahrain. As a result of the study, he found that in all cases, the Gulf stock markets received volatility from the oil market, but only in the case of Saudi Arabia, significant volatility spread from the Saudi market to the oil market.

Adam and Tweneboah (2008) found a significant relationship between the increase in oil prices and the stock index in Ghana. As a result of the study by Ravichandran and Alkhatlan (2010), it was found that oil price change has an impact on GCC stock market returns in the long run. Negi, Chakraborty, and Mathur (2011) examined the long-term

relationships between rising oil prices and stock market prices in India and China. Because of the study, it was proved that there is a long-term relationship between oil prices and stock market prices for both countries.

The result of the study by Sadorsky (2012) determined that stock prices of clean energy companies are highly correlated with technology stock prices (with higher correlation) compared to oil prices (than). Tandon, Ahuja, and Tandon (2012) examined the impact of price movements in the futures market of Brent crude oil on the share prices of companies engaged in oil and gas exploration and extraction in India. In a study conducted by Akçayır, Doğan, and Demir (2014), the applicability of the portfolio selection method mean-variance model developed under the Single Index Model was tested on BIST 50 based on the daily closing data of August 2, 2013, to September 30, 2013.

In a study by Baykut and Kula (2018), the volatility structure of the BIST 50 index was examined over the daily closing values for the 2007-2016 period. In a study conducted by Eskin and Güvemli (2020) to examine the effects of working capital components on profitability, the financial and non-financial data of 33 businesses that are traded in the Borsa Istanbul (BIST) 50 index and that are not financial institutions between 2012 and 2016, using multiple regression and correlation methods. analyzed with

As a result of the study by Wang and Kong (2021), it was found that economic policy uncertainty has a negative impact on the energy stock market in China, and the energy stock market is also positively affected by the country's overall stock market. In a study conducted by Topaloğlu (2021), the relationship between the dividend policies of the real sector companies traded in the BIST 50 index in the period 2000-2019 and the stock volatility was examined by panel data analysis.

### Electricity Index

Energy is the lifeblood of technological and economic development (Huseynli, 2022a). The state's energy independence as a component of energy security is a complex socioeconomic category. It is characterized by a complex statistical indicator, the level of state independence in carrying out an energy policy that can withstand external and internal

challenges through intensive economic development measures without harming society and national production (Tutar et al., 2022).

Electricity demand is one of the most important parameters of economic growth in national economies, especially since it is an indicator of the industrial sector. Papapetrou (2001) examined the relationship between oil, stocks, interest rate, employment, and real economic activity between January 1989 and June 1999 in Greece. As a result of the analysis, it has been determined that oil plays an important role in economic activity and employment and that oil shocks suppress stock returns.

Green et al. (2018) investigated the effect of shocks in natural gas, coal prices, and carbon emissions on electricity prices in the German energy market for the period 2008 – 2016. As a result of the study, it is concluded that the change in natural gas and coal prices has a spillover effect that cannot be neglected on electricity prices. Liu et al. (2020) investigated the return and volatility spread from coal, natural gas, and oil prices to the electricity markets in Europe during the 2007 – 2019 period and found that natural gas had the most volatility spillover effect out of the three fossil fuels.

In a study by Gürlevik and Gazel (2020), based on the data set consisting of the quarterly electricity index and energy prices for March 2010-March 2019, the interaction between the electricity index traded in Borsa Istanbul and energy prices, which can also include the asymmetric relationships in the model. It has been examined with the Distributed Autoregressive Model (Nonlinear Autoregressive Distributed Lag – NARDL). In a study conducted by Gümüş and Kurt Cihangir (2022), the effect of changes in world oil, coal, and natural gas prices on the return of the BIST electricity index, which is unadjusted and adjusted for the market interest rate, is investigated for the period 17 May 2010 to 29 May 2020. As a result of the study has determined that the BIST 100 index return and the changes in world oil and coal prices have a strong volatility spillover effect on the adjusted BIST electricity index return.

## METHODOLOGY

### Data Set

The data required for the analysis part of the study were obtained from [investing.com](http://investing.com). The data

set required for analysis was evaluated monthly. The main purpose of the data covering the period from 2012 to 2022 (first six months) is to measure whether there is any causality between the consumer confidence index, BIST 50 index, and BIST electricity index. In the study, the Granger method was chosen to measure causality. Before moving on to the Granger analysis, tests such as the ADF test and the VAR model were performed.

It is out of the question that non-stationary series tend to return to their deterministic path in the long run. In addition, a shock in the current period permanently affects the long-term values of the series (Özata and Esen, 2010, p.60). For these reasons, it is important to test the stationarity of the data to be analyzed. While performing Granger causality analysis, the

Augmented Dickey-Fuller (ADF test), which is widely used in the literature, was also used in this study to examine whether the series contained unit roots.

Developed by Granger in 1969, causality analysis is one of the most widely used methods to detect causal relationships between time series (Karaca, 2003, p.250). Granger causality analysis is used to test the direction of causality between the series, in other words, whether there is any relationship between the current value and the past values of the series. In the Granger causality analysis and to test the causality relationship between these variables, including two variables, a VAR (Vector Autoregressive) model is estimated as follows (Bayrakdaroğlu & Nazlıoğlu, 2009).

$$\Delta Y_t = \alpha_{12} + \sum_{i=1}^{T_{11}} \beta_{11i} \Delta Y_{t-1} + \sum_{j=1}^{T_{12}} \beta_{12j} \Delta X_{t-j} + \varepsilon_{12t} \tag{1}$$

$$\Delta X_t = \alpha_{21} + \sum_{i=1}^{T_{21}} \beta_{21i} \Delta X_{t-1} + \sum_{j=1}^{T_{22}} \beta_{22j} \Delta Y_{t-j} + \varepsilon_{21t} \tag{2}$$

Here, T is the lag length, and  $\beta$  is the parameter to be estimated, the error term. To test whether there is a Granger causality relationship from variable to variable in Equation 1, the Wald test or test is applied to the hypothesis (Bayrakdaroğlu & Nazlıoğlu, 2009).

In this study, where monthly data are used, the sampling period covers 01, 2012 through 06,

2022. The consumer confidence index used in the model is from the Central Bank of the Republic of Turkey (TCMB) Electronic Data Distribution System, and values such as BIST 50 index and BIST electricity index were obtained from investing.com. The series graphs expressed as monthly percentage change values are shown in Figure 1- 3.

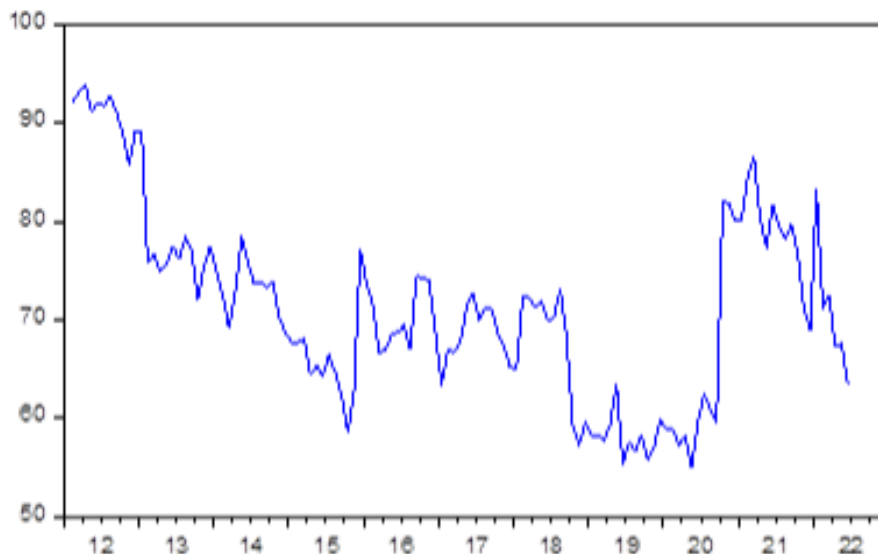
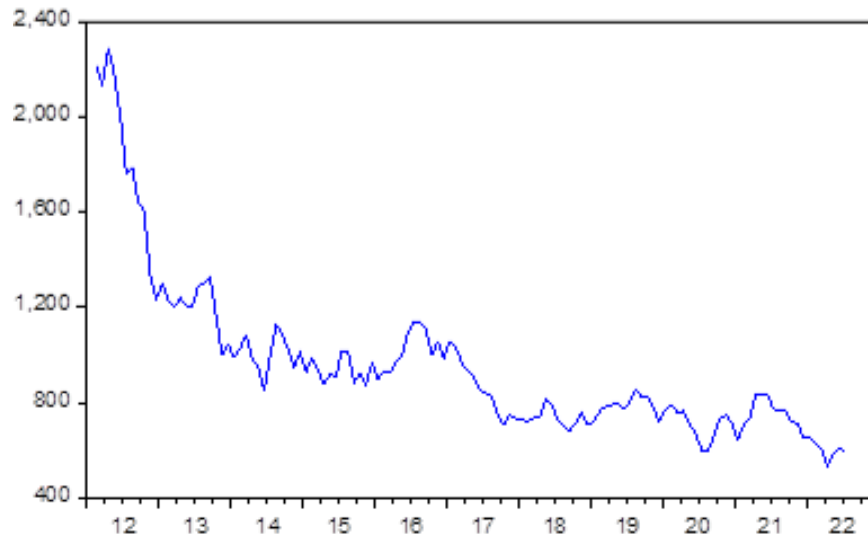
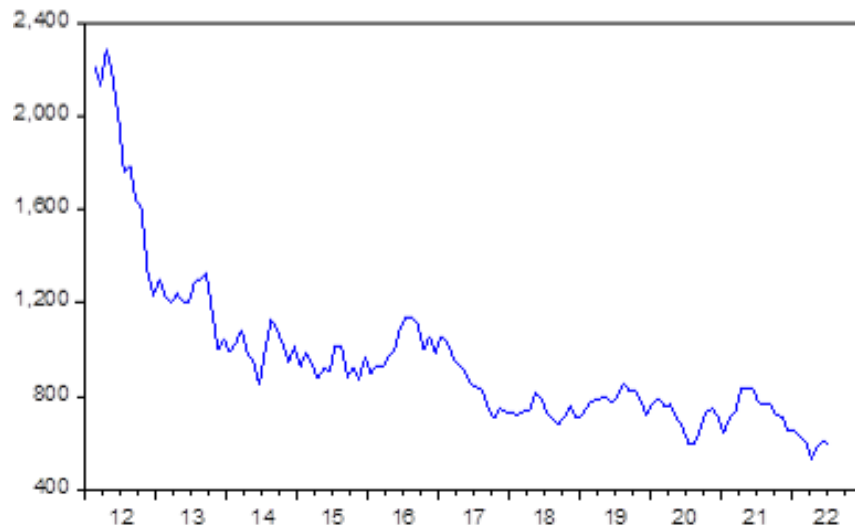


Figure 1: 10-year Dynamics of Consumer Confidence Index Prices



**Figure 2:** 10-year Dynamics of BIST 50 Index Values



**Figure 3:** 10-year Dynamics of BIST Electricity Index

### Analysis Method

The data set required for the study analysis covers approximately 11 years. The data used in the analysis were included in the analysis monthly. As the year 2022 continues, the first six-month period is included in the study. The causality between consumer confidence, BIST 50 index and the BIST electricity index was investigated in the study, which was analyzed with the Granger method.

### ANALYSES AND RESULTS

As a result of the stationarity test, it is seen that all three variables are stationary from the level degrees of the consumer confidence index, BIST 50 index, and BIST electricity index. The fact that both the t statistics values are less than the critical test values and the probability values are less than 0.05 show us this. This is true for all three data. In this case, the acceptability of the  $H_1$  hypothesis is valid.

**Table 1:** Results of the level values of series

		Consumer confidence index		BIST 50 index		BIST electricity index	
		t-statistics	Possibility	t-statistics	possibility	t-statistics	possibility
ADF testing statistics		-3.952501	0.0424	-4.162795	0.0011	-5.184554	0.0000
Test Critical Values	%1	-3.483751		-3.483312		-3.483312	
	%5	-2.884856		-2.884665		-2.884665	
	%10	-2.579282		-2.579180		-2.579180	

The VAR model was established by using the level-to-level stationary values of the variables, and the appropriate lag numbers were tried to be determined with the help of Akaike (AIC), LL, LR, FBE, SC, and HQ information criteria. Information on suitable delay numbers is given in Table 2. The

level with the most stars represents the appropriate delay length. The appropriate lag length for these variables has been determined as one, as seen in Table 2.

**Table 2:** Results of the appropriate delay length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2195.278	NA	2.23e+12	36.94585	37.01591	36.97430
1	-1823.965	717.6628*	5.05e+09*	30.85656*	31.13681*	30.97036*
2	-1820.364	6.778896	5.53e+09	30.94729	31.43773	31.14644
3	-1816.758	6.606631	6.06e+09	31.03794	31.73856	31.32244
4	-1814.607	3.830717	6.81e+09	31.15307	32.06387	31.52291
5	-1805.085	16.48462	6.77e+09	31.14428	32.26527	31.59948
6	-1795.820	15.57118	6.76e+09	31.13983	32.47101	31.68038

After a series of tests, the transition to Granger analysis was made as the last step. Granger's results regarding the consumer confidence

index, BIST 50 index, and BIST electricity indices are given in Table 3.

**Table 3:** Results of the Granger causality test

Hypotheses	F-value	Probability value (p)	Decision at 5% significance level
BIST 50 index is not the reason for the consumer confidence index	1.272915	0.5292	Rejected
BIST 50 index is the cause of BIST electricity index	7.449885	0.0241	Acceptable
Consumer confidence index is not the reason for BIST 50 index	0.947101	0.6228	Rejected
Consumer confidence index is not the cause of BIST electricity index	0.037305	0.9815	Rejected
BIST electricity index is not the cause of BIST 50 index	5.401318	0.0672	Rejected
BIST electricity index is not the reason for the consumer confidence index	0.402827	0.8176	Rejected

According to the results of a series of tests and Granger analysis, there is no strong causality relationship between the variables. Only one of the hypotheses assumed is valid, and there is a

unilateral causality running from the BIST 50 index to the BIST electricity index. In other words, the BIST 50 index is the Granger cause of the BIST electricity index.

## DISCUSSION AND CONCLUSION

This study's main purpose is to examine whether there is a causal relationship between the consumer confidence index, BIST 50 index, and BIST electricity. The study was conducted assuming there may be a causal relationship between the consumer confidence index and BIST 50 and BIST electricity indices. The causality relationship between the consumer confidence index, BIST 50 index, and BIST electricity index was examined with the Granger causality test covering the periods 2012:01-2022:06. Data were evaluated monthly. For the data of the examined variables, the stationary test was carried out using the Extended Dickey-Fuller (ADF) unit root test. As a result of the tests carried out considering the lag lengths determined, a one-way causality relationship between the BIST 50 index and the BIST electricity index. Finally, as per the research conducted by Gürlevik and Gazel (2020), no significant long-term relationship was found between BIST Electricity Index and electricity prices and Brent oil prices.

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