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TESTING THE RELATIONSHIP BETWEEN TURNOVERS AND ECONOMIC CONFIDENCE VARIABLES WITH FRACTIONAL FREQUENCY FOURIER ADF AND GRANGER CAUSALITY TEST: THE CASE OF TURKIYE 2009:01-2023:05

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ABSTRACT

This study aims to determine the causality relationship between economic confidence and sectoral turnover increases in Turkey. The sectors to be analysed in the study are industry, construction, trade and service sectors and the relationship between sectoral turnovers and economic confidence will be evaluated for the period 2009:01-2023:05. In the study, Augmented Dickey Fuller Unit Root Test and Fourier Granger Causality Test were applied. When the causality test results are analysed, it is seen that the relationship between variables differs on sector basis. In this context, while there is no causality relationship between the turnover of the construction sector and economic confidence, there is a relationship with the turnover of other sectors. The outputs obtained in this context will serve as a source for analysing which sector-specific policy arrangements should be made to increase economic confidence.

Keywords: *Economic Confidence, Sectoral Turnovers, Fourier Analyses, Granger Causality Test.*

Jel Code: *C32, D84, J63.*

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1. INTRODUCTION

Economic confidence refers to a situation in which uncertainty is low and future predictions are high in a certain area of the economy, and can be evaluated as the reaction given by actors such as consumers, investors, etc. (Ahmed, Xie and Issam, 2021). Economic confidence can be measured statistically, and there are multiple factors that affect economic confidence. These elements are called macroeconomic variables. Macroeconomic variables include sector-based income (turnovers), interest rates, economic growth, production amount, real effective exchange rate, employment level, unemployment rates, GDP, etc. (Demirel and Artan, 2017). In addition to studies (Ha and So, 2023; Guo and He, 2020; Kilci, 2020; van Suntum, 2009; Vadas, 2005; Batchelor and Dua, 1998) examining the relationship between identified variables and economic confidence, studies (Kuzenbayev and Pelizzo, 2023; Montes and Nogueira, 2021; Acar, 2019; Lam, 2002) examining the effect of political regulations on economic confidence are frequently encountered in the literature.

In this study, the causality relationship between the turnover obtained on sectoral basis and the economic confidence variable will be investigated. Before conducting causality research, firstly, economic confidence, service sector turnover, construction sector turnover, industrial sector turnover and trade sector turnover series will be subjected to Augmented Dickey Fuller Unit Root Test and the stationarity of the series of variables will be analysed. The output to be obtained as a result of the analysis also provides guidance on which test is more appropriate to use when examining the causality relationship between variables. More precisely, while the Granger causality test is a method that can be applied when the series are stationary, the Toda-Yamamato test does not require stationarity in the series for the analysis. When the literature is examined, more than one study (Koç, Şenel and Kaya, 2018; Hutcheson, 1994) is observed examining the relationship between turnovers and "economic confidence". In these studies, the relationship between relevant variables is examined in different frameworks.

Considering the building industry, Hutcheson (1994), noted that Koç et al. (2018) conducted an examination specifically in the industrial sector that included evaluations in the retail sector to the literature. When we look at studies based on economic trust and turnovers, we see that they focus on studies in which a specific sector is selected as a sample. This study will provide a comprehensive output and contribute to the literature by examining the relationship between variables in industry, building, trade and service sectors. In this section, before the literature review section, defining the main variables of the study will eliminate the confusion in the study.

The variables expressed here are sectoral turnover and economic confidence. When examined on a sectoral basis, an increase in turnover in the relevant sector indicates that the economic activity of the operating company is positive. Increased turnover can be linked to increased revenue. The current

increase is shaping future expectations and boosting economic confidence by raising the level of stability in turnover and revenue growth. Economic confidence is increasing in the market, making it easier for companies to access credit and increasing investment activities. In this regard, it can be interpreted that both variables have a feedback mechanism on each other. Moreover, rising economic confidence fosters optimism among consumers and businesses, encouraging further consumption and investment. In this way, a dynamic feedback loop emerges increased turnover enhances economic confidence, which further stimulates sectoral activity and leads to sustained turnover growth. Briefly stated, having a strong economic turnover increases production activities for the relevant sector, the increase in production increases the need for labour force and thus employment, and the trust mechanism is strengthened with the development provided. In sectors where economic confidence is high, not only consumers increase their spending rates, but also investors increase their interest in the relevant sectors. Here, turnover is not limited to consumption but is also fuelled by increased investments. In addition to the turnover-based quantitative contribution brought by economic trust, perceptions and expectations arising from trust are also shaped in a positive direction. Sectoral confidence increases the perception of the relevant sector, positively affects individual and institutional perspectives and has a positive psychological impact. These interrelated dynamics provide a theoretical basis for examining the causal relationship between the two variables. As a result if the existence of a two-way relationship is supported by statistical data, the importance of these analysed variables can be made more clearly visible.

The values of economic confidence and sectoral turnovers to be used in the study from January 2009 to May 2023 can be examined with the help of graphs. Supporting statistical data with graphs will increase the reliability and clarity in the evaluation of the findings.

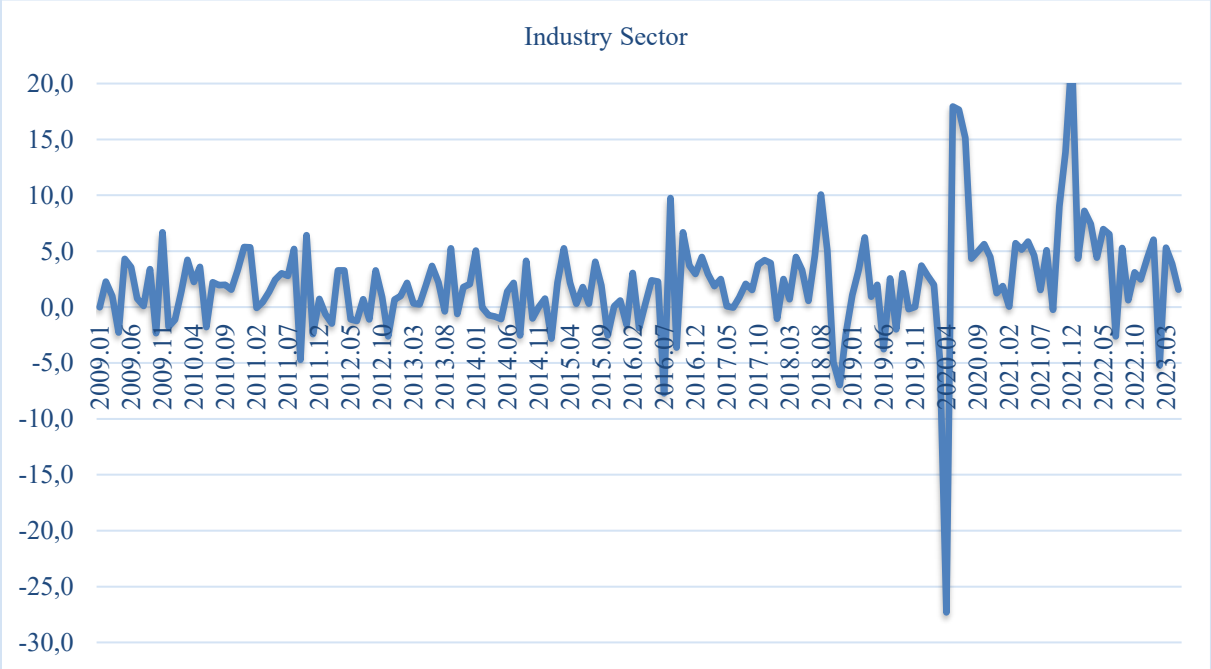
Graph 1. Variable Development in The Economic Confidence Variable Between 2009:01. and 2023:05

Source: Turk Stat, 20.10.2024

Chart 1 shows the monthly change in the economic confidence index. Economic confidence, which was determined as 63 in January 2009, increased until July of the same year. Although this upward trend continued to increase and decrease from August to March 2020, the lowest level of the trend was 54.8 in 2020. The economic confidence index, which started to recover later, was calculated as 103.7 as of March 2023.

When the increases and decreases observed in the values in the chart are evaluated, the reason for the value rising from the 60s in 2009 and exceeding the 95 limit is the gradual disappearance of the effects of the Mortgage crisis, which was active on a global basis between 2008-2009, resulting in an increase in economic confidence. Another high rate of decline in the graph was observed in the transition to 2018. In 2018, the dollar level increased unpredictably with the new year and weighed an increase of 91%, which negatively affected the level of stability and brought about a significant decrease in confidence in the economy. The increase in the exchange rate, which leads to sector-based borrowing, is among the factors that negatively affect the country's economy. Another high-rate decrease seen in the chart was detected in 2020. The Covid-19 epidemic, expressed as a global health crisis and described as an international pandemic, has officially created a climate of panic as of March 11, 2020. The spread of conditions such as full quarantine, isolation, etc. throughout the world and the sanctions imposed created a driving force for the negative impact on the economic confidence index.

Graph 2. Variable Development in The Industry Sector Backing Between 2009:01. and 2023:05

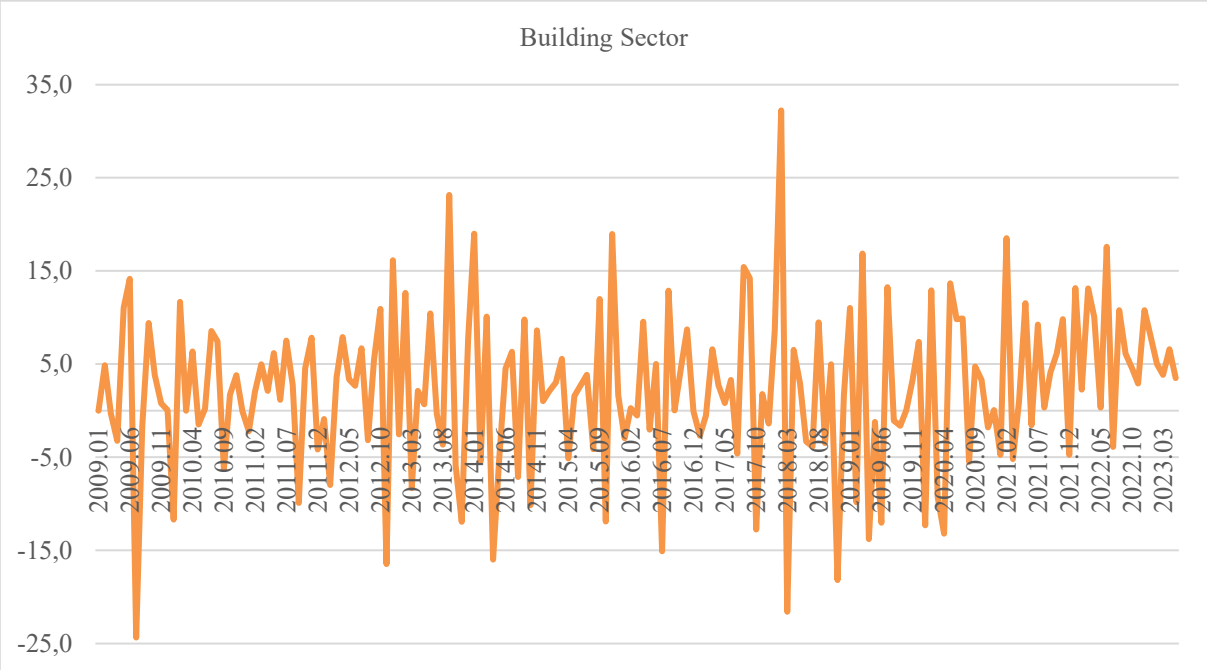


Source: Turk Stat, 20.10.2024

Industry sector turnovers is shown in Chart 2. As of February 2009, the sector whose data is available is observed at the level of 2.3, but as seen on the map, it shows a constant fluctuation in terms of increase and decrease. Rates, which fluctuate between the -2 and +2 band on average, reached -7.7 in July 2016, but increased to 9.8 in August, causing fluctuations in the chart. The reason for the decline in sectoral turnover observed here can be explained by the negative impact of the coup attempt that took place in Turkey on 15 July 2016 on political stability and the accompanying sectoral panic.

While the most significant decrease in the chart is observed as -27.3 in April 2020, the highest increase can be expressed as the increase from -27.3 to 18.0 in May of the same year. The highest level of the examined period was determined as 22.6 in December 2021. Just like the effect on the economic confidence variable, the 2020 pandemic crisis, which affected the sector at a high rate and caused economic fluctuations, also affected the industrial sector. The removal of uncertainty and adaptation to the current crisis environment enabled the recovery process in 2021 and brought about a rise again in terms of sectoral turnover.

Graph 3. Variable Development in The Building Sector Backing Between 2009:01. and 2023:05



Source: Turk Stat, 20.10.2024

The building industry is observed to be the sector that fluctuates most frequently among all sectors. It is observed that the lowest rate in the sector, where multiple sudden turnovers decreases were detected, was determined as -24.4 in July 2009, and the highest level was determined as 32.2 in February 2018. The economic confidence index reached its lowest level in April 2020, with an average decrease of -13.2, suggesting that the relationship between sector turnovers and economic confidence is lower than the industrial sector. The fact that the 2020 pandemic crisis affected the construction sector less than other sectors can be explained by the exemption obtained by this sector in full closure practices in

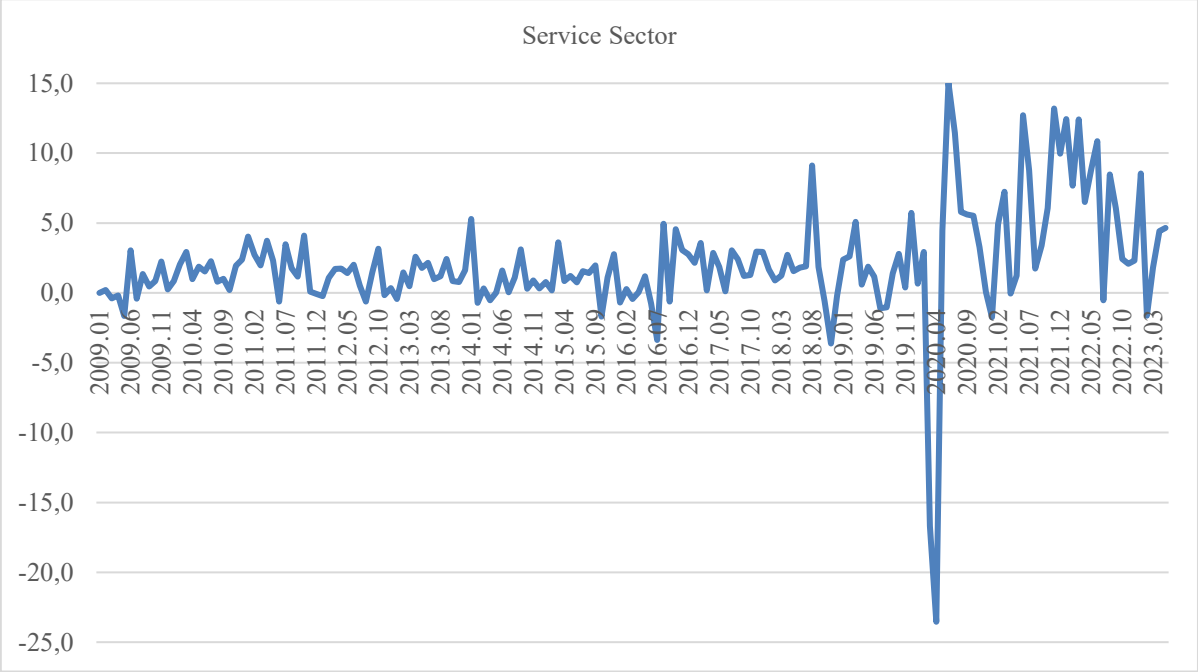
order to protect it from the pandemic effect. As a matter of fact, considering the measures published by the Ministry of Interior, the exemption provided to this line of business by considering the workplaces that provide equipment such as raw materials to the sector, as well as the workers operating in the construction sector, as permitted, ensured that the sector was less affected by the crisis.

Graph 4. Variable Development in The Trade Sector Backing Between 2009:01. and 2023:05

Source: Turk Stat, 20.10.2024

The graph examined for the trade sector is almost similar to the industrial sector, and a high low of -25.0 is observed in the graph for April 2020 and a high increase of 16.8 in the following month. The data obtained from the graph shows a thought-provoking feature regarding the possibility of a high relationship with economic confidence.

Graph 5. Variable Development in The Service Sector Backing Between 2009:01. and 2023:05



Source: Turk Stat, 20.10.2024

The last sector to be examined in the study is the service sector, and it can be commented that the turnovers obtained from the sector has a high relationship with economic confidence. The relevant comment can be explained by the rate determined as -23.5 in April 2020. As observed in other sectors, it can be said that the fluctuation observed in the service sector in 2020 is related to the global pandemic crisis. One of the sectors most affected by the isolation necessitated by the pandemic has been the service sector. The adoption of a structure that requires one-to-one contact with citizens within the scope of the service sector explains the contraction of the sector in isolated life.

In this context, a preliminary assessment of the expected output of the study can be made by analysing the data obtained from the TurkStat database with the help of graphs. The analysed data show that the relationship between the economic confidence index and sectoral turnovers is highly observed for industry, trade and service sectors, but a complete interpretation cannot be made for the construction sector. The predicted outputs will be statistically analysed in the findings sections of the study.

The tests to be applied to examine the relationship between the variables discussed in this study can be expressed as Augmented Dickey Fuller unit root test with structural breaks and Fourier Granger causality test. In addition to the number of sectors covered, the use of Fourier analysis methods in the study will also increase the effectiveness of the study in the literature.

2. LITERATURE REVIEW

When the literature was examined, it was observed that there was more than one study written on economic confidence. The observed studies will be given in this section, and it is aimed to provide output on which aspect of economic confidence is examined.

Among these studies, the study of Ha and So (2023) can be included. The study analyses the relationship between global confidence and economic fluctuations in the countries examined between 1985-2019. In addition to economic confidence, uncertainties and macroeconomic variables affecting confidence are taken into account in the study. Under the umbrella of uncertainty, financial and economic uncertainties as well as political uncertainties are mentioned, and factors such as unemployment, inflation and interest rates can be itemised among macroeconomic variables. In the study, 39 countries were analysed and subjected to the FAVAR method. Countries were evaluated by taking into account their development levels and analysed in 2 separate groups as developing and developed countries. At this point, it is assumed that confidence will be higher than in undeveloped countries. Although this study does not analyse the turnover variable, sectoral trust indicators have a significant effect on turnover. Therefore, this article is included in the literature review of the study.

Another study was brought to the literature by Claveria (2020). The study, which presents a sectoral evaluation of consumer uncertainty, has made an assessment within the framework of both production and consumption. In the study, 32 countries and European Union countries were analysed and the survey method was used. In addition to the survey, geometric inconsistency was measured by taking into account the data between January 2020 and June 2020. In the study, separate survey questions were asked to the sectors and different evaluations were made according to sectoral outputs. The fact that it allows this by providing comparative output increases the strength of the study. As a result of the study, it has been observed that expectations and therefore trust give different results according to sectors. The position of expectations and trust in the Covid-19 period has been defined in detail. In this study, an analysis is made on uncertainty and uncertainty can be integrated with confidence and turnover. More precisely, when expectations are negative for the manager, it can be assessed that production activities are negatively affected and turnover decreases. At the same time, the fact that Covid-19 was also covered in the time period examined by this study makes the study of Claveria (2020) a source.

Not only academic studies but also reports should be evaluated in the literature at this point. The report ‘Short-term business statistics and the economic sentiment indicator’ published by Eurostat (EuroStat, 2025) was updated in 2025 and interpreted the relationship between turnover and economic confidence on a sectoral basis in the light of statistical data. This report shows the importance of the issue in the light of the variables analysed. The report assessed the relationship between manufacturing, construction, services and economic confidence. The assessment was carried out for 27 EU countries.

The another of the identified studies was written by (Pirinsky, 2013) and the relationship between economic confidence and attitudes thought to have an impact on trust was examined. In addition to determining that there is a relationship between economic confidence and demographic factors, the study also determined that positive changes in education level and income level also have positive results on economic confidence.

Another study (Chu, 2007) was created to examine the relationship between economic confidence and economic growth and shows that the effect of trust in people who engage in entrepreneurial activity on economic growth is positive. Hanke (2008), on the other hand, carried out an analysis in his study on the fact that the income level of the country under examination, the poverty problem and low living standards have an impact on economic confidence.

Another study (Matsusaka and Sbordone, 1995), which examined the effect of economic confidence on the economy on an output basis by using the quantitative analysis method, stated that the upward change in the level of pessimism had an effect on production activities, and in addition, consumer sensitivity had an effect on GNP.

The use of machine learning as a new generation artificial intelligence system is widespread in academic studies and is effective in more than one field as a quantitative method. The aim of another study (Claveria, Monte and Torra, 2020) that analyses confidence indicators by taking them into account is to make predictions regarding economic growth. The study can be evaluated as a recommendation to the literature on the method by presenting the result that the predictive power of the applied method is higher compared to traditional methods.

In the literature, political regulations that have an impact on consumer confidence have also been examined. In the study written by Dajčman (2020), the causality relationship was examined using quantitative analysis methods. And the relationship between the variables has been determined. Filippin and Paccagnella (2012), examined the relationship between economic confidence and people's self-confidence.

Nadenichek (2007), conducted a study specifically in Japan and examined the economic recession. The aim of the study is to present output by evaluating the relationship between economic recession and consumer confidence. In this regard, the study comments on the existence of a relationship between the negativities experienced in 1990 and economic confidence. In another study (Vaillant and Flambard, 2015), the relationship between economic confidence and the sensitivity level of individuals is evaluated. Although the study evaluated the relationship between economic conditions and economic confidence in the French sample, it could not prove the existence of a specific relationship between the variables.

Batchelor and Dua (1998), conducted an examination on economic confidence by choosing the United States as a sample. The study aimed to find an answer to the question of whether an analysis can

be carried out at the point of detecting stagnation in the economy, based on economic confidence, and a quantitative analysis was carried out. Another researcher who conducted research on the USA is Kilic and Cankaya (2016), and they are examines the impact of manufacturing and inventory systems, which are among the economic activities, on trust. The study contributes to the literature by detecting the existence of a relationship between variables. Another study (Choudhry and Wohar, 2023) conducted for the USA examined the effect of uncertainty in country policies on trust and found that this effect was negative. Another study examining whether political uncertainty has a negative effect on trust was written by Montes and Nogueira (2021), and was conducted specifically in Brazil. As a result of the study, proving the effectiveness of policies and uncertainty order on economic trust shows the contribution of the study for the years 2004-2017.

Another variable that has a relationship with economic confidence is the Gross Domestic Product value, which can be expressed as an indicator of economic growth of the country. As a result of the study, it can be stated that a conclusion can be reached that predictions can be made by establishing a relationship network between economic confidence and economic growth (Borisov, 2022). Bovi (2009) also examines the relationship between economic confidence and prejudices and presents the output in his quantitative study that prejudice can lead to the mistake of making wrong predictions about any subject and that economic confidence will be negatively affected at this point.

Employment problems and income level concerns, which are one of the main research areas of the economy and among the biggest problems of the country's citizens, are also considered to have an impact on economic confidence. Bugarin and Hazama (2014), examined the existence of the relationship between these variables in their study and found that the importance individuals attach to these variables can change the effect on trust. This study aims to make suggestions on a society basis, based on the importance citizens attach to variables.

Government policies implemented during the Covid-19 period have also been examined in the literature, and Gholipour, Tajaddini and Farzanegan (2023), aimed to examine the effect of government support provided to people with financial inadequacy on economic confidence in the relevant period. As a result of the study, it has been determined that economic support has a positive effect on trust, and it can be commented that the level of trust can be increased with such policies during crisis periods.

An analysis of the literature reveals that the relationship between economic confidence and uncertainty is frequently analysed. In addition, macroeconomic variables, which are among the factors affecting trust, are also frequently analysed within the scope of the analysis. In addition, quantitative studies examining the causality of economic confidence and sectoral turnover variables, which constitute the area of investigation of this study, are limited. No study has been identified within the scope of this study. This study will fill an important gap in the literature in terms of providing a sectoral perspective.

3. DATA SET AND METHOD

This study is designed to examine the relationship between the economic confidence variable and sectoral turnover variables for 4 different sectors. For this purpose, monthly statistical data obtained from TurkStat database and covering the years 2009:01-2023:05 were analysed in this study. In the study where a total of 172 observation values were analysed, the economic confidence index was used to measure economic confidence. When evaluating the data, it should be noted that the 2015 value is the base value.

The data obtained were evaluated by using quantitative analysis methods. Econometric analysis is a reliable analysis method used in the literature because it provides quantitative output in determining the existence of a relationship between variables. While performing econometric analysis, applying numerical data obtained through databases increases the reliability of the analysis. Unit root tests, which examine the relationship between two variables and are frequently used in macroeconomic studies, can be considered among reliable econometric analysis methods. The Augmented Dickey Fuller unit root test, which is the unit root test to be applied in this study, can be described as the most widely used unit root test and was first described in the literature in 1979 (Dickey and Fuller, 1979). The development of the test was carried out in a study in 1981 (Dickey and Fuller, 1981).

Augmented Dickey Fuller unit root analysis is a type of stationarity analysis and examines the degree to which the series are stationary. Although the application of the unit root test is also necessary for other tests applied to determine the causality relationship between variables, if stationarity is not detected as a result of the analysis, the analysis is repeated by taking the logarithmic value of the series.

In order to understand the formulation of the Fourier ADF unit root test to be applied in the study, the Augmented Dickey Fuller unit root test formulation will be expressed in lines (1), (2) and (3). When analyzing series, model (1) formula is used when constant term and trend term are not included. It can be described as one of the most rarely used models in the literature. While formula (2) is the model in which the series contains a constant term, formula (3) refers to the formula with constant terms and trend effect.

$$\Delta Yt = \lambda Yt\text{-}1 + \mu t \quad (1)$$

$$\Delta Yt = \alpha 0 + \lambda Yt\text{-}1 + \mu t \quad (2)$$

$$\Delta Yt = \alpha 0 + \alpha 1\, t + \lambda Yt\text{-}1 + \mu t \quad (3)$$

Another test to be applied in the study can be described as the Granger causality test, which examines the causality relationship between variables. The Granger causality test will be applied to determine the direction of the relationship between the economic confidence variable and the service, building, industry and trade sectors that will be examined in the study.

The Granger causality test first appeared in the literature in the research "Investigating Causal Relations By Econometric Models and Cross-Spectral Methods" (Granger, 1969). The traditional Granger causality test is expressed by formulas (4) and (5).

$$Y_t = \alpha_0 + \sum_{i=1}^{k1} \alpha_i Y_{t-i} + \sum_{i=1}^{k2} \beta_i X_{t-i} + \varepsilon_t \quad (4)$$

$$X_t = X_0 + \sum_{i=1}^{k3} x_i X_{t-i} + \sum_{i=1}^{k4} \delta_i Y_{t-i} + v_t \quad (5)$$

With the Granger causality test, information can be obtained on the direction of causality between the variables analysed and the series of variables and which variable affects the other. Determining the direction of the relationship between variables will provide an effective power in making necessary political, economic and social arrangements. Due to the long time interval analysed and in order to increase the reliability of the outputs obtained, the variables were also evaluated with another method, Enders and Paul (2016) Analysis method. Enders and Paul (2016) the improved version of the Granger causality test by applying the new generation Fourier analysis is shown in formulas (6) and (7).

$$\beta(t) \cong \beta_0 + y_{1k} \sin\left(\frac{2\pi kt}{T}\right) + y_{2k} \cos\left(\frac{2\pi kt}{T}\right) \quad (6)$$

$$y_t = \beta_0 + y_{1k} \sin\left(\frac{2\pi kt}{T}\right) + y_{2k} \cos\left(\frac{2\pi kt}{T}\right) + \vartheta_1 y_{1t} + \cdots + \vartheta_u y_{t-u} \quad (7)$$

The Fourier Analysis method provides more reliable results in terms of detecting and distinguishing the crises or shocks that occurred in the examined series in the examined time interval. In this respect, the extension of the Granger causality test with the Fourier Analysis method by Enders and Paul (2016) and its application in this study will increase the reliability of the study. As a matter of fact, the fact that this study covers a wide time interval between 2009 and 2023 shows that it includes shocks that have an impact in different areas due to multiple different factors in the analysis line. This situation explains the necessity of the method.

4. FINDINGS

In this part of the study, descriptive statistics on sector turnovers (service, building, industry and trade) and economic confidence variables obtained from the Turk Stat base will be expressed first, and then the test results will be given in tables and comments will be made in the

Table 1. Descriptive Statistics

	Economic Confidence (EC)	Service Sector Turnovers (SST)	Building Sector Turnovers (BST)	Industrial Sector Turnovers (IST)	Trade Sector Turnovers (TST)
			Sector Turnovers (ST)		
Mean	100,4672	2,085016	2,321931	2,125646	2,141563
Median	102,1962	1,603812	2,70926	2,030959	1,678865
Maximum	113,4308	15,02245	32,23454	22,58971	23,65431
Minimum	54,84831	-23,54017	-24,35258	-27,30938	-24,96858
Std. Dev.	8,483397	3,969783	8,547239	4,626535	4,498275
Skewness	-2,136094	-1,23849	-0,158403	-0,454755	-0,022778
Kurtosis	10,27469	15,84703	3,863134	14,72562	13,49152
Jarque-Bera	510,0705	1226,802	6,058454	991,2753	788,8649
Probability	<0,0001	<0,0001	0,048353	<0,0001	<0,0001
Sum	17280,35	358,6227	399,3721	365,6111	368,3489
Sum Sq. Dev.	12306,53	2694,819	12492,46	3660,225	3460,095
Observations	172	172	172	172	172

The descriptive statistical values of the variables used in the study are shown in table 1. The table presents descriptive statistics for a total of 172 observations analysed in this study. In the study, 2 different variables are analysed and these are analysed in two separate groups as Economic Confidence (EC) and Sectoral Turnover (ST) in the table. Sectoral Turnover is supported by different columns for each sector in the table and detailed outputs are presented for each of them. As seen in the table, the sectors are evaluated under 4 separate sub-headings as service, construction, industry and trade, respectively. When the table is analysed, it is seen that the value of the economic confidence variable is around 100 in terms of both minimum, maximum and average values. The turnover obtained is positive in all sectors and this situation can be integrated with the fact that the countries are in the status of developing and developed countries. As a matter of fact, when sectoral values are examined, it is seen that the highest turnover is in the construction sector and the lowest turnover is in the labour-intensive service sector. In addition to maximum values, minimum values are also expressed in the table and it is seen that these values are negative. By analysing by years, possible shocks and crises occurring during periods of significant declines in turnover can be examined on the basis of these data. At the same time, when the skewness values are analysed, it is seen that the values are negative, which indicates that negative shocks occur more frequently than positive shocks. In the light of these evaluations, the variables defined in Table 2 and the values of these variables are analysed and the results are expressed.

Table 2. Augmented Dickey Fuller Unit Root Test Results

Variables	Economic Confidence (EC)	Service Sector Turnovers (SST)	Building Sector Turnovers (BST)	Industrial Sector Turnovers (IST)	Trade Sector Turnovers (TST)
Intercept Model					
t Statistics	-4,79293	-8,02739	-19,0193	-11,0828	-11,2556
Probability	0,0001	<0,0001	<0,0001	<0,0001	<0,0001

Table 2 presents the Augmented Dickey Fuller unit root test. According to the table, the Economic Confidence (EC), Service Sector Turnover (SST), Construction Sector Turnover (BST), Industrial Sector Turnover (IST) and Trade Sector Turnover (TST) variables are all at a 1% level of significance. More precisely, as seen in the table, as a result of the stationarity test, the series of the variables analysed were found to be stationary. It can be evaluated that stationary series do not contain unit root. The findings obtained can be characterised as a prerequisite for the Fourier Granger Causality Test.

Table 3. Fourier Granger Causality Test (From Sectoral Turnovers to Economic Confidence Index)

	Wald Stat.	Asymptotic Probability Value	Bootstrap Probability Value	Frequency	Lag Length	Conclusion
SST – EC	71,386	<0,0001	<0,0001	3	4	SST→EC
BST – EC	12,104	0,0600	0,1000	3	6	BST–EC
IST – EC	35,104	<0,0001	<0,0001	3	5	IST→EC
TST - EC	55,548	<0,0001	<0,0001	3	4	TST→ EC

Table 3 presents the Granger causality test results, and the results in the table measure causality from sectoral turnovers to the economic confidence index. When the analysis outputs are interpreted in this direction, it can be stated that the turnovers in the service sector has an impact on economic confidence. When the relevant evaluation is made for other sectors, it can be stated that the turnovers obtained in the building sector does not cause economic confidence, while there is a causality relationship towards the economic confidence index for the industrial sector and the trade sector.

Table 4. Fourier Granger Causality Test (From Economic Confidence Index to Sectoral Turnovers)

	Wald Stat.	Asymptotic Probability Value	Frequency	Delay Length	Conclusion
EC - SST	4,825	0,30	3	4	EC–SST
EC - BST	12,348	0,05	3	6	EC–BST
EC - IST	4,88	0,43	3	5	EC–IST
EC - TST	10,495	0,03	3	4	EC→TST

Table 4 shows the causality relationship from economic confidence to sectoral turnover. The analysis results show that economic confidence does not cause turnover in the service sector. Additionally, it has been determined that there is a causality from economic confidence to turnover in the trade sector, but there is no causality from economic confidence to turnover in the construction sector. In this regard, when a common interpretation is made for Table 3 and Table 4, there is a one-way causality relationship from the service sector to economic confidence. In addition, it can be said that there is a unidirectional causality relationship from the industrial sector to economic confidence and a bidirectional causality relationship between the commercial sector and economic confidence.

5. CONCLUSION

Economic confidence, which is recognised as an important indicator of macroeconomic stability, is shaped by the expectations and perceptions of consumers, investors and businesses about the future performance of the economy. Sectoral turnover refers to the economic activity and the income obtained as a result of this activity. The development of sectors and the increase in turnover can be associated with an increase in economic confidence.

In this study, examining the economic confidence variable were examined and it was observed that there was more than one study in this field in the literature. When the studies in the literature are examined, it is observed that these studies carry out more frequent examinations by taking macroeconomic variables into account (Borisov, 2022; Bugarin and Hazama, 2014; Hanke, 2008; Chu, 2007; Nadenichek, 2007). In addition, studies have been conducted based on the assumption that economic confidence should be examined on a sectoral basis, but it has been observed that these evaluations are mostly made for a single sector (Koç et al., 2018; Hutcheson, 1994).

It has been determined that quantitative analysis methods are used when examining the factors that are affected by or affect economic confidence, and the methods put into practice can be described as traditional analysis methods. Based on this, it can be stated that Fourier analysis, which is among the new generation analysis methods in quantitative studies, is used less frequently.

This study aims to determine the causality relationship between the variables by examining the economic confidence variable and the increase in sectoral turnovers. The sectors that will be examined for this purpose are the service sector, industrial sector, building sector and trade sector. In order to test the relationship between these variables with causality tests, first the Fractional Frequency Fourier Augmented Dickey Fuller Unit Root Test was applied and then the Fourier Granger Causality test was performed. When the causality test results are examined, it can be stated that the relationship between variables varies on a sector basis.

In this direction, as a result of the study, it can be stated that there is a unidirectional causality relationship from service sector turnovers to economic confidence. There may be more than one reason for the causality from service sector turnover to economic confidence. Among these reasons, the first reason is that the service sector adopts labour-intensive labour force and has an employment-creating effect in this respect. Increasing employment rates reduces unemployment, raises the living standards of employees and improves their perspectives positively. This situation causes the increasing income and employment in the service sector to have a positive effect on economic confidence. The service sector is among the most frequently used sectors not only for the employees operating in that sector but also for the consumers. Here, food and beverage, clothing, holiday, etc. being a structure that appeals to the final consumer brings along a structure that consumers frequently prefer and in this respect, sectoral income increases. The fact that the service sector maintains its vitality compared to other sectors despite every crisis and shock situation positively affects all citizens, investors, producers and consumers, about the sustainability of this sector and feeds economic confidence. The same outcome can be expressed for the industrial sector, and it can be interpreted that sector turnovers has a unidirectional causality on economic confidence. In the industrial sector, the strengthening of industrialisation, increase in investment activities and expansion of capacity utilisation in the light of technological innovation positively affect the sectoral turnover. The impact of the activities in the industrial sector on foreign trade may also increase the industrial turnover. When an evaluation is made for the construction sector, it is seen that there is no causality relationship from construction sector turnover to economic confidence, nor from economic confidence to construction sector turnover. The fact that no relationship was detected can be explained by the fact that the sector has projects that are not completed in the short term. The construction sector often has long-term, state-funded projects and acts with the precautionary principle against sudden crisis etc. situations that may occur. In addition to this, sectoral saturation can be cited as another reason, which emphasises that while turnover is high, confidence is not in the same direction. Here, the expansion of the construction sector can be explained not by economic confidence but by variables such as investment, credit, etc. Based on this, the increase or decrease in income in the building sector can be evaluated as having a insignificant impact on the economic security table. For the trade sector, which is the last sector examined in the study, it can be stated that there is a bidirectional causality between the turnovers increase in the relevant sector and economic confidence. The output obtained can

be evaluated within the framework of the activity of the trade sector. The trade sector is the sector where the production and expenditure cycle is the most intense and it is integrated with people. In this direction, the increase in expenditures will act in partnership with confidence and this will support the increase in turnover. Here, the increase in turnover and the expansion of the sector can also increase confidence, while the increase in confidence will also expand the sector. At this point, a bidirectional causality can be proved. The people-based, dynamic and fast-acting nature of the sector explains its relationship with trust.

In addition to the fact that the data covered in the study covers the period 2009:01-2023:05 and examines more than one sector, the fact that the analysis methods applied in the study are among the new generation analysis methods strengthens the contribution of this study to the literature. Based on this, the outputs obtained as a result of the study will serve as a resource for determining which sector-specific political arrangements should be made in order to increase economic confidence and will serve as a guide for those concerned in the field.

In Turkey, the direction of the relationship between economic confidence and the sectoral turnover index is generally from sectoral turnover to economic confidence. The revival of the sectors and the increase in their turnover cause a feeling of confidence in the economy. Only in the construction sector is there a causal relationship between the turnover index and the economic confidence index. However, increased mobility and turnover in the industry, service, and trade sectors cause economic confidence. Therefore, policies to be implemented for these sectors will also affect economic confidence. The other result of the study is that economic confidence causes turnover in the trade sector. Therefore, there is a bidirectional causal relationship between the trade sector and economic confidence. In this respect, it is seen that the policies to be implemented for the trade sector in the economy will have an impact on economic confidence, and economic confidence will affect the turnover index of the trade sector.

The scarcity of resources in the economy is the main problem of economics. For this reason, the resources allocated to implement economic policy should be used primarily for the trade sector. It has been observed that the impact of the policies to be implemented in the trade sector on the economy will be higher compared to other sectors.

In studies involving econometric analysis, certain econometric methods are used for certain periods of time. Therefore, in studies involving econometric methods, the change of time interval or the emergence of new econometric methods makes the studies obsolete. From this point of view, updating the time period or econometric methods will lead to the need for new studies to examine the relationship between the economic confidence index and sectoral turnover. In future studies, similar relationships with different methods and different time intervals will contribute to the literature.

In the light of the findings obtained in the study, sectoral suggestions can be made to develop incentive systems for the service sector in order to increase employment. At this point, the social aspect of incentive policies can be strengthened by prioritising positive discrimination. By supporting innovative policies for the industrial sector, it can be aimed to increase turnover and ensure sustainability in economic security in the long term. The construction sector has remained passive in the variable relationship compared to other sectors, and the effect on confidence can be strengthened by feeding both turnover and employment with infrastructure investments and housing projects in the relevant sector. As it is a two-way relationship for the trade sector, strengthening the technological integration of the sector, stimulating sectoral mobility with incentives, adopting a culture of transparency, and strengthening financial access will strengthen the relationship between turnover and trust.

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