The Causality Relationship Between Food Prices, Housing Prices and Exchange Rate in Türkiye

Tuncay Turan Turaboğlu[1], Ayşegül Yılmaz[2]*

[1]Faculty of Economics and Administrative Sciences, Mersin University, Ciftlikkoy, Mersin, Turkiye, [2]PhD, Mersin, Turkiye.
*Email: aysgul3331@gmail.com

ABSTRACT

This study aims to examine the causality relationship between food prices, housing prices, and exchange rates in Turkiye. To this end, the Consumer Price Index (CPI) calculated for monthly food and non-alcoholic beverages, the Borsa Istanbul Construction Sector Index (XINSA), Housing Price Index (KFE), and exchange rate (USD-EURO) (KUR) data for the period March 2013 to March 2024 were analysed using the Granger Causality Test. According to the findings obtained from the analysis, a two-way causality relationship was found between the exchange rate (KUR) and the housing price index (LNKFE), as well as between the consumer price index (LNTUFE) calculated for food and non-alcoholic beverages and the construction sector index (LNXINSA). Similarly, there is a one-way causality relationship from the consumer price index for food and non-alcoholic beverages (LNTUFE) to the housing price index (LNKFE) and from the exchange rate (KUR) to the consumer price index for food and non-alcoholic beverages (TÜFE).

Keywords: Consumer Price Index, Housing Price Index, Construction Sector Index, Exchange Rate, Granger Causality Test
JEL Classifications: F31, C01

1. INTRODUCTION

Both nutritional and housing needs form the basis of Maslow's (1943) Hierarchy of Needs. In addition to being fundamental human requirements, the food and housing sectors also underpin national economies as a whole. Expenditures on raw and processed food, construction activities, and housing, which significantly impact GDP, constitute a substantial portion of household income. The prices of these products are influenced by numerous factors. In open economies, one of the most critical factors is the exchange rate. Consequently, the relationship between macroeconomic variables such as food and housing prices and the exchange rate will directly affect households and the overall economy, as it influences the determination of food and housing prices (Badurlar, 2008). Therefore, the causal relationship between the exchange rate, which reflects the value of the local currency

against foreign currencies, and food and housing production has consistently been regarded as deserving of research in the field of finance. The aim of this study is to investigate the causality relationship between food and housing prices and the exchange rate, and it is believed that the results obtained will contribute to the literature in this domain.

Nutrition has always held great importance throughout history, and today, the way we eat has also become a significant factor. While the rapidly growing population increases food consumption, the necessary rise in production to meet this demand is relatively contrary to nature, leaving humanity facing a dilemma. From this perspective, ensuring that consumption is addressed in a proper and balanced manner, while providing individuals with adequate and appropriate nutrition, has become a priority for countries. Another aspect of the issue is the rise in food prices caused by

increasing consumption. Food prices influence not only individual consumption but also economic development, the balance of trade, income distribution, public revenues, and employment (Tunçsiper and Yamaçlı, 2018). In Türkiye, the Turkish Statistical Institute (TÜİK) calculates the Agricultural Products Producer Price Index (Agricultural PPI), Agricultural Input Price Index (TGFE), and Consumer Price Index (CPI) for Food and Non-Alcoholic Beverages, with the Food Price Index (TEGE) being calculated by the Turkish Economic Policies Research Foundation (TEPAV).

The fact that housing needs have begun to include standards that rise in parallel with humanity's socio-cultural development requires a significant portion of household income to be allocated for renting or purchasing housing. Not only does it meet a need, but it has also become an investment tool based on security and profit potential, taking the issue to another level. In parallel with population growth and urbanisation, the construction sector, which includes not only housing but also the construction and renovation of infrastructure, social and green spaces, service buildings and shopping centres, is clearly one of the driving forces of national economies when related sectors are also taken into account. For this reason, in addition to the size of the industry, production costs and sales prices are also closely monitored by stakeholders. Housing prices, which are also a key macroeconomic indicator, are variable and influenced by other macroeconomic factors, including GDP, interest rates, exchange rates, and the money supply. In recent times, external migration resulting from the civil war in Syria and internal migration triggered by the earthquake disaster have led to an increase in demand, particularly in certain provinces. When the cost increases caused by the current inflationary environment are factored in, there has been a rapid increase in housing prices, and this increase is still ongoing. The construction sector and related sectors are highly sensitive to these price increases. Price stability will also bring financial stability, making it easier for the industry to operate in line with its importance (Aydın, 2023).

In Türkiye, it is possible to track construction costs and housing prices through (Konut Fiyat Endeksi, n.d.) the Construction Turnover and Production Indices, Construction Labour Input Indices, Construction Cost Index, and Construction Production Index calculated by the Turkish Statistical Institute (TÜİK), as well as the Housing Price Index (KFE) calculated by the Central Bank of the Republic of Türkiye (TCMB). The BIST Construction Index, calculated by the Istanbul Stock Exchange (BIST), is significant in reflecting investors' views on publicly traded companies operating in the construction and related sectors.

Changes in exchange rates, a cornerstone of global trade, are of significant importance, particularly for the stability of economies in developing countries. The impact of exchange rate fluctuations on daily life is much greater than imagined. Changes or the possibility of changes in exchange rates constitute a source of risk for companies, directly affecting their performance and, if not managed properly, may lead to the termination of their legal existence. Exchange rate stability is a desirable situation for all stakeholders, except for speculators who take positions based on different expectations (Uçar and Alsu, 2024).

Graph 1 illustrates the annual changes in the exchange rate, housing price index, and consumer price index for the food sector during the period from 2013 to 2024, which is covered in this study. While minor price fluctuations in the exchange rate index occurred between 2013 and 2024, these fluctuations are understood to explain the changes in the consumer price index for the food sector and the housing price index. The observable trend indicating that changes in the exchange rate impact food and housing prices has prompted an investigation into the causality relationship among these three variables.

Accordingly, this study aims to examine the causality relationship between food prices, housing prices, and the exchange rate in Türkiye. The Consumer Price Index (CPI) for Food and Non-Alcoholic Beverages was selected to represent food prices; the Housing Price Index (HPI) and the BIST Construction Index (XINSA) were chosen to represent housing prices, while the (USD-EURO) exchange rate was selected to represent the exchange rate (KUR). In the second section of the study, relevant literature studies related to the subject are presented, followed by sections on the data set and methodology. The findings obtained from the analysis are then described. Finally, the study concludes with a section evaluating the study as a whole.

2. RELATED STUDIES

This section presents studies carried out over the years that investigate the causality relationships between various macroeconomic variables.

Bhattacharya and Mukherjee (2006) examined the causality relationship between macroeconomic variables and the Mumbai Stock Exchange Sentiment Index. They found a two-way causality relationship between stock returns and the inflation rate.

Wain (2013) examined the relationship between real estate prices and investor sentiment, finding that investor sentiment plays a significant role in shaping real estate prices.

Mutascu (2016) examined the causality relationship between economic development and energy consumption in G7 countries from 1970 to 2012. The results suggest a two-way relationship between GDP and energy consumption in the United States, Canada, and Japan.

Saksonova and Koleda (2017) investigated the causality relationship between economic growth and commercial bank

Graph 1: Time graph related to variables.
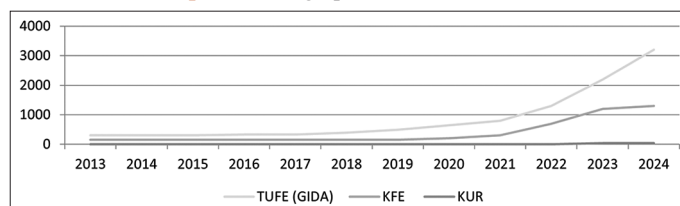
Source: EVDS Verinin Merkezi (2024)

activities, finding a two-way causality relationship between these two variables. In another study conducted in 2017 on Mexico, Guerra stated that the increase in GDP had a positive effect on loans granted by the banking sector; however, the loans had no impact on GDP growth. In another study conducted in 2017 (Çetin and Doğaner), the causality relationship between the construction index and the housing price index was examined for the period from 2011 to 2017, and it was determined that the construction index was a Granger cause of the housing price index.

Troster et al. (2018) examined the relationship between sustainable energy use, economic growth, and oil prices in their study, which covered the period from July 1989 to July 2016 in the United States. They found a two-way causality relationship between changes in sustainable energy use and economic growth. Özcan and Tormuş (2018), who focused on Türkiye in their study, found that increases in exchange rates have a positive effect on the housing price index.

Another study, specifically conducted on Türkiye, was carried out by Barbaros et al. (2019). The results of the study, which investigated the causality relationship between food inflation, food exports and the general level of inflation, indicate that there is a causality relationship between food prices, food exports and inflation.

Baylan and Pazarcı (2020) approached the subject from a different angle and aimed to test the validity of the Fisher hypothesis for Türkiye. The results of their study demonstrate a one-way causality relationship between the inflation rate and the nominal interest rate, thus confirming the validity of the Fisher hypothesis in Türkiye. In their 2020 study, also conducted for Türkiye, Kök and Nazlıoğlu (2020) examined the risk transfer mechanism between exchange rate volatility and stock markets using asymmetric causality analysis. According to this, there is a causality relationship from positive volatility in the dollar exchange rate to both negative and positive volatility in the BIST100, from positive volatility in the VIX to negative volatility in the BIST100, and from negative volatility in the BIST100 to negative volatility in the dollar. Eryüzlü and Ekici (2020), on the other hand, examined the relationship between the housing sector and the exchange rate in Türkiye by applying the Dolado-Lütkepohl (1996) causality test. In their study, which used the housing price index to represent the housing sector and the real exchange rate to represent the exchange rate, the result was that the exchange rate has an impact on housing prices.

Bayhan et al. (2021) investigated the causality relationship between the exchange rate and credit default swap (CDS) in Türkiye in their study. They found that there is only a long-term causality relationship from the exchange rate to the CDS. Uğur and Tosun (2021) examined the relationship between the housing price index and investor sentiment in Türkiye, revealing a two-way causality relationship between the housing price index and investor sentiment. Turgut and Uçan (2021), who examined the relationship between the exchange rate and the housing price index in Türkiye after the 2008 global financial crisis, found that the housing price index is a Granger cause of the real effective exchange rate and that the real effective exchange rate is also a Granger cause of inflation.

One of the studies examining the causality relationship between the exchange rate, inflation rate, and interest rate in Türkiye is by Konak and Peçe (2022). According to Konak and Peçe (2022), who identified a two-way causality relationship between the exchange rate and the inflation rate in the short term and a one-way causality relationship from the interest rate to the inflation rate, in the long term there is only a one-way causality relationship from the inflation rate to the exchange rate. The results of Yılmaz (2022)'s study, which also focuses on Türkiye, indicate a two-way causality relationship between the dollar exchange rate and the housing price index, the BIST 100 index and the housing price index, and the BIST construction index and the housing price index.

Usman and Bashir (2022) identified a two-way causality relationship between economic growth and imports in their study on G7 countries, India, and China. In contrast, Zhu et al. (2022), who focused on 31 city municipalities in China, found a two-way causality relationship between economic growth and road transport.

Another researcher focusing on cities is Sakur (2023). The study's results, which examined the relationship between cities' export values and the indices created for them, reveal a one-way causality relationship from cities' export values to index values. Tunçsiper and Yamaçlı (2023) investigated the effects of exchange rates, oil prices, and agricultural product imports on non-alcoholic beverage and food prices in Türkiye for the period 2002-2022. Their findings underscore a one-way causality relationship between agricultural product imports and non-alcoholic beverage and food prices, while indicating a one-way causality relationship between oil prices and non-alcoholic beverage prices. Moreover, according to the Johansen cointegration analysis, agricultural product imports have a positive influence on non-alcoholic beverage and food prices in the long term. In their study, Tümtürk and Kırca (2023) addressed uncertainties in the Turkish economy and discovered that their fixed-parameter causality analysis did not support a causality relationship from inflation rates to uncertainties, although the time-varying causality analysis indicated that such relationships existed in certain sub-periods. Focusing on housing in Istanbul and Izmir, two significant metropolitan areas in Türkiye, Türkcan et al. (2023) found that the earthquake sensitivity of housing has no significant impact on housing prices. Ovalı and Çayırlı (2023), who explored the effects of uncertainty in exchange rates and inflation expectations on housing prices by applying the Time-Varying Granger Causality Test, concluded that uncertainty in both exchange rates and inflation expectations affects real housing prices.

Sağlam (2024) and Ünlü (2024) conducted their studies separately using indices. As a result of their research, Sağlam (2024) identified a one-way causality relationship from the dollar exchange rate to the Investor Risk Appetite Index (RISE) from the BIST 100 index, while Ünlü (2024) noted a two-way causality relationship between the BIST 100 index and the consumer price index (CPI), as well

as a one-way causality relationship from the BIST 100 index to the Industrial Production Index (BIST SINAI) and unemployment.

3. DATA SET AND METHOD

This study examines the causality relationship between the Consumer Price Index (CPI) for food and non-alcoholic beverages, the Borsa Istanbul (BIST) Construction Sector Index (XINSA), the Housing Price Index (HPI), and the exchange rate (USD-EUR) (KUR) variables. Since XINSA data has been available since March 2013, monthly data for the period 2013:M03-2024:M01 were included in the study. CPI, KFE, and Exchange Rate data were obtained from the Central Bank of the Republic of Türkiye (CBRT) electronic data distribution system (EVDS), while XINSA data were obtained from investing.com. Since the variables are parallel to each other, the natural logarithm of all variables was taken to ensure they are at the same level. The variables used in the study, along with their descriptions, are presented in Table 1.

In the study, the Granger Causality Test was used to assess the stationarity of the four variables mentioned above. The Augmented Dickey-Fuller (ADF) unit root test employed for this purpose relies on the assumption that there is no autocorrelation in the error terms. If autocorrelation exists in the error terms, lagged values of the dependent variable are incorporated into the model (Konak and Peçe, 2023). The analysis of the ADF unit root test is conducted using three models (Öner, 2018);

Lean Model: $\Delta Y_t = (p-1)Y_{t-1} + u$ (1)

Fixed Model: $\Delta Y_t = \delta Y_{t-1} + u_t$ (2)

Constant and Trended Model: $\Delta Y_t = \beta_1 + \beta_2 t + \Delta Y_{t-1} + \alpha i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t$ (3)

The unit root test results obtained using these models are compared with MacKinnon's (1996) critical values and/or probability values, and the resulting analysis is tested against both the null and alternative hypotheses. The hypotheses used in the analysis are as follows:

H_0: The series is non-stationary, and there is a unit root.
H_1: The series is stationary, and there is no unit root.

If there is a unit root in the series, the null hypothesis (H_0) is accepted. Conversely, if the series lacks a unit root, it is deemed stationary, leading to the rejection of the null hypothesis (H_0). Applying the ADF unit root test to render the series stationary facilitates the examination of the direction of causality between the series using the Granger Causality Test. Before conducting the Granger Causality Test, it is essential to ascertain the appropriate lag lengths of the series, which have been made stationary by the unit root test. Once the correct lag lengths are established, the causality test can be executed.

The Granger Causality Test is used to determine whether there is any causality relationship between the series and, if so, to identify the direction of this relationship. Due to its ease of application,

this test is frequently used in the literature. The model for this test is as follows (Granger, 1969):

$$Y_t = \sum_{i=1}^{p} \alpha_i Y_{t=i} + \sum_{j=1}^{p} \beta_j X_{t=j} + \varepsilon_{1t}$$ (4)

$$X_t = \sum_{i=1}^{q} \gamma_i Y_{t=1} + \sum_{j=1}^{q} \delta_j X_{t=j} + \varepsilon_{2t}$$ (5)

The hypotheses developed based on the equations in this model are as follows:
H_0: There is no unidirectional or bidirectional causality relationship between the series.
H_1: There is a unidirectional or bidirectional causality relationship between the series.

The model tests whether the coefficients of the lagged values of the independent variables are equal to zero at a certain significance level. If the coefficients in the first equation are different from zero at a certain significance level. In that case, this is interpreted as the X variable being a Granger cause of the Y variable. When the coefficients in the second equation are different from zero, it also indicates that the Y variable is a Granger cause of the X variable. In the equations in question, the four variables included in this study are substituted for X and Y, and the Granger Causality Test result between them is determined (Öner, 2018).

4. ANALYSIS AND FINDINGS

In the analysis section of the study, the Augmented Dickey-Fuller (ADF) unit root test was first applied to each variable, followed by the Granger Causality Test to examine the short-term causality relationship for series that are integrated of the same order.

4.1. Stationarity Test
The results obtained from the ADF unit root test, which aims to determine the stationarity of the series, are presented in Table 2. When the unit root test results in Table 2 are examined based on Mackinnon (1996), the null hypothesis (H_0) is rejected as the absolute values of the t-statistic for all series exceed the critical values, indicating that the series do not contain a unit root and are therefore stationary.

4.2. Granger Causality Test
Table 3 displays the models developed in the Granger Causality Test, which is used to assess whether a short-term causality relationship exists between variables, irrespective of whether they are dependent or independent, along with the hypotheses established based on these models.

Within the Granger Causality Test, the lag lengths of the series were initially determined, and the coefficients are shown in Table 4. Upon examining the results in Table 4, it was concluded that the optimal lag length is 1 according to the SC and HQ information criteria, 3 according to the FPE information criterion, and 6 according to the LR and AIC information criteria. However, a 6-year interaction is considered too long-term; therefore, the

Table 1: Variables used

Variables	Symbols	Source
BIST Construction Index	LnXINSA	Available from: https://www.investing.com/indices/bist-construction
Exchange Rate	LnKUR	Available from: https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket
Consumer Price Index for Food and Non-alcoholic beverages	LnTUFE	Available from: https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket
House Price Index	LnKFE	Available from: https://evds2.tcmb.gov.tr/index.php?/evds/dashboard/310

Table 2: ADF unit root test results of variables

Variables	Test	Difference	%	Critical value	t-Statistic	Probability value	Delay	Decision
LnKUR	ADF	Level	1	−4.0313	−8.4112	0.000	1	I (1)
			5	−3.4453				
			10	−3.1475				
LnXINSA	ADF	Level	1	−4.0307	−13.3924	0.000	0	I (1)
			5	−3.4450				
			10	−3.1473				
LnTUFE	ADF	Level	1	−4.0307	−7.7550	0.0000	0	I (1)
			5	−3.4450				
			10	−3.1473				
LnKFE	ADF	Level	1	−4.0349	−12.1058	0.0000	0	I (1)
			5	−3.4470				
			10	−3.1485				

H_0: There is a unit root. H_1: There is no unit root. *Critical values are obtained from MacKinnon (1996). *The maximum lag length was taken as 18 and lag lengths were determined according to the Schwarz Information Criterion (SIC)

Table 3: Models and hypotheses for the series

Model	Hypothesıs
$TÜFE_t = \sum_{i=1}^{p} \alpha_i TÜFE_{t-i} + \sum_{i=1}^{p} \beta_i KFE_{t-i} + u_t$	H_0: There is no causality relationship from XINSA to CPI.
$KFE_t = \sum_{i=1}^{q} \gamma_i XINSA_{t-i} + \sum_{i=1}^{q} \delta_i KFE_{t-i} + u_t$	H_1: There is a causality relationship from XINSA to CPI.
$TÜFE_t = \sum_{i=1}^{p} \alpha_i TÜFE_{t-i} + \sum_{i=1}^{p} \beta_i KFE_{t-i} + u_t$	H_0: There is no causality relationship from CPI to CPI.
$KFE_t = \sum_{i=1}^{q} \gamma_i TÜFE_{t-i} + \sum_{i=1}^{q} \delta_i KFE_{t-i} + u_t$	H_1: There is a causality relationship from CPI to CPI.
$KUR_t = \sum_{i=1}^{p} \alpha_i KUR_{t-i} + \sum_{i=1}^{p} \beta_i KFE_{t-i} + u_t$	H_0: There is no causality relationship from KUR to CPI.
$KFE_t = \sum_{i=1}^{q} \gamma_i KUR_{t-i} + \sum_{i=1}^{q} \delta_i KFE_{t-i} + u_t$	H_1: There is a causality relationship from KUR to CPI.
$TÜFE_t = \sum_{i=1}^{p} \alpha_i TÜFE_{t-i} + \sum_{i=1}^{p} \beta_i XINSA_{t-i} + u_t$	H_0: There is no causality relationship from CPI to XINSA.
$XINSA_t = \sum_{i=1}^{q} \gamma_i TÜFE_{t-i} + \sum_{i=1}^{q} \delta_i XINSA_{t-i} + u_t$	H_1: There is a causality relationship from CPI to XINSA.
$KUR_t = \sum_{i=1}^{p} \alpha_i KUR_{t-i} + \sum_{i=1}^{p} \beta_i XINSA_{t-i} + u_t$	H_0: There is no causality relationship from KUR to XINSA.
$XINSA_t = \sum_{i=1}^{q} \gamma_i KUR_{t-i} + \sum_{i=1}^{q} \delta_i XINSA_{t-i} + u_t$	H_1: There is a causality relationship from KUR to XINSA.
$KUR_t = \sum_{i=1}^{p} \alpha_i KUR_{t-i} + \sum_{i=1}^{p} \beta_i TÜFE_{t-i} + u_t$	H_0: There is no causality relationship from KUR to CPI.
$TÜFE_t = \sum_{i=1}^{q} \gamma_i KUR_{t-i} + \sum_{i=1}^{q} \delta_i TÜFE_{t-i} + u_t$	H_1: There is a causality relationship from KUR to CPI.

Table 4: Lag coefficients for variables

Lag	Logl	LR	FPE	AIC	SC	HQ
0	1074.610	NA	9.63e-14	−18.61931	−18.52384	−18.58056
1	1120.766	88.29779	5.70e-14	−19.14376	**−18.66638***	**−18.94999***
2	1141.057	37.40585	5.30e-14	−19.21838	−18.35910	−18.86960
3	1158.249	30.49674	**5.20e-14***	−19.23911	−17.99792	−18.73532
4	1170.709	21.23688	5.56e-14	−19.17755	−17.55446	−18.51875
5	1185.047	23.43927	5.77e-14	−19.14864	−17.14365	−18.33483
6	1206.922	**34.23850***	5.27e-14	**−19.25081***	−16.86391	−18.28198
7	1221.065	21.15376	5.53e-14	−19.21852	−16.44972	−18.09468

LR: Sequential Modified LR Test Statistic, FPE: Final Estimation Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion, HQ: Hannan-Quinn Information Criterion, *: The most appropriate lag length determined according to the relevant criteria
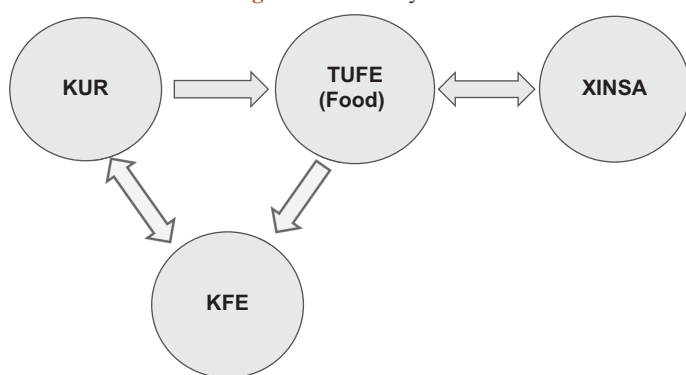
Table 5: Granger Causality Test results

Two-way Granger Causality Test
Sample: 2013M03-2024M01
Delay: 1

H_0	Observation	F-Statistics	Possibility	Result
LnXINSA-LnKFE	122	0.29068	0.5908	Could not be rejected.
LnKFE-LnXINSA		3.09155	0.0813	Could not be rejected.
LnTUFE-LnKFE	122	6.31443	0.0133	Rejected.
LnKFE-LnTUFE		0.26206	0.6097	Could not be rejected.
LnKUR-LnKFE	122	12.2294	0.0007	Rejected.
LnKFE-LnKUR		4.38327	0.0384	Rejected.
LnTUFE-LnXINSA	129	6.25814	0.0136	Rejected.
LnXINSA-LnTUFE		6.34346	0.0130	Rejected.
LnKUR-LnXINSA	129	3.15499	0.0781	Could not be rejected.
LnXINSA-LnKUR		0.02792	0.8676	Could not be rejected.
LnKUR-LnTUFE	129	26.8561	8.E-07	Rejected.
LnTUFE-LnKUR		2.30583	0.1314	Could not be rejected.

H_0: There is no causalityity relationship between the series. H_1: There is a causality relationship between the series. LnXINSA: Construction Sector Index, LnKFE: House Price Index, LnTPPI: Consumer Price Index, LnKUR: Exchange Rate

Figure 1: Causality flow

appropriate lag length was accepted as 1, and the results based on this were included.

After determining the most appropriate lag length for the variables, the Granger Causality Test was applied. According to the results of the Granger Causality Test presented in Table 5, at the 5% significance level, there is a bilateral causality relationship between the exchange rate (LnKUR) and the housing price index (LnKFE), and between the consumer price index (LnTUFE) and the construction sector index (LnXINSA). A unidirectional causality relationship was identified from the consumer price index (LnTUFE) to the housing price index (LnKFE) and from the exchange rate (LnKUR) to the consumer price index (LnTUFE). No causality relationship was found between the other indices.

To facilitate understanding of the relationship between variables, a Causality Flow (Figure 1) was created based on the results of the Granger Causality Test.

5. CONCLUSION

The recent economic crisis in Türkiye has deeply affected various sectors. The food and housing sectors, which are essential to the Turkish economy, are among them. Changes in exchange rates are some of the primary factors contributing to the crisis. In this study, which is framed in this direction, the aim is to examine the causality relationship between food prices, the housing price index, the BIST construction index, and the exchange rate. In this study, using monthly data from the period 2013:m1-2024:m1, the ADF Unit Root Test was initially applied, followed by the Granger Causality Test on the identified stationary series.

According to the findings obtained from the Granger Causality Test, which examines the causality relationships between the variables, there is a bidirectional causality relationship between the exchange rate (KUR) and the housing price index (LNKFE). The unit square meter construction cost, which influences the formation of housing prices, is primarily affected by the exchange rate. Consequently, it can be said that any change in the exchange rate affects housing prices. In other words, there is a causality relationship between housing prices and the exchange rate. Additionally, another bidirectional causality relationship was identified between the consumer price index (LNTUFE) calculated

for food and non-alcoholic beverages and the construction sector index (LNXINSA). Food and housing are among the most basic needs of human beings, and the necessity they represent also necessitates bearing their prices and costs. Due to the economic crisis currently being experienced in Türkiye, the increase in food and housing prices continues. Therefore, although no direct relationship can be established between these two indices, the existence of a two-way causality relationship is a result of both indices having a similar degree of importance for the general public. This is because any increase in food prices and costs also affects the prices and costs of other sectors, including housing.

On the other hand, a one-way causality relationship exists between the consumer price index (LnCPI), calculated for food and non-alcoholic beverages, and the housing price index (LNHPI). The relationship between these variables yields results similar to those of the consumer price index for food and non-alcoholic beverages, as well as the BIST construction sector. In the identified one-way causality between the exchange rate (LnKUR) and the consumer price index (LnTUFE) for food and non-alcoholic beverages, it can be stated that the exchange rate, which significantly influences the formation of food prices, will directly impact food prices due to any changes that may occur within it.

The causality relationship between the dollar exchange rate and the housing price index observed as a result of the study has also been seen in the studies conducted by Özcan and Tormuş (2018), Eryüzlü and Ekici (2020), Turgut and Uçan (2021), Yılmaz (2022), and Ovalı and Çayırlı (2023). However, the causality relationship between the construction index and the housing price index identified by Yılmaz (2022) and Çetin and Doğaner (2017) was not observed in the findings of this study.

REFERENCES

Aydın, S. (2023), Analysis to determine the causality relationship between housing prices and macroeconomic indicators in Turkey. Turkish Business Journal, 4(8), 83-100.

Badurlar, İ. (2008), Investigating the relationship between housing prices and macroeconomic variables in Turkey. Anadolu Üniversitesi Sosyal Bilimler Dergisi, 8(1), 223-238.

Barbaros, M., Kalaycı, S., Bakır, D. (2019), Examining the causality between food exports, food prices and inflation in Turkey. AVRASYA Uluslararası Araştırmalar Dergisi, 7(18), 537-548.

Bayhan, S., Kömür, S., Yıldız, Ü. (2021), Frequency domain causality analysis of the relationship between exchange rate and CDS premiums for Türkiye. Uluslararası Ekonomi, İşletme ve Politika Dergisi, 5(2), 329-339.

Baylan, M., Pazarcı, P. (2020), The relationship between inflation and interest in Turkey: Causality analysis. İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 9(1), 193-216.

Bhattacharya, B., Mukherjee, J. (2006), Indian stock price movement and the macroekonomic context -a time series analysis. Journal of International Business and Economics, 5(1), 167-181.

Çetin, G., Doğaner, A. (2017), The relationship between the construction sector confidence index and the housing price index: An empirical analysis for Türkiye. İktisat Politikası Araştırmaları Dergisi, 4 (2), 155-165.

Dolado, J.J., Lütkepohl, H. (1996), Making wald tests work for cointegrated VAR systems. Econometric Reviews, 15(4), 369-386.

Eryüzlü, H., Ekici, S. (2020), The relationship between housing price index and real exchange rate: The example of Türkiye. İktisadi, İdari ve Siyasal Araştırmalar Dergisi, 5(12), 97-105.

EVDS Verinin Merkezi. (2024), Türkiye Cumhuriyeti Merkez Bankası. Available from: https://evds2.tcmb.gov.tr/index.php?/evds/seriemarket/collapse_26/5949/datagroup/turkish/bie_hkfe [Last accessed on 2024 May 26].

Granger, C.W. (1969), Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3), 424-438.

Guerra, E.A.R., (2017), The economic growth and the banking credit in Mexcio: Granger causality and short-term effects, 2001Q1-2016Q4. Economia Informa, 406(1), 46-58.

Konak, A., Peçe, M.A. (2023), Causality analysis between interest rate, inflation rate and exchange rate in Turkey. Türkiye Sosyal Araştırmalar Dergisi, 27(1), 171-186.

Konut Fiyat Endeksi. (n.d.), Available from: https://www.tcmb.gov.tr/wps/wcm/connect/b4628fa9-11a7-4426-aee6-dae67fc56200/kfe-metaveri.pdf?mod=ajperes&cacheıd=rootworkspace-b4628fa9-11a7-4426-aee6-dae67fc56200-nwwpcfr

Kök, N., Nazlıoğlu, E.H. (2020), Asymmetric causality in financial markets: BIST100, VIX and exchange rate example. Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 55, 246-262.

Mackinnon, J.G. (1996), Numerical distribution functions for unit root and cointegration tests. Journal of Applied Econometrics, 11(6), 601-618.

Maslow, A.H. (1943), A Theory of human motivation. Psychological Review, 50, 370-396.

Mutascu, M. (2016), A bootstrap panel granger causality analysis of energy consumption and economic growth in the g7 countries. Renewable and Sustainable Energy Reviews, 63, 166-171.

Ovalı, M., Çayırlı, Ö. (2023), Uncertainty in inflation and exchange rate expectations and housing prices: The case of Türkiye. İzmir İktisat Dergisi, 38(2), 550-569.

Öner, H. (2018), Examining the relationship between consumer and producer price indices through Granger causality test. Finans Ekonomi ve Sosyal Araştırmalar Dergisi, 3(1), 318-327.

Özcan, G., Tormuş, N.B. (2018), The Relationship between Housing Price İndex and Exchange Rate: An Empirical Study on Türkiye. İn: Uluslararası Politik, Ekonomik ve Sosyal Araştırmalar Kongresi (ICPESS). Vol. 5. p505-512.

Sağlam, K. (2024), Examining the causality relationship between BIST100 index and dollar exchange rate on investor risk appetite index. Finans, Ekonomi ve Sosyal Araştırmalar Dergisi, 9(1), 1-11.

Saksonova, S., Koleda, O. (2017), Evaluating the ınterrelationship between actions of latvian commercial banks and latvian economic growth. Procedia Engineering, 178, 123-130.

Sakur, R. (2023), The effect of export change on BIST index returns: A causality analysis on BIST city indices. Finans, Ekonomi ve Sosyal Araştırmalar Dergisi, 8(1), 40-47.

Troster, V., Şahbaz, M., Uddin, G.S. (2018), Renewable energy, oil prices and economic avtivity: A granger-causality in quantiles analysis. Energy Economics, 70, 440-452.

Tunçsiper, Ç., Yamaçlı, S.D. (2018), Analysis of food and non-alcoholic beverage prices in Turkey: Causality and cointegration findings for the period 2002-2022. Yönetim Bilimleri Dergisi, 21, 899-918.

Turgut, E., Uçan, O. (2021), The Relationship between Housing Price İndex and Exchange Rate: The Case of Türkiye. İn: Iksad International Congress On Social Sciences. Vol. 6.

Tümtürk, O., Kırca, M. (2023), Belirsizliklerin enflasyon üzerindeki etkisinin zamanla değişen nedensellik yöntemiyle analizi: Türkiye örneği. Fiscaoeconomia, 8(1), 222-243.

Türkcan, B., Kışla, H.G.Ş., Bucak, Ç. (2023), Deprem ve konut fiyatları ilişkisi: Konutlarda depreme dayanıklılık ekseninde istanbul ve izmir analizleri. Türk Coğrafya Dergisi, 83, 131-143.

Uçar, İ.H., Alsu, E. (2024), Exchange rate foreign trade relationship: The example of Türkiye. Assam Uluslararası Hakemli Dergi (ASSAM- UHAD), 24, 78-93.

Uğur, A., Tosun, N. (2021), Konut fiyat endeksi ve yatırımcı duyarlılığı ilişkisinin analizi: Türkiye üzerine ampirik bir uygulama. Uluslararası Ticaret ve Ekonomi Araştırmaları Dergisi, 5(1), 11-21.

Usman, K., Bashir, U. (2022), The causal nexus between imports and economic growth in China, İndia ve G7 countries: Granger causality analysis in the frequency domain. Heliyon, 8(8), e10180.

Ünlü, M. (2024), Borsa endeksi ve makroekonomik değişkenler arasındaki zamanla değişen nedensellik ilişkisi: BİST X100 endeksi üzerinden ampirik kanıtlar. Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 60, 243-256.

Wain, U.A. (2013), The Impact of Investor Sentiments on Real Estate Prices. Master Thesis, North Carolina Wilmington of Business Üniversitesi.

Yılmaz, Y. (2022), Causality relationship between stock, exchange rate and housing prices. Akademik Yaklaşımlar Dergisi, 13(1), 167-185.

Zhu, F., Wu, X., Peng, W. (2022), Road transportation and economic growth in china: Granger causality analysis based on provincial panel data. Transportation Letters, 14(7), 710-720.