

## The Effect of Macro-Economic Indicators on Voter Behavior in Turkey: An Analysis on General and Local Elections of 1980-2019 \*

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### Abstract

The main actor of voter behavior is the human and human behavior under the identity of voter. For this reason, voter behavior emerges as a product of a complex process as it can be influenced by different factors. In this respect, voter behavior, which constitutes the most measurable behavior type of political participation, requires a multidimensional approach. This study aims to determine the sensitivity of political party vote rates to changes in macroeconomic indicators such as inflation, growth and unemployment rates in general and local elections held in Turkey between 1980-2019. The sensitivity of voters to economic indicators is analyzed within the framework of the economic approach and the responsibility hypothesis. In this study, econometric analyses were conducted with the help of Eviews 10 program and necessary tests were applied. In the study, the existence of correlation relationship between variables is revealed by horizontal cross-section dependence test. The results of the horizontal cross-section dependence test show that voters who vote in general and local elections are sensitive to variables such as unemployment, inflation and economic growth.

**Keywords:** *Voter Behavior, Macro-Economic Indicators, Economic Voting Approach, Responsibility Hypothesis.*

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## 1. INTRODUCTION

After the world wars, political participation research, which developed under the influence of the behavioral approach that dominated social sciences, first focused on voter behavior. Because voter behavior constitutes the most measurable behavior type of political participation (Polat, 2009: 95-96). Voter behavior includes two dimensions: whether to participate or not and party choice (Gülmen, 1979: 15-19). Voter behavior is a form of periodic individual political behavior in which the individual comes into direct contact with the political system as a result of his active or passive participation in the election activity (Negi, 2005: 98-100). In this context, individuals are referred to as voters through voting behavior. Voter defines the people who will participate in the elections to determine the administrative staff in the country, as a right and duty that being a citizen of a country provides. The actions taken by voters for this purpose are evaluated within the scope of voter behavior (Gülmen, 1979: 18). Therefore, the factors on which voters vote are of great importance. As a matter of fact, examining the behavior of voters, which is of great importance in determining the governance of the country, is in a central position in scientific research (Tüzün, 2005: 11-14). As a result of scientific analyzes conducted for many years, various approaches and hypotheses based on factors affecting voter behavior have been put forward. When studies conducted in the field of voter behavior are examined, it has been observed that there are approaches stating that different elements are effective in the voting process. In general, there are four basic approaches in theory. These approaches can be classified as economic voting, sociological, socio-psychological and strategic voting approaches.

One of these approaches, the economic voting approach, is based on the idea that voters take economic variables and events into consideration when voting and the idea of responsible voters. In this regard, voter behaviors, which constitute the subject of the study, were examined on the basis of the responsibility hypothesis of the economic voting approach. Therefore, this study tries to determine the relationship between political party votes in the general and local elections held in Turkey and macroeconomic variables that reveal the basic performance criteria in an economy. The study analyzes whether voters were sensitive to economic indicators in the general and local elections held between 1980 and 2019, and if so, how this happened, within the framework of the economic approach and responsibility hypothesis. In addition, Turkey came under the influence of a new economic paradigm after the decisions of January 24, 1980, and while this paradigm opened a more autonomous space for the economy in the relations between politics and economy, it increased the weight of private capital in the economy. With the public shrinkage discourses of neoliberal economic policies, the state began to transfer some of its previous service areas to the private sector, and this led to a change in the relations between the state and the citizen based on mutual rights and duties. Neoliberal economic policies, including elements such as privatization, deregulation, globalization, free trade, monetary policy, austerity policies and reduction of state expenditures, and the transition to an outward-open growth strategy have made the country's domestic political environment vulnerable to the effects of cyclical

economic fluctuations. For this reason, this study, which deals with the relationship between voter behavior and macroeconomic data, covers the years 1980 and 2019, which was the last election year at the time of the application.

## **2. ECONOMIC VOTING (RATIONAL CHOICE) APPROACH**

The economic voting (rational choice) approach argues that the political and economic conjuncture during election periods should be taken into account when explaining the reasons for changes in voter behavior. According to this assumption, individuals are considered rational. Rational individuals, on the other hand, want to realize their economic benefits at the maximum level by making cost-benefit calculations, while minimizing their costs. For this reason, the rational choice model is also called the economic voting approach (Teyyare and Avcı, 2016: 53). This approach is also considered as an approach developed based on the explanations of voting and party competition put forward by Anthony Downs in his work "An Economic Theory of Democracy" published in 1957 (Scarbroug, 1984: 83-84).

Downs, an American economist specializing in public administration, adapted the models valid in economics to political science with this work. Accordingly, Downs likens the election arena to the market mechanism in the economy. Here, voters constitute demand, and political parties' discourses constitute supply. Therefore, theoretically, the relationship between voters and political parties is clearly expressed. According to Downs, before the elections, political parties develop various discourses against the problems that concern the country and convey their solution proposals to the voters. Voters decide to vote for the party or candidate that offers the most beneficial discourse among these suggestions. Accordingly, political parties determine their promises and propaganda in the political arena and express their thoughts on the country's issues and the welfare of citizens. Voters make a choice by evaluating the approaches and past actions of political parties. Voters turn to the candidate or party that they want and that will best fulfill their wishes (Downs, 1957: 55-56). However, voters who act rationally can easily change their political decisions in the next election if they detect a disruption in the practices of the party they voted for in the past that benefited them (Teyyare and Avcı, 2016: 53).

In this approach, voters are aware of their interests. Voters' wishes and goals are prioritized in their voting behavior. Voters do not make any choices for the sake of it. Voters access more information and make their political choices by taking their political goals into consideration (Harper and Miller, 1987: 146). In this context, in the economic approach, voting behavior is evaluated as an individual phenomenon, as opposed to being evaluated as a mass behavior. Therefore, voters' voting behavior is evaluated as a result of their individual decisions. At the same time, voters are assumed to have full information about their own interests and the promises of other political parties. In this regard, the management ability of the government and the way political parties approach events are also re-evaluated in the minds of the voters. In addition, voters generally evaluate the economic activities and

performances of the party in power between two elections, such as unemployment and inflation, in the process of making election decisions (Lau and Redlawsk, 2006: 141). As a result of increases or decreases in these variables, there is a change in the vote rates of the party in power between two elections (Akarca and Tansel, 2007: 633). Therefore, this study was analyzed within the framework of the responsibility hypothesis, which is one of the approaches examining the relationship between voter behavior and economic performance. For this reason, the responsibility hypothesis on which economic voting behavior is based is included in the next title of the study.

### **3. THE RELATIONSHIP BETWEEN VOTER BEHAVIOR AND ECONOMIC PERFORMANCE: RESPONSIBILITY HYPOTHESIS**

In the responsibility hypothesis, voting behavior is expressed as a concrete indicator of voter satisfaction or dissatisfaction. This hypothesis constitutes the hypothesis on which the study is based. According to this hypothesis, voters want to maximize their benefits due to their economic interests. In this regard, if the voters are satisfied with the economic conditions, they reward the current government, and if they are not satisfied, they punish it. In this context, the responsibility hypothesis is considered as a hypothesis that links voter behavior with the economic performance of the party in power in the period between two elections (Polat, 2009: 102).

According to the responsibility hypothesis, voters hold the party in power in the period between two elections responsible for macroeconomic indicators such as high inflation or unemployment rate (Sezgin, 2005: 110). Additionally, proponents of the responsibility hypothesis try to prove that voters do not discriminate between left and right. Accordingly, the voters whose behavior is examined look at the macroeconomic success or failure of the parties rather than their positions in the political spectrum. In this regard, voters punish the party they see as responsible in the elections by not voting for that party, or, on the contrary, if macroeconomic indicators are good, they reward that party by increasing the vote of the political power. In summary, in the responsibility hypothesis, the main determinant of the voters' voting behavior is considered to be the success or failure of the current political power in the economy (Green and Shapiro, 1994).

### **4. STUDIES RELATED TO VOTER BEHAVIOR AND MACRO-ECONOMIC INDICATORS IN TURKEY**

Empirical studies on voter behavior focus more on electoral studies as they provide comprehensive and measurable regular data for the whole country. Researchers in the fields of political science and political sociology mostly examine the election studies of different periods, descriptively and comparatively, in order to explain the continuity or change in voter preferences. However, studies on voter behavior are not limited to these areas, but methodologically more explanatory studies are carried out on the factors affecting voter preference by using different analysis techniques, especially in the field of economics. While the studies carried out in both fields try to explain through quantitative data, political science and sociology mostly apply to field research such as surveys. On the other hand,

economics tries to explain the subject mostly through mathematical models. For this reason, we come across a rich literature to explain voter behavior.

When studies on analyzing voter behavior in Turkey are examined, it is seen that these studies gained momentum after the second half of the 1990s. In this respect, especially the 1999 elections are considered as a turning point in terms of analyzes made in Turkey (Aziz, 2003). Therefore, it can be stated that studies conducted by both public opinion research companies and universities have focused on voter behavior after this date. It can be said that the analyzes carried out in this context contributed significantly to the development of the field (Çakır and Biçer, 2015).

The study by Sencer (1974) aims to analyze whether voters evaluate the past economic performance of the government while voting. In this study, it was found that voters cast their votes taking into account the past economic performance of the government before the election. Çarkoğlu (1997) conducted a study to analyze the effect of the economic success or failure of political parties on the elections. As a result of the study, it has been determined that the macroeconomic variables, gross national product per capita, inflation and unemployment rate are effective in the continuation of the support to political parties. Bakırtaş (1998), within the framework of political fluctuations theory, aimed to analyze the relationship between the economic policies implemented in Turkey and the political structure in Turkey. As a result of the study, it has been found that election results are closely related to economic instability.

Akgün (1999), in his study to measure the sensitivity of voter behavior to economic variables, revealed the finding that economic parameters have a great impact on voting behavior and that voters cast their votes by considering these parameters. Therefore, in this study, it has been revealed that the economic success of the government has a direct effect on voter behavior. In addition, it has been found that voters are affected by both positive and negative changes in economic indicators. Another finding reached by this study is that the voters hold the government directly responsible for the developments in economic indicators. In this context, vote rates are used by the voters as a reward or punishment mechanism.

Akçoroğlu (2004) aimed, firstly, to examine the existence of political economic fluctuations, and secondly, to determine whether the ideological tendencies of political parties lead to differences in macroeconomic policies. In this context, they primarily used Hendry's general-to-specific approach and cointegration analysis technique. The study is based on economic indicator data for the period 1987:1 and 2003:1. As a result of the study, they concluded that the elections did not have a statistically significant effect on the inflation and growth variable. The other finding of the study is that various assumptions have emerged as a result of the experimental application made by considering the possibility that the governments may not consist of a purely center-right or center-left party. Accordingly, no noticeable difference was observed in inflation, economic growth and budget deficit

when a centre-right party shares power with a centre-left party in Turkey during the period under review. However, it was observed that there was a slowdown in economic growth and an increase in the budget deficit during the periods when parties that adopted the nationalist view were in power.

Bakırtaş and Koyuncu (2005) aimed to test the validity of the electoral political fluctuations hypothesis in Turkey. For this purpose, they studied five macroeconomic indicators. They used the least squares method in their work. As a result of the study, they found that the hypothesis is valid for public expenditures and GDP, but it is invalid for inflation, interest rate and money supply variables.

Çinko (2006), In his study, he aimed to analyze the theoretical foundations of economic performance and voter behavior on the basis of Turkey. As a result of the study, although there are many factors affecting the voter behavior, it has been found that the economic conditions are effective in the voting decisions of the voters in Turkey.

In his study, Sezgin (2007) aimed to investigate whether voters in Turkey were affected by economic variables while evaluating political parties and their leaders. In addition, within the scope of the research, it is focused on the economic variables that affect the popularity of political leaders in terms of voters. These data were analyzed by using the questionnaires made for this purpose. As a result of the analysis, it has been found that Turkish voters are affected by economic variables, and that they react more quickly to unemployment and inflation rate than the change in growth rate.

Ercins (2007), in her study to determine the sensitivity of voter behavior to developments in economic indicators, revealed that voters are more sensitive to negative developments in economic performance than positive developments. With this study, she found that when the inflation rate rises, there is a significant change in the vote rates of the political parties in the government, but when the economy grows, although they continue to vote for the government, there is no significant change.

Aydemir (2007) analyzed the election results between 1987 and 2004 using the least squares method. In this analysis, political parties are divided into two groups as centre-right and centre-left. The study aimed to measure the interaction between the changes in the voting rates of the parties and the macroeconomic indicators of inflation, growth and unemployment. In line with the empirical application, it has been found that the parties on the right give priority to growth and unemployment among macroeconomic variables, while the parties on the left give importance to the inflation variable.

Haydaroğlu (2011) aimed to examine the relationship between the voting power variable and macroeconomic indicators with the panel data analysis method, in addition to the studies that reveal the connection between political instability and basic macroeconomic indicators such as employment, inflation, and growth rate. For this purpose, the results of the elections held between 1987 and 2009 in 47 different countries were analyzed. As a result of the study, it has been found that the voting power variable is effective on macroeconomic indicators such as employment, inflation and growth rate.

Altun (2014), in the study conducted to test the validity of the approach that political actors cause economic cyclical fluctuations, Turkey's period between 1950 and 2012 is discussed. In this direction, the autoregressive moving average method was used in the analysis. As a result of the study, it was found that the theory of opportunistic and partisan political cyclical fluctuations was valid for the period examined, but the evidence for the model was unclear.

Kopurlu (2016) aims to test the economic voting model, one of the theoretical approaches related to voter behavior. For this purpose, the results of the local elections held in 2004, 2009 and 2014 and the general election results of the parliamentary elections held in 2007 and 2011 were analyzed. In this study, in order to measure the effect of macroeconomic indicators on political parties, the data valid at the mentioned dates were tested econometrically with panel data analysis. As a result of the analysis; it has been determined that the voters punish the ruling party in the periods when inflation and unemployment rates increase and reward them in the periods when the growth rate increases, but the same is not true for the opposition parties.

Gündem (2017), the determinants of the votes received by the parties from the electorate were investigated by the spatial econometric method. As the election subject to the research, the election results held on 1 November 2015 were discussed. As a result of this election, the spatial effects of the votes received by the political parties that had the right to enter the parliament by passing the 10% electoral threshold were investigated. In this context, regressions on spatial models were reconstructed using LM tests. According to the analyzes made, it was concluded that the spatial effects mentioned should not be ignored in the examination of voter behaviors, and it was stated that the findings to be achieved would be insufficient and incomplete if they were ignored.

Korkmaz (2019) analyzed the results of the elections held between 1980 and 2016 in order to examine the effects of the changes in economic indicators on the voting behavior of the voters. As a result of these analyzes, it has been concluded that economic variables are effective in the behavior of the voters and that the voter is more affected by economic factors such as the inflation rate and changes in unemployment figures, especially during economic crisis periods.

Haydaroğlu and Korkmaz (2020) examine the effect of economic policies implemented by political actors on voting behavior. As a result of the study, it was found that the voters were affected by the indicators in the economy. They found that this effect is more determinant than socio-psychological factors especially during economic depression periods.

Demir and Çımat (2021), they aimed to determine whether the voters in Turkey were affected by the inflation rate and unemployment rate before the election. For this purpose, they worked on the inflation and unemployment rate data between 1960-2019 and the election results. As a result of the analysis made, two different findings were reached. Accordingly, before 1980, voters displayed a voter

behavior based on ideological and political stability. In the post-1980 period, on the contrary, they concluded that macroeconomic variables were the main determinant in the voting behavior of the voters.

## 5. DATA SET AND MODEL

In the study, the relationship between the political party votes in the general and local elections held between 1980-2019 in Turkey with the macroeconomic variables that reveal the basic performance criteria in an economy has been tested. How sensitive the voters are to economic indicators is analyzed within the framework of the economic approach and responsibility hypothesis. In the model established within this framework, the voting rates of the political parties participating in the general and local elections between 1980 and 2019, as well as the growth rate, inflation rate and unemployment rate data are used. In 2015, the November 1 election results were taken into account. The reason for examining the period 1980-2019 in the study is that the data used in the analysis is complete in these periods. The voting rates of the political parties participating in the general and local elections used in the analysis were obtained from the Turkish Statistical Institute and Supreme Election Council (Supreme Election Council, 2022; TUIK, 2022), the growth rate from the Total Economy Database (Total Economy Database, 2022), and the unemployment rate and inflation rate from the World Development Indicator database (WDI, 2022). Based on these variables, the model was created as follows:

$$Vote Rate_t = \beta_1 Unemployment Rate_{ti} + \beta_2 Inflation Rate_{ti} + \beta_3 Growth Rate_{ti} + \varepsilon_t \quad (1)$$

It is defined as In the equation,  $i = 1, 2, 3, \dots, N$  denotes cross-section units,  $t = 1, 2, 3, \dots, T$  denotes time dimension and  $\varepsilon$  denotes error term.

**Table 1: Descriptive statistics**

Variables	Mean	Median	Maximum	Minimum	Skewness	Kurtosis
Vote Rate (%)	21.517	19.500	49.800	1.100	0.845	3.074
Unemployment Rate (%)	9.326	8.835	12.060	7.640	0.531	2.077
Inflation Rate (%)	37.440	35.123	89.113	6.471	0.457	1.974
Growth Rate (%)	4.898	5.563	11.200	-3.297	-0.505	2.875

Descriptive statistics regarding the variables used in the analysis are given in Table 1. In this direction, the relationship between the vote rates of political parties as a result of the general and local elections and the unemployment rate, inflation rate and growth rate, which are macroeconomic indicators, will be tested with the cross-sectional dependency method.

### 5.1. Cross Section Dependency Test

Cross-section dependency test is a test method used to determine the correlation relationship between variables. Cross-section dependency tests vary according to the number of cross-sections (N) and time series (T) that are the subject of the analysis. If the time series is larger than the number of units ( $T > N$ ), the LM test introduced by Breusch-Pagan (1980) is used and the correlation between the units is analyzed. If the number of cross-sections is equal to the number of time series ( $T = N$ ), the cross-

section dependence is determined by the Pesaran (2004) LM test. If the number of units is greater than the time series ( $N > T$ ), the test used is the Pesaran (2004) CD test (Yıldırım et al., 2013). If there is a cross-section dependency in the analysis, it means that the effects of the shocks in the independent variables on the dependent variable are different. For this reason, the emergence of cross-sectional dependence in the variables affects the rate of votes of the ruling party and the vote rates of each of the opposition parties at different levels. Therefore, considering the cross-section dependency in the analysis ensures that the test results are more consistent (Koçbulut and Barış, 2016: 28-29).

Hypothesis tests established to test the cross-sectional dependence between the variables in the analysis,

$$H_0: \text{There is no cross section dependency.} \quad (2)$$

$$H_1: \text{There is a cross section dependency.}$$

It is defined in the form. According to these hypotheses, Breusch-Pagan LM, Pesaran Scaled LM and Pesaran CD methods were used to test the cross-sectional dependence between the variables. The common feature of these tests is that they can be used together in cases where the variables are both homogeneous and heterogeneous (Koçbulut and Barış, 2016: 30).

### 5.1.1 LM Test

The Breusch-Pagan LM test is estimated by a hypothesis test based on parametric constraints. Accordingly, it is a cross-section dependency test based on the correlation coefficients of errors and calculated by the Lagrangian multiplier method under the assumptions of  $N$  constant and  $T \rightarrow \infty$ . Making any choice between Wald or LM test in the analyzes varies depending on the ease of estimation of the null and alternative hypotheses. Accordingly, the LM test is generally used when it is easier to predict the constrained model. Therefore, since the LM statistic is simple, it is calculated using the residuals of a linear regression model estimated as OLS (Breusch and Pagan, 1980: 239)

When a number of observations obtained from a data set of size  $N$  are analyzed by the LM test, it is expressed as a function as  $\theta = (\theta_1, \dots, \theta_K)$ . This function gives the probability  $L(\theta)$  of the parameters obtained from 1 to  $K$ . Based on the  $\theta$  equation, hypothesis testing under the  $p < K$  constraint;

$$H_0: h_j(\theta) = 0 \rightarrow \text{There is no cross section dependency.} \quad j=1, \dots, p \quad (3)$$

It is defined as. The solution of this problem is done by the Lagrange multiplier method according to Aitchison and Silvey (1960);

$$L(\theta) + \sum_{j=1}^p \lambda_j h_j(\theta) \quad (4)$$

When the partial derivative of the established Lagrangian function is taken according to the parameter  $\theta$ , the first order condition is met and the Lagrange multiplier  $\lambda_j$  is solved so that  $\tilde{\lambda}$  and  $\tilde{\theta}$  are obtained from this solution. According to this;

$$\tilde{D} + \tilde{H}\tilde{\lambda} = 0 \tag{5}$$

$$h_j(\tilde{\theta}) = 0 \quad j=1, \dots, p \tag{6}$$

In equation 5,  $\tilde{D} = \left\{ \frac{\partial L}{\partial \theta_i}(\tilde{\theta}) \right\}$   $K \times 1$  vector,  $\tilde{H} = \left\{ \frac{h_j}{\partial \theta_i}(\tilde{\theta}) \right\}$   $K \times p$  sized matrix and  $\tilde{\lambda}$  it expresses the objective and constraint functions of the Lagrangian multiplier, provided that it is a vector of size  $p \times 1$ . According to this function, while the null hypothesis of the basic view underlying the LM test is true,  $\theta$  It is that the estimation of  $\theta$  will tend to be close to the unconstrained maximum-likelihood estimation, so that  $\tilde{D}'$  will be close to the zero vector. In addition, Feign (1976) states that  $D$  will be zero-mean under the condition of regularity in which the order of differentiation and integration can be reversed. According to Crowder (1976),  $C_N^{-1/2} D \rightarrow N(0, \lim_{N \rightarrow \infty} C_N^{-1/2} J_N^{-1/2})$  when  $\mathcal{J} = E \left\{ \frac{-\partial^2 L}{\partial \theta \partial \theta'}(\tilde{\theta}) \right\}$  is defined as Fisher's information matrix. Accordingly,  $c_N$  is expressed as a matrix of norms chosen in accordance with the equation. At the same time, this equality statistically forms the basis of the LM test (Breusch and Pagan, 1980: 240-242).

$$\begin{aligned} LM &= \tilde{D}' \tilde{J}^{-1} \tilde{D} \\ &= \tilde{\lambda}' \tilde{H}' \tilde{J}^{-1} \tilde{H} \tilde{\lambda} \end{aligned} \tag{7}$$

Accordingly, under the assumption that the null hypothesis is true,  $\tilde{J}$  is defined as the information matrix. The constraint  $\tilde{D}' \tilde{J}^{-1} \tilde{D}$  is expressed as the result statistic when the expression  $\tilde{\lambda}' \tilde{H}' \tilde{J}^{-1} \tilde{H} \tilde{\lambda}$  is the Lagrange multiplier. This situation makes it clear that the two test statistics are actually similar and thus the suitability criterion is taken into account in choosing which form to use. Therefore, under the usual maximum likelihood conditions, the LM statistic in equation 5' is equivalent to the W and LR statistic. In other words, when the  $H_0$  hypothesis is accepted,  $\chi^2(p)$  shows an asymptotic distribution feature. When the statistic is greater than the  $\chi^2(p)$  distribution, the test rejecting the  $H_0$  hypothesis has the same asymptotic properties as the other tests (Breusch and Pagan, 1980: 240-242).

Therefore, when the referenced value  $\theta$  is divided into two subsets,  $\theta_1$  and  $\theta_2$  and in the special case defined as the parameter subsets of the tested constraints being equal to the values they take, the LM statistic is;

When  $H_0 = \theta_1 = \theta_{10}$ ,  $\theta' = (\theta_1' \theta_2')$  or  $H_0: h(\theta) = [I_p : 0] \begin{bmatrix} \theta_1 \\ \theta_2 \end{bmatrix} - \theta_{10} = 0$  is divided in this form. In accordance with this division operation  $D$  and  $\mathcal{J}$ ;

$$\tilde{D} = \begin{bmatrix} \tilde{D}_1 \\ \tilde{D}_2 \end{bmatrix} = \begin{bmatrix} \tilde{D}_1 \\ 0 \end{bmatrix} \text{ ve } \mathcal{J} = \begin{bmatrix} J_{11} & J_{12} \\ J_{21} & J_{22} \end{bmatrix}$$

It can be displayed as. In this case, when  $\tilde{D}_2 = 0$ , the first order conditions given in the equation 3 are met and the LM statistic is;

$$\tilde{D}_1(J_{11} - J_{12}J_{22}^{-1}J_{21})\tilde{D}_1 \equiv \tilde{D}_1(J_{11})\tilde{D}_1 \quad (8)$$

It is expressed as. Accordingly, the LM test statistic has exactly zero mean for constant values of T and N, unlike  $CD_{LM}$  (Breusch and Pagan, 1980: 240-242).

### 5.1.2 Pesaran CD test

The Breusch Pagan LM test produces consistent results with N constant and  $T \rightarrow \infty$  going. However, it loses consistency for N constants and  $T \rightarrow$  finite values. Therefore, the CD test is recommended by Pesaran (2004) in order to eliminate the consistency problem (Keskin and Aksoy, 2019). According to Pesaran (2004) when N is large and T is small, it is stated that there is a need for a cross-section dependency test with small sample characteristics that are not dependent on a particular weight matrix. Acknowledging the inadequacy of the Breusch-Pagan LM test when the pesaran N is large, he proposes the following simple alternative based on binary correlation coefficients rather than squares used in the LM test (Pesaran, 2004: 6)

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (\tilde{\rho}_{ij}) \quad (9)$$

The CD test consists of the sum of the correlation coefficients of the errors obtained from the cross-section model. In the CD test, the  $H_0$  hypothesis expresses the situation where there is no correlation between the variables and shows normal distribution characteristics (Pesaran, 2004: 6-7).

Accordingly, including heterogeneous dynamical models subject to multiple breaks in the cross-section dependency model established, while the conditions for the  $y_{it}$  and  $x_{it}$  variables are constant, the changes in the slope coefficients and error variances are distributed symmetrically in each new case and comply with the following assumptions (Pesaran, 2004: 6-7).

- According to the first assumption, the  $u_{it}$  errors for each i value are evaluated as an independent series with  $0 < \sigma_i < \infty$  and zero mean and  $\sigma_i^2$  variance.
- The second assumption  $H_0: u_{it} = \sigma_i \varepsilon_{it}$  states that  $\varepsilon_{it} \sim \text{IID}(0,1)$  under the null hypothesis, while  $\varepsilon_{it}$  errors for all i and t's are symmetrically distributed.
- The third assumption is that the  $x_{it}$  parameters are strictly exogenous. Accordingly,  $X_i'X_i$  is a positive definite matrix, with  $x_i = (x_{i1}, \dots, x_{it})$  for all i and t's, while  $E(u_{it}|x_i) = 0$  dir.
- The fourth assumption is  $T < k+1$  and OLS's errors  $e_{it}$  are not 0.

Under these assumptions, all N and  $T > k+1$  are expressed as  $E(\tilde{\rho}_{ij}) = 0$  and  $E(CD) = 0$  (Pesaran, 2004: 6-7).

### 5.1.3 $CD_{LM}$ Test

The  $CD_{LM}$  test can be applied when both N and T are relatively large. The  $CD_{LM}$  test is considered an improved form of the Breusch and Pagan LM test. According to the  $CD_{LM}$  test, when  $N \rightarrow \infty$  and  $T \rightarrow \infty$ , the null hypothesis is accepted, that is, it is stated that there is no cross-sectional dependence. Accordingly, the cross-section dependency test  $CD_{LM}$  is based on the LM statistic and is defined as follows (Pesaran, 2004: 5)

$$CD_{LM} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \tilde{\rho}_{ij}^2 \quad (10)$$

The  $\tilde{\rho}_{ij}$  given in the equation is expressed as a sample estimate of the binary correlation of the residuals. Especially;

$$\tilde{\rho}_{ij} = \tilde{\rho}_{ij} = \frac{\sum_{t=1}^T e_{it} e_{jt}}{(\sum_{t=1}^T e_{it}^2)^{1/2} (\sum_{t=1}^T e_{jt}^2)^{1/2}} \quad (11)$$

The  $e_{it}$ 's in the equation are defined as the  $u_{it}$ 's obtained from the OLS estimation. The errors obtained from the OLS estimation are;

$$e_{it} = y_{it} - \hat{\alpha}_i - \hat{\beta}_i x_{it} \quad (12)$$

It is shown in the form. The parameters  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  in the equation are the sampling parameters of  $\alpha_i$  and  $\beta_i$  in the  $y_{it}$  model estimated by OLS. The cross-section dependency test proposed here, unlike the LM test, does not require the cross-sectional units to be sequential in terms of applicability. However, this only applies where N is relatively small and T is large enough (Pesaran, 2004: 5)

The  $CD_{LM}$  test conforms to the chi-square distribution under  $N(N-1)/2$  degrees of freedom. This test is not applicable when  $N \rightarrow \infty$ . However, under the  $H_0$  hypothesis, while  $i=1, \dots, N-1$  and  $j=i+1, \dots, N$ , the expression  $T\rho_{ij}^2 \sim \chi_1^2$  is asymptotically independent. Therefore, the  $CD_{LM}$  test can be used to test the cross-dependency hypothesis. The equation  $CD_{LM}$  defined in this case;

$$CD_{LM} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (\tilde{\rho}_{ij}^2 - 1) \quad (13)$$

It is shown as. However, in the empirical applications of this test, it is stated that if N is large and T is small, there will be distortions. The main reason for this is that for a finite T value, the expression  $E(T\rho_{ij}^2 - 1)$  cannot be correctly centered, and size distortions occur as a result of miscentring the LM statistic when N is large (Pesaran, 2004: 5)

## 6. RESULTS

Based on the explanations made, the results of the cross-section dependency test applied to explain the relationship between vote rates in local and general elections and unemployment, inflation and growth rates are given in the table below.

**Table 2: Test Results Regarding General Elections**

Tests	Statistical value	Probability value
LM Test	16.03405	0.0136**
CD <sub>LM</sub> Test	2.896580	0.0038***
CD Test	-0.546323	0.5848

\*\*\*, \*\*, \* expressions express the 1%, 5% and 10% significance levels of the variables.

In the model constructed according to the results of the cross-section dependency test in Table 2, the  $H_0$  hypothesis is rejected according to the significance levels of 5% according to the Breusch-Pagan LM test and 1% according to the Pesaran Scaled LM test. These results show that there is a cross-section dependency in the model. The test results regarding the local elections are given in Table 3.

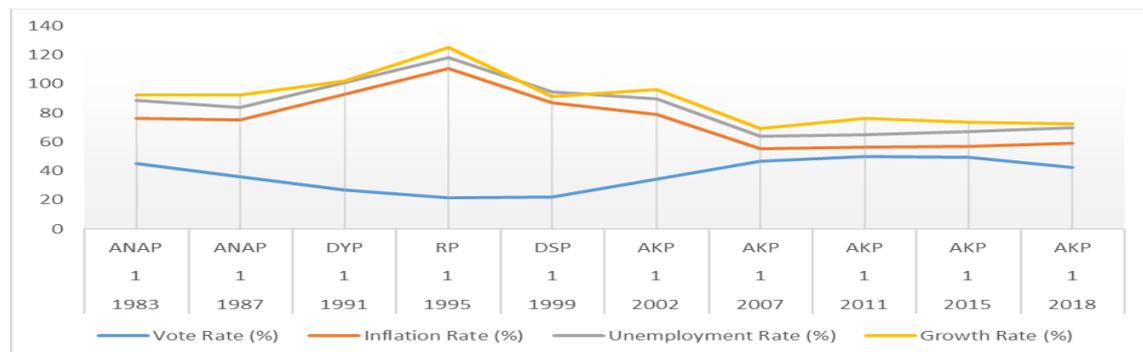
**Table 3: Test Results Regarding Local Elections**

Tests	Statistical value	Probability value
LM Test	18.35754	0.0054***
CD <sub>LM</sub> Test	3.567314	0.0004***
Pesaran CD	-1.392861	0.1637

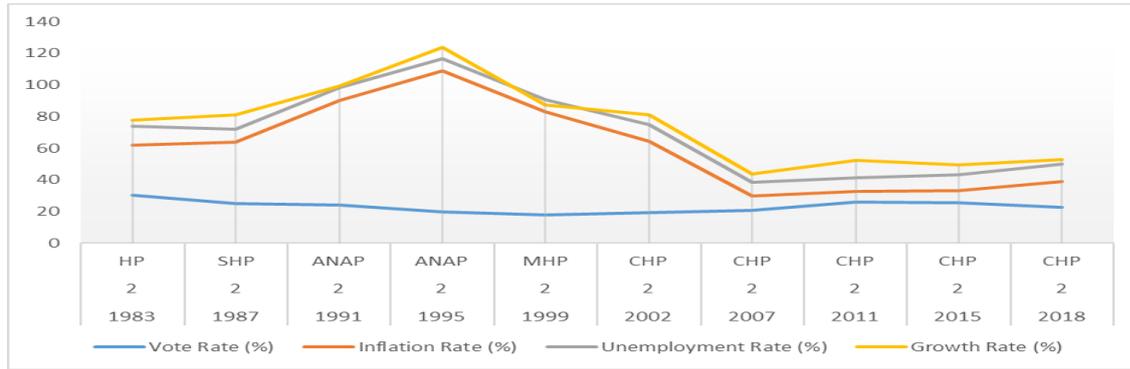
\*\*\*, \*\*, \* expressions express the 1%, 5% and 10% significance levels of the variables.

In the model constructed according to the cross-section dependency test results in Table 3, the  $H_0$  hypothesis is rejected at 1% significance levels according to the Breusch-Pagan LM and Pesaran Scaled LM tests. These results show that there is a cross-section dependency in the model. The fact that there is a horizontal cross-section dependency between the series in the analyzes indicates that the voters' approach to the political party that received the highest votes and those that received the lower votes is different. As a result of the analysis, it is observed that the changes in any of the independent variables used in the study have different effects on the dependent variable of the study. According to the results of this analysis, the change in the voting rates of the ruling party and other parties in the general elections against the fluctuations in macroeconomic indicators is shown in the charts below (Graph 1a-Graph 1d).

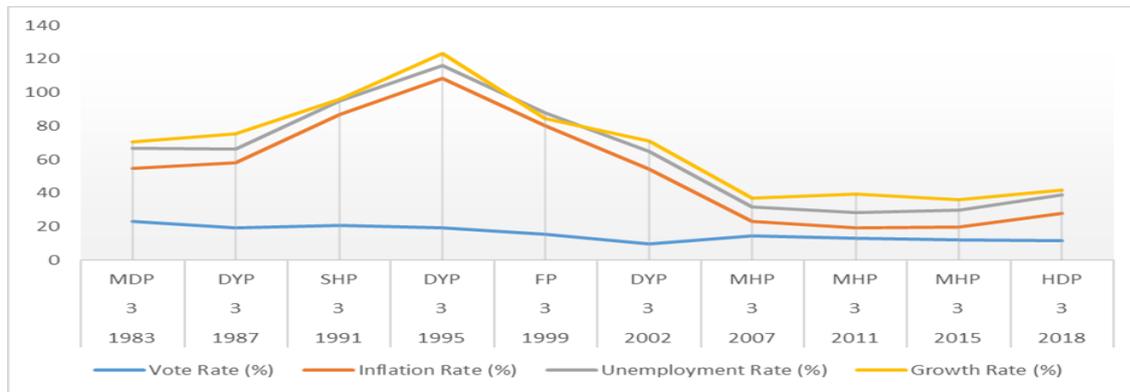
**Graph 1a: The Relationship Between the Vote Rates of the Political Party That Got the Highest Votes in the General Elections Held Between 1980-2019 and Macroeconomic Variables**



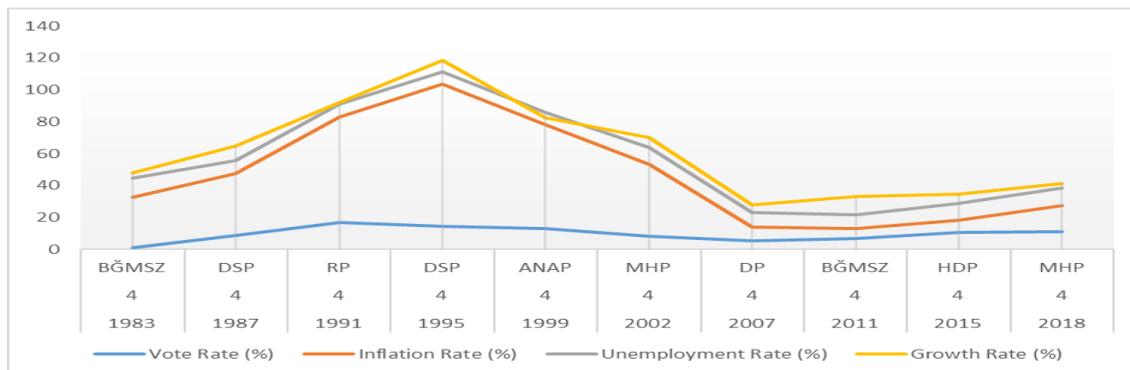
**Graph 1b: The Relationship between the Vote Rate of the Political Party with the Second Highest Vote Rate in the General Elections Held Between 1980-2019 and Macroeconomic Variables**



**Graph 1c: The Relationship between the Vote Rate of the Political Party with the Third Highest Vote Rate in the General Elections Held Between 1980-2019 and Macroeconomic Variables**



**Graph 1d: The Relationship Between the Vote Rate of the Political Party with the Fourth Highest Vote Rate in the General Elections Held Between 1980-2019 and Macroeconomic Variables**

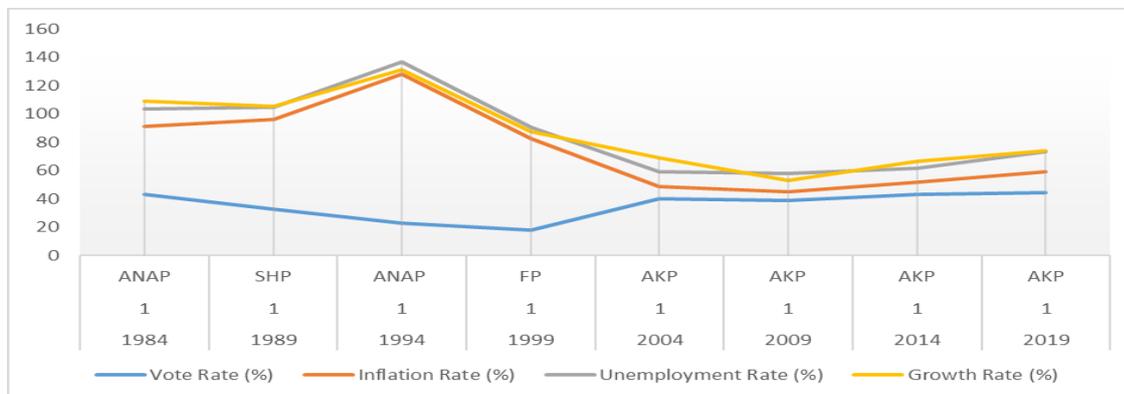


**Source:** Graph 1a-Graph 1d has been prepared by using Turkish Statistical Institute data.

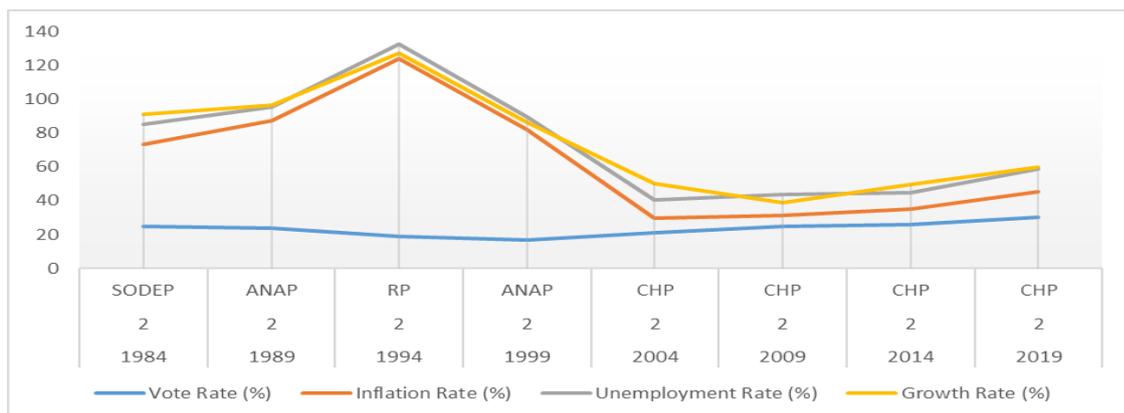
When the graphs (Graph 1a- Graph 1d) are analyzed, it is observed that the decrease in the voting rates of the ruling party especially in the periods when inflation and unemployment increase and the rate of growth rate slows down. At the same time, it is observed that the rate of votes of the political party that received the highest votes in the elections increased with the increase in the growth trend in the case of the decrease in unemployment and inflation. However, changes in the voting rates of other parties are less affected by economic variables.

As a result of the analysis, the change in the vote rates of the political party and other parties that obtained the highest vote rate in the local elections, in response to the fluctuations in the macroeconomic indicators, is shown in the charts below (Graph 2a-Graph 2d).

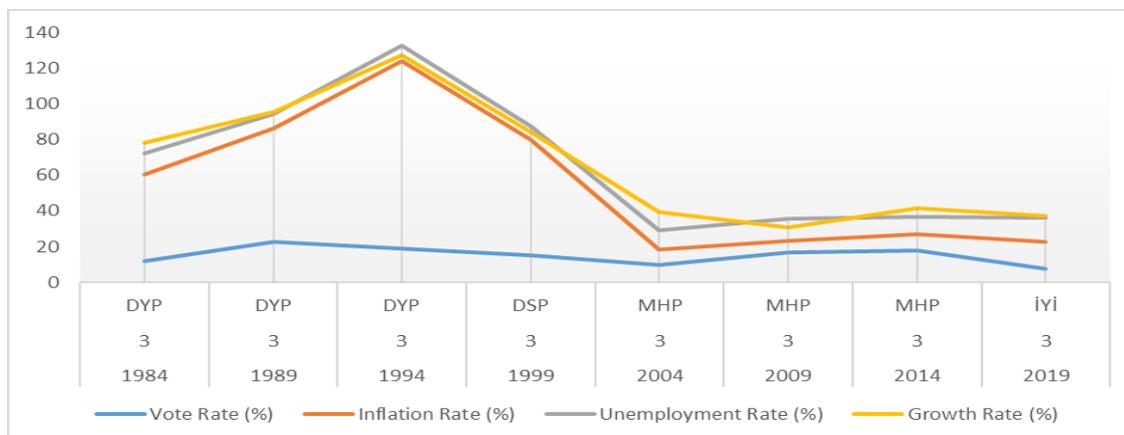
**Graph 2a: The Relationship Between the Vote Rate of the Political Party with the Highest Vote Rate in the Local Elections Held Between 1980-2019 and Macroeconomic Variables**



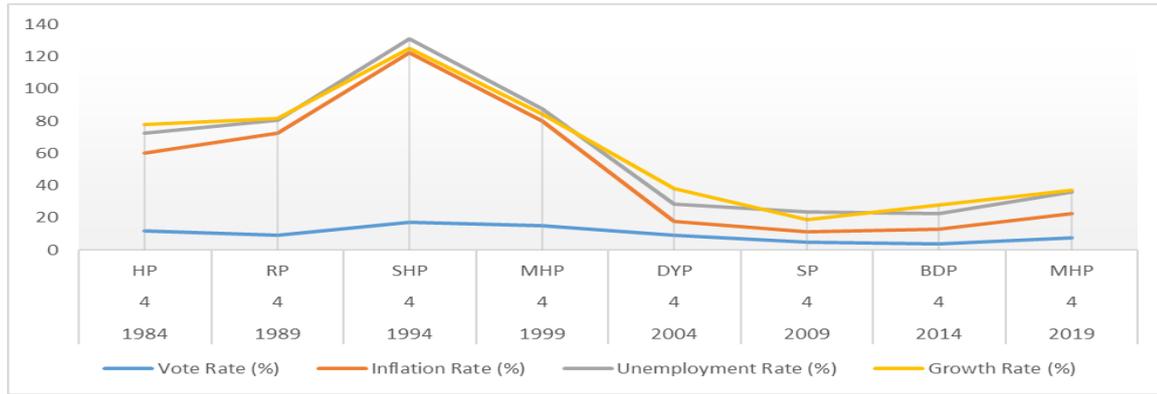
**Graph 2b: The Relationship Between the Vote Rate of the Second Political Party with the Highest Vote Rate in the Local Elections Held Between 1980-2019 and Macroeconomic Variables**



**Graph 2c: The Relationship Between the Vote Rate of the Third Political Party with the Highest Vote Rate in the Local Elections Held Between 1980-2019 and Macroeconomic Variables**



**Graph 2d: The Relationship Between the Vote Rate of the Fourth Political Party with the Highest Vote Rate in the Local Elections Held Between 1980-2019 and Macroeconomic Variables**



**Source:** Graph 2a-Graph 2d has been prepared by using Turkish Statistical Institute data.

According to the results of the cross-section dependency test applied in the study, the existence of the cross-section dependence between local elections and macroeconomic variables reveals that the voter's economic voting behavior also reflects in local elections. In the graphs created in this context (Graph 2a-Graph 2d), the relationship between the voting rates of the political parties and macroeconomic variables was examined. Accordingly, the decline in the voting rates of the ruling party is particularly evident in the periods when inflation and unemployment increase and the growth rate slows down. At the same time, it is observed that the vote rate of the political party that received the highest votes in the elections increases with the increase in the growth trend in the case of a decrease in unemployment and inflation. However, changes in the voting rates of other parties are less affected by economic variables.

## 7. CONCLUSION

By examining the results of 11 general and 7 local elections held in Turkey between 1980 and 2019, the study reveals how political party vote rates were affected by changes in inflation, unemployment and growth rates in this period, using the cross-sectional dependence method. Therefore, the sensitivity of voter behavior in Turkey to basic macroeconomic indicators has been analyzed. With the cross-sectional dependency test, the validity of the economic voting approach explaining voter behavior and the responsibility hypothesis derived from this approach was also tested. In the analyzes carried out within this framework, the existence of cross-sectional dependence among the variables indicates that the voters' approach to the political party with the highest vote rate is different from the political party with the lower vote rate. As a matter of fact, the existence of cross-sectional dependence means that changes in any of the macroeconomic indicators, that is, the independent variables, have different consequences on the dependent variable, the voting rates. In addition, Turkey came under the influence of a new economic paradigm after the decisions of January 24, 1980, and while this paradigm opened a more autonomous space for the economy in the relations between politics and economy, it increased the weight of private capital in the economy. With the public shrinkage discourses of

neoliberal economic policies, the state began to transfer some of its previous service areas to the private sector, and this led to a change in the relations between the state and the citizen based on mutual rights and duties. Neoliberal economic policies, including elements such as privatization, deregulation, globalization, free trade, monetary policy, austerity policies and reduction of state expenditures, and the transition to an outward-open growth strategy have made the country's domestic political environment vulnerable to the effects of cyclical economic fluctuations. For this reason, this study, which deals with the relationship between voter behavior and macroeconomic data, covers the years 1980 and 2019, which was the last election year at the time of the application.

The results of the cross-sectional dependency test show that voters who vote in general and local elections are sensitive to variables such as unemployment, inflation and economic growth, and that they attach great importance to economic events in the elections. In this context, voters in Turkey react with their votes to this situation, especially when there is an improvement or deterioration in basic macroeconomic indicators. Accordingly, voters in Turkey are affected by macroeconomic indicators in both general and local elections and reflect this effect on the vote rates of political parties. This result also constitutes one of the important findings of the study. Moreover, as a result of the analysis, it is seen that the influence level of political parties on the vote rates is different from each other. This situation is also important in terms of reflecting the economic perspective of the voters. Accordingly, voters hold the party in power in the period between two elections responsible for the positive or negative changes in economic indicators and take into consideration the performance of this party in the past period. As a result of these findings, it is observed that individuals follow current economic events and hold the party in power in the period between two elections responsible as the implementer of these events. As a matter of fact, the fact that the votes of the party in power tends to decrease in the period between two elections in times of economic crisis supports these results. In addition, the results obtained from the study support the economic voting theory and responsibility hypothesis. However, the results obtained using statistical methods and supported by numerical data reveal the reliability of the results and the unique contribution of the study to the literature. Because, in the studies examined in the literature, no other study supported by statistical methods was found.

Another important finding of the study is that voters continue their economic behavior in local elections. In local elections, the candidate factor generally comes to the fore and voters evaluate the candidate a priori and reflect their preferences. However, the existence of a cross-sectional dependence between local elections and macroeconomic variables reveals that the voters also reflect their economic voting behavior on local elections. This indicates that the voters who vote in both general and local elections prioritize their economic welfare. In periods when their welfare increases and stability in the economy is achieved, individuals generally do not change their preferences and expect the stability environment to be maintained.

The study does not necessitate Ethics Committee permission.

The study has been crafted in adherence to the principles of research and publication ethics.

The authors declare that there exists no financial conflict of interest involving any institution, organization, or individual(s) associated with the article. Furthermore, there are no conflicts of interest among the authors themselves.

In the study, the contribution rate of the first author is 60%, and the second author's contribution rate is 40%.

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