CAUSALITY RELATIONSHIP BETWEEN MUNICIPAL EXPENDITURES AND ECONOMIC GROWTH

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Abstract

Fiscal localization consist of service and income distribution and service distribution requires expenditure. When we look at empirical studies about the subject; the opinion that municipalities should be more effective in expenditure decisions suggests that the service distribution will affect economic growth positively. However, there are also studies that argue against this, or that there is no relationship between service distribution and economic growth. In this study, the causality relationship between economic growth and expenditures of integrated municipalities in Turkey during the period of 2006-2017 has been investigated. In this way, it will be analyzed whether service distribution has an effect on economic growth. The causality relationship has been examined by the Granger Causality Test based on the VAR model and the Granger Causality Test based on the Toda-Yamamoto approach. As the result of the analysis, no causality relationship has been found between the variables in the model. The findings indicate that in Turkey service distribution does not affect economic growth in terms of causality in the period under review.

Keywords: Municipal expenditures, fiscal decentralization, economic growth, granger causality.

1. INTRODUCTION

There are different opinions in the literature on the effect of fiscal decentralization, which can be defined as municipalities having some authority for local common activities, on economic efficiency and economic growth. Fiscal decentralization consist of service and income division and service
division requires expenditure. The view that the municipalities can be more effective in expenditure decisions and that they can take into consideration the local preferences more suggests that the service division will increase the economic efficiency. On the other hand, there are opinions that argue that service division may create some disadvantages due to causes such as lack of full operation of the market mechanism, the failure to comply with the principle of locality, failure to determine the optimal service area, existence of externalities, the inability to take the advantage of the scale economy, the lack of institutional and administrative structures of the municipalities, and coordination problems that municipalities may live with the central government. This leads to social welfare losses and affects economic growth negatively.

In this study, the causality relationship between economic growth and the expenditures of integrated municipalities in Turkey has been investigated. By this way, it will be analyzed whether the fiscal decentralization (service division) has an effect on economic growth.

2. FISCAL DECENTRALIZATION: SERVICE DIVISION

Fiscal decentralization refers to the fact that local governments have an independent authority from the central government in order to be able to supply (provide) local common services. A wide variety of definitions have been made on this subject. However, there is no agreed definition (Akman, 2018: 116). In general, fiscal decentralization is the authorization of local governments (municipalities) for local common needs. In other words, it is the transfer of decision-making authority to the subordinate units. Thus, with fiscal decentralization, the local government units are provided with the income and expenditure autonomy, and the goods and service demands of the people living in the region or district can be met more effectively (Yüksel, 2013: 193).

There are two branches of fiscal decentralization: Service division and income division. With the division of services between the central government and local governments, it is determined that which public goods and services will be supplied and which expenditure responsibilities will be assumed (Gündüz and Agun, 2009: 230). In other words, the authority to determine the division of expenditure responsibilities and expenditures is left to local governments. Income is needed for each expenditure (Yüksel, 2013: 193). In this context, income division is to determine the self-incomes of the local governments themselves (Gündüz and Agun, 2009: 235) and to have the authority to determine their division of income sources and their incomes. Both responsibilities of expenditure and income are important indicators of the effectiveness and power of fiscal decentralization (Yüksel, 2013: 193).

The factors that make fiscal decentralization popular today arise from different points. The first of these is the spread of democratic participation to the whole society, due to the more internalisation of the democracy in the countries. The second is globalization which has created a market space that now abolish national identity. The third is, according to economists, the analogy of fiscal decentralization that the higher the income, the more desirable is the “superior good”. The final is the redivision of income to the poorer regions from the richer regions through the tax system and expenditure programs as income, information flow and income levels between regions increase in the countries. Due to these factors, studies on fiscal decentralization have been intensified in recent years (Tanzi, 2002, 17-8). In this framework, it is thought that with fiscal decentralization, local governments – especially the municipalities - will be able to use the public resources more effectively and efficiently. Namely, fiscal decentralization will increase economic performance by enhancing the effectiveness of public service supply (Oates, 1999: 1123-4). On the other hand, there are opinions that argue that service division may create some disadvantages due to causes such as lack of full operation of the market mechanism, the failure to comply with the principle of locality, failure to determine the optimal service area, existence of externalities, the inability to take the advantage of the scale economy, the lack of institutional and administrative structures of the municipalities, and coordination problems that municipalities may live with the central government (Gündüz and Agun, 2009: 233-35; Neyapti,
This situation may lead to social welfare losses and consequently the economic growth may be adversely affected.

In the literature, empirical studies on the effect of fiscal decentralization on economic growth have yielded different results. For example, Davoodi and Zou (1998), Zhang and Zou (1998), Sağbaş, Kar and Şen (2005), Tosun and Yılmaz (2008) found a negative relationship between fiscal decentralization and economic growth in the periods and countries that have studied; Akai and Sakata (2002), Stansel (2005), Lin and Lui (2000), Jin and Zou (2005), Yüksel (2014) and Neyaptı (2005) found that there is a positive relationship between the variables in question. In addition, İlim (2005) have found that the relationship between fiscal decentralization and economic growth is statistically significant; Xie et al (1999) have found that the coefficients of local expenditure rates which they used as a indicator of fiscal decentralization, were statistically insignificant.

3. DATA AND METHODOLOGY

In the investigation of the causality relationship between economic growth and the expenditures of integrated municipalities in Turkey, quarterly data for the period of 2006Q1-2017Q4 of the relevant variables are used. Time series related to municipal expenditures has been taken from TR Ministry of Finance Directorate General of Public Accounts website and time series related to GDP has been taken from Turkish Statistical Institute’s (TÜİK) website. The municipal expenditure series has been made real by the real GDP index based on 2010, which is taken from IMF-IFS (International Financial Statistics) and then a seasonal adjustment has been performed using the Census X-12 method. The natural logarithm of this series (Lex) is used in the model. On the other hand, seasonal adjustment has been applied to the GDP series and natural logarithm (Lgdp) of this series has been also used.

In the methodical framework of the study, the stationarity of the series related to municipal expenditures and GDP variables is tested with ADF, PP and Ng-Perron Unit Root Tests. In ADF Unit Root Test developed by Dickey and Fuller (1979), it is shown whether the time series variables can be explained by the autoregressive (AR) process or not. In order to understand the kind of process that time series pass through, when a regression model is constructed between the values of the period \( t \) and the value of the period \( t-1 \), this model becomes first-level autoregressive model (Enders, 2003, 211-221). The large model used in the ADF unit root test is:

\[
\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + \sum_{i=2}^{p} \beta_i \Delta Y_{t-j+1} + \epsilon_t
\]

In this model, \( p \) represents the lag lengths and is determined by information criteria such as AIC or SIC. ADF unit root test depends on the estimation of this equation by the least squares method and the determining of estimated value and standard error of \( \delta \) and thereby \( \tau \) test statistic is calculated. In decision phase, \( \tau \) test statistic is compared with the critical values in the tables designated for three different regression equations according to various sample volumes in Dickey and Fuller (1979). Accordingly, if the absolute value of the \( \tau \) test ( \( |\tau| \) ) is greater than the critical value, the basic hypothesis that states the time series in question is not stationary is rejected and it appears that series is stationary.

Equation (1) in the ADF unit root test is also used in the PP unit root test. However, in PP unit root test, the high-level autocorrelation problem of ADF unit root test is addressed with adjustments by adding the various variations of lagged terms to the model. At the same time, the main advantage of the PP unit root test is that it changes in the t-statistics (Awan, Anjum and Rahim, 2015: 386).

On the other hand, it has been stated that traditional unit root tests such as ADF, PP and KPSS have some disadvantages. These disadvantages are; if the autoregressive roots of the equations for these
unit root tests are close to one or less than one, these tests have a relatively low power; if in the implementation of these tests, the moving average roots approaches to -1, it causes to sample volume distortion and this distortion affects selected lag length (Estevé and L-Lopis, 2005: 2330). The Ng-Perron unit root tests have been developed to correct the size division distortion that occurs in the volume of error term seen in traditional unit root tests, and are generally more accurate tests. In this direction, in order to compare the results obtained from ADF and PP unit root tests, the stationarity of the series will also be examined by the Ng-Perron unit root test. Ng-Perron unit root test includes four different tests, namely $MZ_\alpha$ which is the modified one of Phillips-Perron $Z_\alpha$ test, $MZ_t$ that is the modified version of Phillips-Perron $Z_t$ test, $MSB$ that is the modification of Bhargava (1986) statistic and $MPT$ which is the modification of ERS Point Optimal statistic (Perron and Ng, 1996: 437).

After determining the stationarity levels of the series belonging to the variables in the model, the Granger Causality Test will be performed based on the VAR model where the stationary forms of the series are included. The Granger causality analysis based on VAR model is used to determine whether there is a relationship between two variables and if any, to determine direction of relationship. The following regression models will be estimated for Granger causality analysis (Granger, 1969, 431):

\[
\text{Lex}_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \text{Lex}_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \text{Lgd}_{p_{t-i}} + \varepsilon_{1t} \tag{2}
\]

\[
\text{Lgd}_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \text{Lgd}_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \text{Lex}_{t-i} + \varepsilon_{1t} \tag{3}
\]

In Equations (2) and (3), the lag length $p$ is determined by using the information criteria contained in the standard VAR model which is estimated between variables. Accordingly, it is tested whether the coefficients of lagged values of the independent variable in the model are equal to zero as a group at a certain level of significance. In this process, it is decided by looking at the F-statistic of the variables in the model as a group (Granger, 1969, 428-429).

In the study, the Granger Causality Test based on the Toda-Yamamoto approach is also used to compare the results of the Granger Causality Test. Thus, it is aimed that the results of causality relationship between expenditures of municipalities and economic growth are robust. In the Granger Causality Analysis conducted by estimating the VAR model, F test is generally used. But, Toda and Yamamoto (1995) showed that the result of the F test used in Granger causality may not be valid because F-statistics does not have a standard distribution in the analyzes conducted with non-stationary series. In this respect, even if the series are not stationary, the VAR model in which the level values of the series are included can be estimated and the standard Wald test can be applied (Toda and Yamamoto, 1995: 225-250). According to this approach, first of all, $k$, which is the appropriate lag length of the VAR model and $d_{max}$ the highest degree of integration of the model variables, are determined. Thus, the VAR model of $[k+d_{max}]$th level is estimated and the Wald test is applied to the first $k$ piece of the coefficient matrix (Çiğ Yavuz, 2006:169). The models in which the level values of the series of the Lex and Lgd variables to which the causality test will be applied according to Toda-Yamamoto approach can be shown as follows:
If \( \forall \lambda_{1i} \neq 0 \) in Equation (4), it is concluded that there is a causality relationship from economic growth to municipal expenditures. If \( \forall \beta_{2i} = 0 \) in Equation (5), it is concluded that there is a causality relationship from municipal expenditures to economic growth.

4. FINDINGS

Results of the Augmented Dickey-Fuller (ADF) Unit Root Test and Phillips-Perron (PP) Unit Root Test regarding the stationarity of the series of expenditures of integrated municipalities in Turkey (Lex) and GDP (Lgdp) are shown in Table 1.

### Table 1. Results of ADF and PP Unit Root Tests

| Variables | ADF \( d(\text{max}) \) | Critical Values | PP \( d(\text{max}) \) | Critical Values |
|-----------|----------------|----------------|----------------|----------------|
| \( \text{Lex} \) | -6.22* (0) | -4.16 -3.50 -3.18 | -6.28* (3) | -4.16 -3.50 -3.18 |
| \( \text{Lgdp} \) | -3.48*** (7) | -4.20 -3.52 -3.19 | -1.87 (2) | -4.16 -3.50 -3.18 |
| \( \Delta \text{Lgdp} \) | -3.12* (1) | -2.61 -1.94 -1.61 | -5.54* (3) | -2.61 -1.94 -1.61 |

**Açıklama:** \( \Delta \) indicates the first difference value, and the values in parentheses indicate the lag lengths. The maximum lag length in the ADF unit root test is taken as 9 and the optimal lag lengths are determined according to Akaike Information Criteria (AIC). In the PP unit root test, the optimal lags are automatically determined according to Newey-West estimator. According to critical values indicated by the package program and indicated by MacKinnon (1996), (*) is statistically significant at 1% significance level, (**) is statistically significant at 5% significance level and (***) is statistically significant at 10% significance level in both tests. The deterministic components (constant and trend) in the model are determined with graphs of the time series.

According to the results of the ADF and PP Unit Root Tests, the \( \text{Lex} \) series appears stationary at 1% significance level. However, it is seen that the level value of the \( \text{Lgdp} \) series is not stationary and becomes stationary after the first difference is conducted. The results of the Ng-Perron Unit Root Test related to the variables in the model are presented in Table 2.
Table 2. Results of the Ng-Perron Unit Root Test

| Ng-Perron Test Statistics | Lex       | Lgdp  |
|---------------------------|-----------|-------|
| MZₜₐ                       | 20.07**   | -6.04 |
| MZₜₙ                       | -3.14**   | -1.71 |
| MSB                        | 0.156**   | 0.282 |
| MPT                        | 4.68**    | 15.04 |

Critical Values

| Ng-Perron Test Statistics | ΔLgdp  |
|---------------------------|--------|
| MZₜₐ                       | -20.56*|
| MZₜₙ                       | -3.20* |
| MSB                        | 0.155* |
| MPT                        | 1.19*  |

Critical Values

| 1%  | -6.04  | -1.71   | 0.282  | 15.04  |
|-----|--------|---------|--------|--------|
| 5%  | -23.80 | -3.42   | 0.143  | 4.03   |
| 10% | -17.30 | -2.91   | 0.168  | 5.48   |

Critical Values

| 1%  | -13.80 | -2.58   | 0.174  | 1.78   |
|-----|--------|---------|--------|--------|
| 5%  | -8.10  | -1.98   | 0.233  | 3.17   |
| 10% | -5.70  | -1.62   | 0.275  | 4.45   |

Açıklama: Optimal lag lengths are calculated by $T^{1/3}$ formulation and in this direction lag length is taken as 4. Critical values are taken from Ng-Perron (2001). (*) indicates that it is statistically significant at 1% significance level, (**) indicates that it is statistically significant at 5% significance level and (***) indicates that it is statistically significant at 10% significance level.

It is seen that the results of Ng-Perron Unit Root Test are parallel to the results of ADF and PP Unit Root Tests. According to this, the Lex series is stationary at the level of 5% significance level and the Lgdp series is stationary at the first-level.

In the continuation of the analysis, VAR model in which stationary forms of the series related to municipal expenditures and GDP variables included, is established and the appropriate lag length of the VAR model is determined with the help of information criteria. The Granger Causality Test based on the VAR model is performed that provided stationarity and stability conditions and the results are presented in Table 3.

Table 3. Results of the VAR Granger Causality Test

|          | F-statistics | Lag | Prob. |
|----------|--------------|-----|-------|
| ΔLgdp ≠ Lex | 2.36         | 2   | 0.31  |
| Lex ≠ ΔLgdp | 1.62         | 2   | 0.44  |

According to the results of the Granger Causality Test based on VAR model, both basic hypothesis that expresses the GDP is not the cause of municipal expenditures and municipal expenditures are not the cause of GDP cannot be rejected. According to this, no causality relationship between municipal expenditures and economic growth can be determined. Results of Granger Causality Test based on Toda-Yamamoto approach are shown in Table 4.

Table 4. Results of Granger Causality Test based on Toda-Yamamoto Approach

|          | $\chi^2$-statistics | Lag $k=2, d_{max}=1$ | Prob. |
|----------|---------------------|---------------------|-------|
| Lgdp ≠ Lex | 3.15            | 3                   | 0.21  |
| Lex ≠ ΔLgdp | 1.41            | 3                   | 0.49  |

When the test results in Table 4 are evaluated, it is seen that the findings in the table overlap with the Granger Causality Test based on the VAR model. According to Toda-Yamamoto approach; the basic hypothesis that GDP is not the cause of municipal expenditures based on the estimation results of Equation (4) and other basic hypothesis that municipal expenditures are not the cause of GDP based on the estimation results of Equation (5), cannot be rejected.
Thus, it has been concluded that there is no causality relationship between municipal expenditures and economic growth in Turkey for the period of 2006Q1-2017Q4.

5. CONCLUSION

As the result of the analysis, no causality relationship between the variables included in the model, i.e. municipal expenditures and economic growth, is found. Findings indicate that in Turkey service division has no effect on economic growth in terms of causality in the period under review.

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