

THE EFFECT OF LOCAL FISCAL VARIABLES ON LOCAL ECONOMIC GROWTH IN TÜRKİYE

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Abstract

The effects of fiscal decentralization, which is a proportional value, on national economic growth and the effects of local expenditures and revenues, which are absolute values, on local economic growth are distinct areas of study. In this study, the effects of local fiscal variables of 81 provinces in Türkiye on local economic growth were tested using the panel data technique for the period 2008–2022.

The findings of the study indicate that local tax revenues, transfer revenues (grants) from the central government, population, and the schooling rate have a significant and positive impact on local GDP. The positive impact of local tax revenues is relatively low, with a value close to zero. While the impact of grants is greater than that of tax revenues, it can be said that population and schooling rates have considerable effects. No significant impact of local public expenditures and other local revenues on local GDP was found. The findings indicate that local fiscal variables in Türkiye should undergo structural transformations to eliminate their inadequacy in increasing local economic capacity.

Keywords: local governments, local decentralization, local economic growth, Türkiye.

1. Introduction

Public goods and services can be national as well as local. It is crucial that local public goods and services are provided by local governments, which constitute a component of the public sector. This is because they offer a number of advantages, including reduced transaction costs and greater resource efficiency, as well as enhanced technical and administrative convenience. In local government economics, the level of autonomy of local governments and the extent of their fiscal capacities have been the main topics of discussion. The concept of fiscal decentralization, which means broadening the spending responsibility and revenue generation authority of local governments, represents a pivotal aspect of these discussions. Although the level of fiscal decentralization varies according to the administrative and political structures of countries, the effect of this level on economic variables also varies. In particular, the effect of a nationally determined fiscal decentralization rate on national economic growth is frequently discussed in the literature. However, regardless of fiscal decentralization, the impact of the fiscal structures of local governments on local economic growth can be ignored. The effects of fiscal decentralization, which is a proportional value, on national economic growth and the effects of local expenditures and revenues, which are an absolute value, on local economic growth are different areas of study.

National economic growth may not be evenly distributed across all regions and provinces of the country. In other words, the rate of economic growth in each region may be contingent upon the structural characteristics inherent to that region. Furthermore, the expenditures and revenues of local governments may also be among the determinants of local growth. Therefore, the aim of this study is to test the impact of local fiscal variables on local economic growth in 81 provinces in Türkiye for the years 2008–2022. While the effects of fiscal decentralization on national economic growth are generally examined in the literature, the originality of this study is hidden in trying to determine the effect of local governments on economic growth at the local level.

The first part of the study, which includes the theoretical explanation, builds a bridge between local government economics and local economic growth. In this context, theoretical discussions in the field of fiscal decentralization within the framework of local public finance are examined. Then, the possible effects of local governments on local economic growth are discussed. In the following section, there is a literature review of empirical studies on the impact of fiscal decentralization and local fiscal variables on local economic growth. In the last part of the study, the effect of local fiscal variables on local economic growth at the level of 81 provinces in Türkiye is tested using the panel data technique, and the findings are presented. The findings are evaluated in the conclusion section.

2. Local government economics for local economic growth

The theoretical foundations of local government economics are the theories of fiscal decentralization or fiscal federalism. According to Tiebout (1956), one of the first-generation theorists working in the field of local government economics, local expenditures have

a larger share than federal expenditures because the majority of public goods and services consist of local goods. For this reason, Tiebout (1956) tried to explain the welfare-enhancing effect of fiscal decentralization under various assumptions, especially that the household has full mobility and full knowledge. Musgrave (1959) revealed that the economic stability and income distribution functions of the public sector should be provided by the central government, while the resource allocation function should be provided by local governments. Oates (1972) also claims that, under the assumption that there are no externalities and economies of scale, the production of local public goods and services that reflect the needs of the local residents will be more beneficial and contribute to the increase of social welfare than the public goods and services that are provided by the central system and that ignore local differences. According to Oates (1999), the provision of public goods and services by local governments, which have more information about the economic and demographic structures of their jurisdictions than the central government, will ensure efficiency in resource allocation and increase economic performance. Brennan and Buchanan (1980) suggest that fiscal decentralization may be a mechanism that limits the expansionary tendencies of the government. Competition among local governments, just like competition in the private sector, can limit the capacity of a monopolistic central government to increase its control over the economy's resources.

Second-generation theorists, on the other hand, draw on research in the field of public choice as well as topics outside the field of public economics, such as principal-agent problems, the economics of information, the new theory of the firm, organization theory, and the theory of contracts (Oates, 2005, p. 349). Second-generation theorists, unlike the first-generation theorists, assume that all actors in the political process seek to maximize their own benefit (in other words, officials do not act solely for the welfare of voters) and that there is no perfect information (Oates, 2005, p. 356).

Although studies that affirm fiscal decentralization by addressing its various aspects are dominant, Prud'Homme (1995) also mentions the possible harms of decentralization. According to Prud'Homme (1995), fiscal decentralization can increase disparities, jeopardize stability, and undermine efficiency. Bahl (1999) similarly mentioned that fiscal decentralization may also cause harm because macroeconomic benefits are provided by the central government, and local financing instruments remain weak.

Although Musgrave (1959) thought that the task of ensuring a stability function, including economic growth, is more efficiently performed by the central government, the current literature also discusses the effects of fiscal decentralization elements on economic growth. Therefore, it is necessary to build a bridge between local government economics and growth economics.

Growth theories are divided into exogenous growth theories, which accept technological development as an external element in the economic growth process, and endogenous growth theories, which accept that technological development is an internal process that occurs as a reaction to market signals. Harrod (1939) and Domar (1946) constitute the first steps of exogenous growth theories. The economic activities of the government are not

included in the Harrod-Domar model, which argues that the savings rate or the productivity of capital should be increased in order to ensure long-term economic growth under the assumption of a closed economy. Although Domar (1946, p. 146) explains in his article that saving and investment fall within the scope of not only the private sector but also the whole economy, including the government, he provides as a justification that the problem of which government expenditures will be considered investments makes it difficult to define. Later, Solow (1956) and Swan (1956) developed the neo-classical growth model. In the neo-classical growth model, which assumes that there is substitution between labor and capital, diminishing marginal returns on factors of production, constant returns to scale, and that population and technology are exogenous, the determinants of growth are capital accumulation, population growth, and technological development. In this model, since the market mechanism is assumed to be sufficient to ensure equilibrium, the role of government is limited, and no direct link is established between government activities and economic growth. The works of Romer (1986) and Lucas (1988) constitute the first steps of endogenous growth theories. These models differ significantly from neo-classical growth models in that they argue that economic growth occurs endogenously through the interaction of some factors in the economy. In endogenous growth models, the main determinants of economic growth are population growth and human capital (Lucas, 1988), technological development (Romer, 1986), and public expenditures (Barro, 1990). The analysis of Barro (1990) is essential in terms of its relevance to the subject of this study. In the model developed by Barro (1990), public services are considered as an input to private sector production, and this productive role of public services creates a positive relationship between the government and growth. Taxes collected for financing government inputs, which provide economic growth as a complement to private capital, have negative effects on the capital accumulation of the private sector. Therefore, when the optimal public expenditure level is exceeded, the distortionary feature of taxes will negatively affect economic growth.

These growth models can also be evaluated in terms of local economic growth. Local governments are a component of the public sector, and there are national growth rates as well as growth rates at the local or regional levels. Therefore, fiscal decentralization indicators at the national level may have effects on national economic growth, as well as local fiscal variables may have effects on local economic growth. In other words, the relationship between the government and economic growth can be examined separately at the national and local levels. Of course, the determinants used when examining this relationship may differ according to the administrative structures of the countries. For example, in some countries, since services such as education, health, and security are provided at the local level, they can be among the determinants of local economic growth (see De Mello, 2002; Bilan *et al.*, 2016; Gunarto, Sentri and Said, 2018). However, mostly in unitary countries, these services are provided by the central government, and the determinants of local economic growth in these countries consist of traditional municipal services such as infrastructure services, social services, and economic enterprises.

It is inevitable that local governments, which provide local public goods and services on behalf of the central government, contribute to economic growth at the local level. Consumption expenditures of local governments will directly affect local economic growth. While the increase in local services will increase regional employment, the fact that local governments are directly involved in the production process will also affect economic growth. In addition, the provision of infrastructure and transportation services by local governments will provide an externality to the private sector, and a crowding-in effect will occur. In some underdeveloped countries, local governments' leadership in the establishment of production cooperatives (especially women's or peasant cooperatives) and providing physical and financial opportunities for the establishment of these cooperatives will also contribute to increasing local production and economic growth. According to Blöchliger and Égert (2013), like other institutional arrangements, fiscal decentralization affects the way firms, households, and public institutions save, invest, spend, or innovate. This may create important consequences for a country's long-term growth potential. Oates (1993) and Martínez-Vazquez and McNab (2006), on the other hand, base the reasons for the positive effect of fiscal decentralization on economic growth on ensuring efficiency in resource allocation and transparency. However, Greasley, John and Wolman (2011), using the State of the Cities Database of 56 Primary Urban Areas in England for the period 1995–2005, concluded that only the service delivery performance of local governments has a positive relationship with the city's jobs growth. In addition, no significant relationship was found between the governance structure, political stability, planning performance, governance capacity, and planning and economic development expenditures of local governments with the jobs growth.

The impact of local governments on local economic growth does not only have a public expenditure dimension. Tax policies implemented at the local level also have effects on local economic growth. For example, it is inevitable that a tax incentive applied at the local level will affect the behavior of companies in that region. At the same time, the fact that local taxes increase voluntary tax compliance is also important for public sector performance. Therefore, just as fiscal variables at the central level have an impact on national economic growth, local fiscal variables also have an impact on local economic growth.

There are studies that link the impact of local governments on economic performance to the level of development of countries. Pommerehne (1976), Oates (1993), and Panizza (1999) concluded that economically developed countries have a greater tendency towards fiscal decentralization. However, such a result does not give an idea as to whether fiscal decentralization will lead to more economic growth in developed or underdeveloped countries. Therefore, Shah (1998) explained that fiscal decentralization has a greater impact on macroeconomic performance in underdeveloped countries. Thießen (2003), on the other hand, concluded that economic growth increases when fiscal decentralization increases from a low level in high-income OECD countries, but that the rate of economic growth decreases when fiscal decentralization continues to increase after a certain peak. In other words, both extreme decentralization and extreme centralization negatively affect economic growth.

3. Empirical literature review

The empirical literature testing the relationship between local government economics and economic growth has mostly examined the effects of fiscal decentralization on economic growth at the national level. In their panel data analysis of 46 developed and underdeveloped countries for the years 1970–1989, Davoodi and Zou (1998) found a negative relationship between fiscal decentralization and growth in underdeveloped countries but could not find this relationship in developed countries. Xie, Zou and Davoodi (1999) concluded that expenditure-based decentralization did not have a significant effect on per capita GDP in the USA during the period 1951–1992. Moreover, the existing spending shares of local and state governments appear to be consistent with growth maximization. Therefore, greater decentralization of public expenditures could be detrimental to growth. Iimi (2005) revealed a significant positive relationship between fiscal decentralization and per capita GDP growth in 7 low-income, 10 lower-middle-income, 12 upper-middle-income, and 22 high-income countries during 1997–2001. According to Thornton (2007), who analyzed 19 OECD countries with average values for the years 1980–2000, when only revenues over which sub-national governments have full autonomy are the measure of fiscal decentralization, the effect of fiscal decentralization on economic growth is not statistically significant. Bodman (2011), using cross-sectional data for 1996 and panel data for 1981–1998 in 18 OECD countries, showed that income-based and expenditure-based fiscal decentralization did not have a significant relationship with economic growth. Blöchliger and Égert (2013) tested the impact of expenditure, income, and tax decentralization on growth for OECD countries using 1970–2011 data and concluded that these variables have a positive and non-linear relationship with GDP per capita; additionally, intergovernmental transfers are negatively related to GDP per capita.

There are also studies that examine the effects of local government fiscal variables on local economic growth. Zhang and Zou (1998) found that provincial government development expenditure was negatively related to local growth in 28 provinces in China between 1978 and 1992. Lin and Liu (2000) tested, through panel data, the positive contribution of fiscal decentralization to local economic growth in 28 provinces in China between 1970 and 1993. Using data from 1985 to 1994 for 26 municipalities (capitals of each state) in Brazil, De Mello (2002) found a positive impact of local government expenditures in areas such as transportation, health, and housing on municipal economic growth. Akai and Sakata (2002) tested the effects of local revenue rate, local expenditure rate, and local own revenue rate on state GDP per capita using a cross-section with the average of years and panel data technique with annual data for the 50 states of the USA in the period 1992–1996 and found that expenditure-based decentralization ensures local growth. Stansel (2005) confirmed the hypothesis that fiscal decentralization increases local economic growth in his test for 314 US metropolitan areas between 1960 and 1990, based on the number of municipalities and counties per 100,000 people instead of local fiscal variables. Akai, Nishimura and Sakata (2007) used the maximum likelihood method for the 50 states of the USA with data from 1992–1997 and found an inverted-U-shaped

relationship between fiscal decentralization and state economic growth. Since the optimal degree of fiscal decentralization in this quadratic relationship is, in some cases, higher than the average of the data, more decentralization is recommended for economic growth. Poulson and Kaplan (2008) tested the effect of local tax structure in states of the USA for the period 1963–2004 and found that higher marginal tax rates and income taxes had a negative effect on economic growth in the states, while greater regressive taxation had a positive effect. Grassmueck and Shields (2010) found that regions with relatively fragmented governments had a greater positive impact on economic growth in metropolitan statistical areas (MSAs) in the United States for the years 1992–2002. Samekto (2012) stated that budget decentralization had a significant impact on local economic growth in 29 residences and 9 cities in Indonesia/ East Java for the years 2004–2007. Bilan *et al.* (2016) tested the impact of local expenditure types for 42 Romanian provinces and found that both the total local expenditure and local expenditure types had a negative impact on local economic growth between 2007 and 2013. Ma and Mao (2018) explained that the province-managing-county (PMC) reform in China led to a significant increase in the local growth rate in 2001–2011, and the PMC reform encouraged county governments to impose a lower tax burden on firms and increase infrastructure construction expenditures. Gunarto, Sentri and Said (2018) tested the impact of local expenditure types on local economic growth for 17 municipalities on Sumatera Island, Indonesia. They found that local government expenditures on education, health, and social affairs have a positive and significant effect, while housing expenditures have a negative and significant effect; government expenditures on agriculture and transportation have no significant impact on local economic growth. Subroto and Baidlowi (2022) tested the impact of funding decentralization on local economic growth between 2009 and 2018 for 38 cities/counties in the East Java region of Indonesia. Accordingly, it has been shown that decentralization of funding sources can significantly increase local economic activities and regional economic growth. Pham *et al.* (2022), using the GMM Panel technique with data for the period 2011–2019 for 61 provinces and cities in Vietnam, showed that local government expenditures and quality of public administration positively affect local economic growth.

In the literature, the effect of fiscal decentralization on economic growth has mostly been examined at the national or regional level. For this reason, the independent variables in these studies have generally been the shares of total local fiscal variables in the total economy or in the total public sector. The difference between this study and others is that it examines the impact of a province's direct local fiscal variables (not their share in the economy) on the GDP of that province. Therefore, the main purpose of this study is not to test the effects of fiscal decentralization but to test the impact of existing local fiscal variables on the economic growth of that locality. Besides, this study also has common points about the enrichment of variables with some studies. Lin and Liu (2000) and Bilan *et al.* (2016) used the population variable in addition to the fiscal variables to increase the explanatory power of the model, while Zhang and Zou (1998) and Xie, Zou, and Davoodi (1999) preferred the labor force growth rate. A more extensive research group, such as Davoodi and

Zou (1998), Akai and Sakata (2002), De Mello (2002), Stansel (2005), Iimi (2005), Akai, Nishimura and Sakata (2007) and Thornton (2007), used both population and schooling rate as independent variables in their model. In this study, with a similar logic, it was preferred to use the population variable and the schooling rate variable as a proxy for human capital, in addition to local fiscal variables.

4. Local governments and local economic growth in Türkiye

4.1. Local fiscal structure in Türkiye

In Türkiye, local governments provide services such as urban infrastructure (zoning, water and sewage, and transportation); geographic and city information systems; environment and environmental health, cleaning and solid waste; municipal police, fire department, emergency aid, rescue and ambulance; urban traffic; burial and cemeteries; forestation, parks and green areas; housing; culture and arts, tourism and promotion, youth and sports; social services and aid, marriage, vocational and skill acquisition; and development of economy and trade (Law no. 5393/2005, article 14). However, local services and expenditures are not expected to have a major impact on local GDP, both because local governments have little authority to generate revenue and because services that expand economic capacity are provided from the center. As a matter of fact, the share of local expenditures, consisting of only traditional municipal services, in total public expenditures is around 13% on average.

On the other hand, the revenues of local governments in Türkiye are basically divided into two: own revenues and transfers from the central government. The own revenues of local governments are regulated by two important laws. Firstly, according to the Municipality Revenues Law no. 2464/1981, municipality revenues consist of taxes such as announcement and advertisement tax, amusement tax, communication tax, electricity and coal-gas consumption tax, fire insurance tax, environmental cleaning tax, and other fees listed in the same law such as occupation fee, holiday working license fee, spring water fee, brokerage fee, animal slaughtering, inspection and control fee, measuring and weighing instruments inspection fee, building construction fee. The second is the building and land tax revenues regulated by the Real Estate Tax Law no. 1319/1970. However, since local governments in Türkiye do not have political autonomy (i.e., local governments do not have the authority to make laws), the tax rate or amount in the said laws is determined by the central government. Local governments are only authorized to collect these own revenues.

In Türkiye, the share of tax revenues collected by local governments in their total revenues does not exceed 10% on average. This is because the taxes collected by local governments in Türkiye generally have low elasticity and are applied at very low rates or amounts. For example, taxes collected from services with rigid demand elasticity, such as the electricity and coal-gas consumption tax, are not expected to reduce local GDP. Other domestic goods and services taxes (amusement tax, fire insurance tax, announcement and advertisement tax, and environmental cleaning tax) are also not expected to have a reducing effect

on local GDP because they are at very low rates and have a fiscal anesthesia effect. Taxes collected on wealth, such as building tax and land tax, do not have much of a reducing effect on local GDP, as they are property taxes with low-income elasticity, and their rates are quite low. As a matter of fact, the main concern of fiscal decentralization theorists about the tax-assignment problem is the equilibrium deviations that may arise from taxing highly mobile tax bases (especially capital) at the local level. For this reason, it is thought that local governments should focus on benefit taxes (such as property taxes and user fees) rather than non-benefit taxes (Oates, 2005, p. 352). In light of this information, it is expected that the concentration of local government tax revenues in Türkiye on benefit taxes will not negatively affect local economic growth. On the other hand, since the fees are collected in exchange for some services provided by local governments (that is, the fees collected are returned to private sector actors as services) and are small in amount, their tendency to reduce local GDP is low. Therefore, while the taxes collected by the central government (especially those collected on income and consumption) have the potential to reduce GDP, taxes and similar revenues collected by local governments have little potential to reduce GDP at the local level.

Apart from own revenues, there are two revenue transfer mechanisms made by the central government to local governments. The first of these is the equalization grant, which is included in the budget of the Ministry of Finance to be distributed to municipalities with a population of less than 10,000 and is equal to one in a thousand of the finalized total general budget tax revenue collection (Law no. 5779/2008, article 6). The second one is the shares allocated from the general budget tax revenues. Accordingly, a total of 6.5% of the general budget tax revenues are distributed to local government types based on criteria such as population and surface area. In addition, 60% of the 6% of the general budget tax revenues collected in metropolitan provinces are transferred to the relevant metropolitan municipality, and the remaining 40% is distributed to all metropolitan municipalities according to population and surface area criteria (Law no. 5779/2008, articles 2-5).

Since transfers from the center in Türkiye constitute a very significant part (approximately 60%) of local government revenues, they are a determining factor in the expenditures of local governments (in other words, in the provision of local services). For this reason, since transfers from the center are returned to the region as local public services, they have the potential to increase local GDP. This situation also implies the flypaper effect.

When we look at the local fiscal structure in Türkiye in general, we see that the own revenue generation capacity of local governments is weak, they are dependent on transfers from the center, and their spending authority is limited to basic municipal services rather than economic growth services.

4.2. Data set and models

In this study, the effect of local government expenditures and revenues on local output growth in Türkiye is examined, based on the Barro (1990) type assumption that public expenditures should be considered as an endogenous variable in economic growth models.

In this context, panel data analysis techniques were used with data from 81 provinces for the period 2008–2022. The models used in the study are presented in equations 1 to 4.

$$lngdp_{it} = \alpha_0 + \alpha_1 lnlexp_{it} + \alpha_2 lnltr_{it} + \alpha_3 lnlgr_{it} + \varepsilon_{1it} \quad (1)$$

$$lngdp_{it} = \beta_0 + \beta_1 lnlexp_{it} + \beta_2 lnltr_{it} + \beta_3 lnlgr_{it} + \beta_4 lnlor_{it} + \varepsilon_{2it} \quad (2)$$

$$lngdp_{it} = \delta_0 + \delta_1 lnlexp_{it} + \delta_2 lnltr_{it} + \delta_3 lnlgr_{it} + \delta_4 lnlor_{it} + \delta_5 lnpop_{it} + \varepsilon_{3it} \quad (3)$$

$$lngdp_{it} = \lambda_0 + \lambda_1 lnlexp_{it} + \lambda_2 lnltr_{it} + \lambda_3 lnlgr_{it} + \lambda_4 lnlor_{it} + \lambda_5 lnpop_{it} + \lambda_6 lnedu_{it} + \varepsilon_{4it} \quad (4)$$

where $lngdp_{it}$ is local gross domestic product, $lnlexp_{it}$ is local public expenditures, $lnltr_{it}$ is local tax revenues, $lnlgr_{it}$ is transfer revenues (grants) from the central government, $lnlor_{it}$ is other local revenues, $lnpop_{it}$ is population, $lnedu_{it}$ is schooling rate (percentage of high school graduates in the population aged 15 and over), and ε_{it} is an independently and normally distributed error term. The natural logarithm of all variables included in the model was taken. In addition, the economic variables were made real with the base year 2010. The GDP, population, and schooling rate data of the 81 provinces used in the analysis were obtained and compiled from the Turkish Statistical Institute (TurkStat), and the local fiscal variables of the provinces were obtained and compiled from the General Directorate of Accounting of the Ministry of Treasury and Finance of the Republic of Türkiye.

4.3. Econometric methodology

The presence of cross-sectional dependence in the variables used in the panel data analysis should be investigated. In this context, cross-sectional dependence was examined using the CD test developed by Pesaran (2004). The CD test is valid when $T < N$ and the CD test statistic is as in equation (5):

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \right) \quad (5)$$

where $\hat{\rho}_{ij}$ is i, j the residual correlation coefficient. The test statistic has a χ^2 distribution with $[N(N-1)/2]$ degrees of freedom. Under the null hypothesis ‘no correlation between units’, if $N \rightarrow \infty$ and T is sufficiently large, $CD \xrightarrow{d} N(0,1)$.

In the second stage, the stationarity properties of the variables used in the study were examined. In this context, the simple heterogeneous model established by the CADF unit root test developed by Pesaran (2007) is defined as follows (Pesaran, 2007, pp. 268–276):

$$y_{it} = (1 - \phi_i)\mu_i + \phi_i y_{it-1} + \mu_{it} \quad (6)$$

where y_{i0} is the initial value in the equation. y_{i0} has a specific density function with a finite mean and variance. The error term (μ_{it}) has a single-factor structure.

$$\mu_{it} = \gamma_i f_t + \varepsilon_{it} \quad (7)$$

where f_t is the unobservable common effect and ε_{it} an idiosyncratic error. Models (6) and (7) can be restated in model (8).

$$\Delta y_{it} = \alpha_i + \beta_i y_{it-1} + \gamma_i f_t + \varepsilon_{it} \quad (8)$$

Here $\alpha_i = (1 - \phi_i)\mu_i$, $\beta_i = -(1 - \phi_i)$ and $\Delta y_{it} = y_{it} - y_{it-1}$. In Pesaran (2007)'s CADF panel unit root test, the null hypothesis tests the proposition that 'the series of each horizontal section forming the panel contains unit root', and the alternative hypothesis tests the proposition that 'a certain part of the horizontal sections forming the panel does not contain unit root' (Pesaran, 2007, pp. 267–269). The coefficients in model (6) are CADF statistics. The CADF unit root test developed by Pesaran (2007) is based on the test of model number (9):

$$\Delta y_{it} = a_i + b_i y_{it-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + \varepsilon_{it} \quad (9)$$

where \bar{y}_t is the cross-sectional average for the series to be tested for unit root, $(\bar{y}_{t-1}, \bar{y}_{t-2}, \dots)$ is lagged values of the cross-section mean, and $\Delta \bar{y}_t$ is a dummy (proxy) variable that allows cross-sectional dependency to be taken into account depending on the general factor structure (Pesaran, 2007, p. 269).

In order to estimate the models established in the panel data analysis, it is necessary to choose between fixed effects and random effects models. In this context, the Hausman Test, which is frequently used in the literature, was used for the selection in question. One of the main differences between fixed and random effects models is whether unit effects are correlated with independent variables. In the Hausman Test, the null hypothesis is tested as 'there is no correlation between explanatory variables and unit effect'. If the null hypothesis is rejected, the random effects model is not effective and the fixed effects model should be preferred (Baltagi, 2005, pp. 21–22). The existence of autocorrelation and heteroscedasticity problems should be investigated in both the fixed effects model and the random effects model. The presence of autocorrelation in the models was investigated by Baltagi-Wu (1999) LBI (Locally Best Invariant) test. In the test in question, the null hypothesis states that 'there is no first-order autocorrelation'. Accordingly, if the calculated test statistic value is less than 2, the null hypothesis is rejected, meaning that there is autocorrelation in the model. The heteroscedasticity problem in the fixed effects model was determined by the Modified Wald Test. In this test, the null hypothesis was established as 'variances are homoskedastic according to units'. The Wald test statistic fits the distribution with degrees of freedom. It is important to choose the appropriate estimator in case of the above-mentioned problems in estimating the specified models.

4.4. Empirical findings

In this study, the impact of local government expenditures and revenues on local output growth in Türkiye was examined using panel data analysis techniques. In this context, first of all, the existence of cross-sectional dependence in the variables was investigated. The results of the CD test developed by Pesaran (2004) are presented in Table 1. According to the results, there is cross-sectional dependence in all variables discussed in the study. Therefore, a shock occurring in one province also affects other provinces. This

situation was especially considered in the later stages of the analysis and in the estimation of the established models.

Table 1: Variables cross sectional dependency test results

Variables	CD-test	p-value
<i>lngdp</i>	212.17***	0.000
<i>lnlexp</i>	165.63***	0.000
<i>lnltr</i>	209.48***	0.000
<i>lnlgr</i>	210.50***	0.000
<i>lnlor</i>	69.81***	0.000
<i>lnpop</i>	117.32***	0.000
<i>lnedu</i>	212.10***	0.000

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1 CD test
 H_0 : Cross-section independence, $CD \sim N(0,1)$

Source: The authors

The stationarity of the variables used in the study was investigated with the CADF unit root test developed by Pesaran (2007), and the findings are presented in Table 2. According to the findings, all variables except the population variable are stationary at the level.

Table 2: CADF unit root test results

Variables	<i>t-bar</i>	<i>Z[t-bar]</i>	<i>p-value</i>
<i>lngdp</i>	-2.436***	-5.943	0.000
<i>lnlexp</i>	-2.276***	-2.991	0.000
<i>lnltr</i>	-2.231***	-4.264	0.000
<i>lnlgr</i>	-2.510***	-6.542	0.000
<i>lnlor</i>	-2.286***	-4.713	0.000
<i>lnedu</i>	-1.660***	-3.220	0.000
<i>lnpop</i>	-2.304	0.408	0.659
<i>d.lnpop</i>	-3.456***	-14.289	0.000

Notes: CADF test under the null hypothesis of non-stationarity. Critical value 0.10: -2.000, Critical value 0.05: -2.070, Critical value 0.01: -2.190

Source: The authors

In order to estimate the models established in the panel data analysis, basic assumption tests were first conducted, and the findings are presented in Table 3. The Hausman Test was used to choose between fixed effects and random effects models in the panel data analysis. The findings show that the fixed effects model is valid in all models. In addition, the existence of heteroskedasticity and autocorrelation problems was investigated. It was determined that there were both autocorrelation and heteroscedasticity problems in the residuals in all models.

Table 3: Basic assumption tests

	Model 1	Model 2	Model 3	Model 4
<i>Hausman Test</i>	335.42 (0.000)	343.35 (0.000)	211.00 (0.000)	117.61 (0.000)
χ^2	1266.76 (0.000)	1211.48 (0.000)	924.09 (0.000)	1044.8 (0.000)
<i>B-W LBI</i>	0.919	0.906	0.971	1.021

Notes: The values in parentheses are probability values

Source: The authors

In the fixed effects model, the estimator frequently used in the literature in cases where there are autocorrelation, heteroskedasticity and cross-sectional dependency problems is the Driscoll-Kraay estimator. Driscoll and Kraay (1998) derive robust standard errors by making Newey-West type correction to the series of cross-sectional averages. The Driscoll-Kraay estimator can also be used when $N \rightarrow \infty$ and unbalanced panels are valid. In this context, the results of the Driscoll-Kraay estimator are presented in Table 4.

Table 4: Driscoll-Kraay estimation results

Variables	Model 1	Model 2	Model 3	Model 4
<i>lnlexp</i>	-0.010 [0.690]	-0.026 [0.077]	-0.045 [0.071]	-0.011 [0.059]
<i>lnltr</i>	0.079 [0.012]***	0.080 [0.012]***	0.079 [0.009]***	0.063 [0.006]***
<i>lnlgr</i>	0.532 [0.092]***	0.539 [0.096]***	0.409 [0.071]***	0.249 [0.050]***
<i>lnlor</i>		0.012 [0.022]	0.032 [0.018]	0.026 [0.024]
<i>lnpop</i>			1.220 [0.155]***	1.107 [0.158]***
<i>lnedu</i>				0.513 [0.056]***
<i>constant</i>	9.699 [0.624]***	9.667 [0.646]***	-4.606 [2.037]**	-0.214 [2.472]
R^2	0.83	0.87	0.83	0.89
<i>F-test</i>	1403.03 (0.000)	1000.78 (0.000)***	1108.17 (0.000)***	5390.24 (0.000)***

Notes:*** p < 0.01, ** p < 0.05, * p < 0.1. The values in parentheses are probability values. Values in square brackets are Driscoll-Kraay Standard Error values

Source: The authors

The findings show that local tax revenues, transfer revenues (grants) from the central government, population, and schooling rate have a significant and positive effect on local GDP. The positive effect of local tax revenues is close to zero. The effect of grant revenues is greater than that of tax revenues. On the other hand, the most important determinants of local GDP are population and schooling rate. Local public expenditure and other local revenues have no effect on local GDP.

5. Conclusion

Although local governments, which are a component of the public sector, are seen as an alternative to the central government, in practice their complementarity feature predominates. This study tried to analyze the effect of fiscal variables in the current local government structure on the economic growth of that region without taking into account the element of competition between governments. In the panel data analysis conducted with data for the period 2008–2022 for 81 provinces of Türkiye, firstly, only the effect of basic local fiscal variables was examined, and then the results were evaluated by adding variables that may be determinants of local GDP, such as population and schooling rate.

According to the analysis, local government public expenditures do not have a statistically significant effect on economic growth in their provinces. This situation can be explained by the fact that the main determinant of even local economic growth in Türkiye stems from central government services. In other words, since the spending authority of local governments in Türkiye is limited to basic municipal services, it is natural that local public expenditures do not have a stimulating effect on local economic capacity. Our findings on the effect of local expenditures are consistent with Bodman (2011) and Xie, Zou and Davoodi (1999) and with the results found by Davoodi and Zou (1998) for developed countries.

The findings of the analysis show that local government tax revenues have a significant and, albeit very small, positive effect on local economic growth. This result is meaningful when Türkiye's local fiscal structural characteristics are taken into account because local taxes collected in Türkiye have low flexibility. Our findings on the effects of local taxes appear consistent with Blöchliger and Égert (2013) and Subroto and Baidlowi (2022).

In the analysis, the fact that transfers from the central government to local governments (i.e., grant revenues of local governments) have a significant and positive effect on local economic growth is also a result that is compatible with Türkiye's centrally dependent local fiscal structure. However, this result is in contrast with the result of Blöchliger and Égert (2013) on intergovernmental transfers.

The revenues of local governments (representing the sum of enterprise and property revenues, donations and aid received, and capital revenues) other than tax and grant revenues did not have a statistically significant effect on local GDP. This situation can also be explained by the fact that these revenues have a relatively small share in local government budgets and their characteristics are not at a level that expands economic capacity.

The population variable used to expand the explanatory nature of the model and the schooling rate variable as a proxy for human capital also met theoretical expectations. Population growth in the provinces of Türkiye has a strong effect on increasing the GDP of the province in question. Likewise, as the schooling rate of provinces increases, local GDP is positively affected. Our finding on the population variable is consistent with De Mello (2002), Stansel (2005), and Thornton (2007), while our finding on the schooling rate is consistent with Thießén (2003), Iimi (2005) and Akai, Nishimura and Sakata (2007).

The results of the analysis generally reflect the effects of weak fiscal decentralization in Türkiye. This shows that the main determinants of local economic growth are not the fiscal variables of local governments. For this reason, a transformation of the local fiscal structure in Türkiye seems to be essential at this time when the importance of local governments has increased. In order to achieve this transformation, the spending powers of local governments (especially their powers to increase local economic capacity) and, in proportion to this, their powers to generate revenue should be expanded. Thus, vertical fiscal equalization will be ensured.

Although local governments in Türkiye do not have the authority to make laws, the initiative to determine the tax rate/amount within a lower and upper limit of the revenues that local governments are authorized to collect in the laws prepared by the central government should be left to local authorities. In this way, a local tax policy suitable for the economic characteristics of the region will be implemented, and a tax competition environment will be created between local governments. In addition, coordination between local governments and the Ministry of Commerce should be institutionally strengthened, and local governments should be given a greater role in the formation of a high value-added production ecosystem.

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