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How to Enhance the Fiscal Performance of Municipalities: A Nonlinear Examination of Turkish Metropolitan Municipality Experience

Summary: We investigate the effects of metropolitan municipal expenditure and revenue on fiscal performance using linear and nonlinear panel data analyses. The empirical results of the nonlinear analysis, which constitutes the original value of our study, indicate that the deterioration in fiscal performance due to investment expenditures is lower when the current budget balance exceeds the estimated threshold level. However, the effect of municipal own-source revenue on budget balances differs in terms of the level of dependency on the central government. The fiscal policy reflections of our findings underline the importance of optimizing expenditure and savings levels and reducing dependency on the central government to enhance the fiscal performance of metropolitan municipalities.

Keywords: Fiscal performance of local authorities, Metropolitan municipality, Municipal debt, Municipal expenditure and revenue, Panel threshold model.

JEL: C23, H70, H77.

Measuring fiscal performance is important for maintaining a sustainable economic structure. Countries employ various methods to measure their budget performance and plan their medium- and long-term fiscal policies. Measuring the fiscal performance of local governments with fiscal autonomy to strengthen their fiscal policies has become critical for both local and central governments.

Our study evaluates fiscal performance and solvency in the metropolitan municipalities of Türkiye, which have huge investment expenditures, together with revenue dependency on the central authority and increasing pressure on fiscal sources. In 2014, Türkiye restructured the local government system by adopting a new metropolitan municipality model for 30 provinces. This change, along with the extension of the service responsibilities of metropolitan municipalities at the provincial level from the municipal level, which covered a smaller geographical area, resulted in a deterioration in municipality budgets.

We aim to empirically examine the fiscal performance of 30 metropolitan municipalities in the period 2015-2021 by assessing the impact of expenditure and

revenue components using linear and nonlinear approaches. Based on the findings of the linear fixed-effects model, we conclude that all components of municipal expenditure have a significant effect on budget balance, which is specified as an indicator of fiscal performance. However, the impact of investment expenditure is particularly notable compared with that of operational and transfer spending. From the revenue perspective, we find evidence supporting the corrective effect of the components of municipal total revenues classified as total own-source revenues and the municipal revenue share from central government taxes on the budget balance.

We employ the panel threshold model from (Bruce Hansen 1999) to develop our empirical findings from the linear analysis in light of the relevant theory and literature. The nonlinear analysis focuses on two research questions: 1) the variations in the deterioration of the budget balance due to the increase in investment expenditure with respect to the threshold levels of the current budget balance, and 2) the healing effect of metropolitan municipal total own-source revenues on fiscal performance in different regimes defined by the level of dependency on the central government. The findings indicate that when the current budget balance exceeds the estimated threshold level, the investment expenditure of municipalities has a less deleterious effect on the fiscal balance. Furthermore, regarding the second research question, we reveal that the effect of municipal own-source revenue on budget balance is positive in the first regime in which the revenue share of the central government is below the threshold value. However, in the second regime, in which the revenue share exceeds the threshold, we reveal the improving effect of the total own-source revenue of metropolitan municipalities on fiscal performance. The novelty of our study is that it contributes to the literature by analyzing the revenue and expenditure determinants of fiscal performance for Turkish municipalities, and also by examining the relationship among levels of selected fiscal indicators in a nonlinear framework.

The first section explores the theoretical aspects and provides a literature overview of expenditure- and revenue-related fiscal discussions. The second part gives a brief overview of the Turkish local government system and municipalities following the recent structural changes. Next, we present the empirical data obtained using the methodology and findings. Finally, we discuss the empirical results and conclude the paper.

1. Literature Overview

The fiscal structure and sustainability of local governments have been widely discussed in literature over the past 15-20 years, with emphasis on the increasing budget deficits and debts. The theoretical background of these discussions is twofold: first, the fiscal autonomy of local municipalities with regard to their dependency on the central government, and second, the current budget balance dynamics.

Discussions on fiscal autonomy can be traced back to the decentralization issue, which is the sharing of expenditures and resources between the central and local governments. Researchers have long held that the efficient allocation of resources reveals the importance of local governments in terms of decentralization (Charles M. Tiebout 1961; Wallace E. Oates 1968; Richard A. Musgrave 1969). Specifically, fiscal decentralization involves imposing taxing and spending power on local governments. In this

case, the degree of decentralization depends on both the number of delegated resources and their management. For example, sovereignty is greater if local governments can make decisions on taxation and allocation of funds, and if they have some level of discretionary power when using grants that have been allocated to them (International Monetary Fund 2019). Fiscal decentralization provides greater policymaking power to local governments, and its impact on the provision of public goods depends on the quality and nature of local institutions (Sarmistha Pal and Zaki Wahhaj 2017).

However, in addition to general policies such as eliminating regional inequalities, central governments in many countries have recently begun to limit local authority, especially on resource sharing, due to increasing macro-financial crises and the rapid deterioration in the fiscal structures of local governments with a high debt burden and budget deficits. Intergovernmental transfers are important sources of revenue for local governments. Transfers play a role when local own-source revenue is considered inadequate or inappropriate for funding local governments' expenditure responsibilities (Harry Kitchen, Melville McMillan, and Anwar Shah 2019). When local governments' own-source revenues are inadequate to finance expenditures necessitated by the assignment of local responsibilities, intergovernmental transfers (grants) are required to compensate for this gap.

There are different approaches to fiscal transfers from the central government to local administrations as well as different effects of these transfers. The widely recognized flypaper effect highlights the increasing dependence of local administrations on financial transfers from central administrations, thus negatively affecting efforts to consider other sources of income. Consequently, studies have focused on how to make fiscal transfers to local administrations without creating an undue burden on the central government's budget. The existence of the flypaper effect may adversely affect local governments' fiscal autonomy. In addition, because municipalities (as decentralized units) are responsible for providing services, factors affecting the quality of these services should be handled carefully. As such, the income structure of municipalities and the sustainability of this structure are crucial, considering the effect of the status of fiscal sources on the quality of services (Oktay Kızılkaya, Mehmet Dağ, and Selim Demez 2018).

In the recent literature on the fiscal performance of municipalities, Javier Cifuentes-Faura, Mihaela Simionescu, and Beata Gavurova (2022) examined the factors influencing fiscal deficits in Spanish municipalities over the period 2011-2020, with a focus on socioeconomic and political determinants such as GDP per capita, unemployment rate, population size, political participation, and the political alignment of governing parties. Using the methodology of moment quantile regression (MMQ) and Mean Group (MG) estimators, this study analyzes both overall and segmented data, which provides evidence supporting the causality between deficits and explanatory variables. The findings indicate that economic growth reduces deficits across quantiles in the long term, whereas unemployment consistently increases deficits in the short and long term. High political participation and right-wing governance are associated with increasing deficits in the higher quantiles. The works (Guillamón López et al. 2021; Cifuentes-Faura, Bernardino Benito López, and María-Dolores Guillamón López 2022; Ana-María Ríos et al. 2022; Cifuentes-Faura, Simionescu, and

Monika Hudakova 2024) discovered that regarding the impact of political dynamics such as the gender of mayors, a causal link between political parties and debt exists in municipalities with male mayors, whereas higher unemployment rates are linked to deficits. Furthermore, they highlighted the adverse socioeconomic impact of political corruption on municipal revenue. Considering these empirical findings, the literature suggests several policy implications for improving municipal governance and fiscal responsibility. It was also asserted that effective policy implementation requires the efficient use of financial resources. Enhancing the efficiency of public services allows for savings and reduces the cost of service delivery.

In this context, although the analysis of fiscal autonomy is based on various aspects as mentioned above, the literature particularly refers to the flypaper effect, which is summarized in Table 1.

Table 1 Literature Overview (Flypaper Effect)

Author	Sample	Methodology	Findings
Edward M. Gramlich and Harvy Galper (1973)	Ten states of the US (1954-1972 quarterly data and 1962-1970 annual data)	Time series and cross section analysis	Pure lump-sum transfers are likely to stimulate local expenditure for each dollar of grant.
Geoffrey K. Turnbull (1998)	5 states of the US	Monte Carlo simulation	There are positive and negative results of flypaper effects.
Andrew C. Worthington and Brian E. Dollery (1999)	176 provinces of Australia	Panel regression model	There is no significant flypaper effect.
Ligia Melo (2002)	Colombia (1980-1997)	Panel data models and alternative functional forms	Local governments are highly dependent on intergovernmental transfers.
Brian Knight (2002)	48 municipalities of the US (1983-1997)	Panel data analysis	There is a statistically significant flypaper effect on intergovernmental transfers in US municipalities.
Bev Dahlby and Ergete Ferede (2016)	Canadian provinces (1981-2008)	Panel data, OLS, 2SLS, LIML	Grants lead to stimulative effects that increase marginal cost of public funds.
Julia Darby, V. Anton Muscatelli, and Graeme Roy (2005)	15 OECD countries (1970-1999)	Panel data analysis	The flypaper effect is evident in OECD countries. Flypaper effects change by demand and price elasticity.
Andrew Abbott and Philip Jones (2012)	23 OECD countries (1995-2006)	Panel data analysis	There is a statistically significant flypaper effect on intergovernmental transfers.
Elena Gennari and Giovanna Messina (2014)	Italy (1999-2006)	Panel data analysis	There is strong flypaper effect on Italy's public policy.
Deniz Aytac (2015)	Türkiye (2006-2014)	Panel data analysis	There exists flypaper effect on intergovernmental transfers.
Maarten A. Allers and Wouter Vermeulen (2016)	419 municipalities of the Netherlands (1992-2010)	Panel data analysis	Changes in grants to Dutch municipalities due to a reform of the equalization system fully capitalize into house prices.
Stijn Goeminne, Carine Smolders, and Elke Vandorpe (2017)	Belgium Flemish local government (1995-2012)	Panel data analysis	Fiscal restriction stimulated the sensitivity of local spending to grants.
Sangsoo Lim, Sanghoon Lee, and Pilhyun Kim (2017)	South Korea municipalities	GMM analysis	Flypaper effect does exist in Korea. When grants decrease, local government expenditure do not decrease.
Kızılkaya, Dağ, and Demez (2018)	Türkiye (2007Q1-2017Q1)	Artificial neural networks and cointegration analysis	In the long-term, flypaper effect is valid for the Metropolitan Municipalities.
Cihan Yüksel (2021)	Turkish municipalities (2008-2017)	Panel data	Grants have a stimulatory effect in Türkiye.

Source: Compiled by the authors.

The problem of how to measure financial performance is also included in the discussions on strengthening the financial structures of local governments. In this sense, the budget deficit, which is defined as the difference between total income and expenditure, is one of the most important key indicators. This is a common feature in most classical definitions of public deficit. This means that while preparing the budget balance, equal weight is given to almost all revenue and expense transactions. This results from the assumption that when measuring financial performance, the income and expenses of the institution are equally important. On the other hand, there are alternative deficit concepts in which the transactions carried out by the institutions are weighed differently according to their importance; as such, budget deficits are measured and analyzed accordingly. The foremost method for defining budget deficit when measuring the financial performance of local governments is the current budget balance, which is the difference between current revenue and current expenditure. When positive, it suggests that the institution can at least finance consumption from its own revenue (IMF 1995). The conventional deficit measures the difference between public investment and public saving. In order to isolate public (dis)saving, the current deficit calculation omits investment outlays and capital revenues (Mario I. Blejer and Adrienne Cheasty 1991). This budget deficit method measures both the level of regular income that meets the regular expenditures and the level of the resources to be allocated for investments. In this context, capital budgeting is especially important in terms of how the investment will be financed.

Our study differs from the current literature in terms of the non-linear analysis of the flypaper effect from a sophisticated perspective, which inquires whether the positive effect of own-source revenues on the budget balance is still valid above a certain level of fiscal dependency on the central government. However, this is the first contribution to the literature discussing the impact of the current budget balance on the nexus between investment expenditure and fiscal balance.

2. An Overview of the Turkish Local Government System and Municipalities

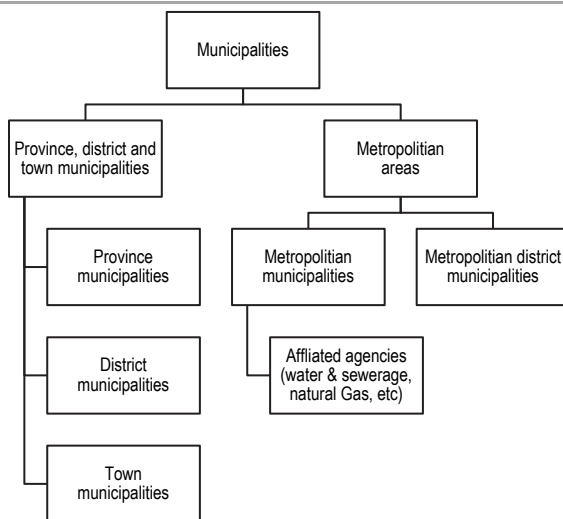
The system of Turkish administration is based on the Unitarian State, whose philosophy rests upon “the principle of unity of the administration”. The administrative structure is accordingly split into central and local administration. The constitutional law reflects “the principle of the unity of the administration”, which determines the division of responsibilities in the sense that “the administration is a whole and the roles and functions of the local administrations should be explicitly listed in the regulations governing their activities and the central administration has the right to exercise its tutelage over the local authorities” (Turkish Constitution, Articles 123, 126, 127, The UN Refugee Agency 2023). Constitutional law defines local administrations as public legal entities seeking to serve the common local interests of the inhabitants of provinces, cities, or villages and the principles of establishment as well as the decision-making organs that have been determined by law. Accordingly, municipalities are elected publicly.

These articles also imply that the responsibilities of the central administration cover areas for which local authorities are also responsible. Therefore, it is necessary to bear in mind that there are overlaps and similarities in the roles and responsibilities of central and local administrations are quite common, especially in the provision of social services.

There are 81 provinces in Türkiye with 51 special provincial administrations (following code 6360, there are no longer special provincial administrations in 30 metropolitan provinces) and 1397 municipalities. Local government administration in Türkiye consists of municipalities, special provincial administrations, municipal-affiliated agencies, local government associations, development agencies, and villages. Within this framework, as of 2018, local authority units have been categorized as either special provincial administrations or municipalities. Municipalities are local authorities whose mayors and decision organs are elected by the local electorate. In terms of their size, municipalities are divided into metropolitan municipalities, province municipalities, district municipalities and town municipalities. Water and sewage, as well as natural gas services in all metropolitan municipalities, as well as transport services in some metropolitan municipalities, are provided by separately established administrations called affiliated agencies.

Regarding Law No. 6360, approved in 2012 and put into effect in 2014, metropolitan municipalities are responsible for providing local services to the entire area within the province boundaries – an area (including rural settlements) that had previously been served by the now abolished Special Province Administration. With the new law, the number of metropolitan cities has increased from 16 to 30, and the metropolitan municipal border has been reestablished as a provincial border. Special provincial administrations and smaller municipalities (1554) were abolished in the provinces where metropolitan municipalities were established, and all villages in metropolitan areas were recategorized as neighborhoods. Thus, the percentage of the Turkish population residing in metropolitan cities rose from approximately 45 percent to 83 percent overnight (H. Hakan Yılmaz, M. Ferhat Emil, and Baki Kerimoğlu 2017). This led to a regional administration modality at the provincial level. Both metropolitan and metropolitan district municipalities are present in 30 provinces. Some of the local and common services are provided by the metropolitan municipalities (for example, local public transportation services and firefighting services); some are distributed between the two levels (for instance, the master development plan may be prepared by the metropolitan municipality while the development plan is prepared by the district municipalities, or the collection of solid waste is undertaken by the district municipalities, while storing and elimination is handled by the metropolitan municipalities); and some are provided by all levels (funerals, burials, and cemetery services). However, in general, the main local infrastructure of provinces is under the authority of metropolitan municipalities.

Municipalities are public legal entities with administrative and fiscal autonomy, and their constituents elect their decision-making bodies. Their primary purpose is to satisfy the common local service requirements of the inhabitants of a county. There are five types of municipalities based on their respective duties and areas of responsibility: metropolitan, metropolitan district, city, district, and town (Figure 1).



Source: H. Hakan Yılmaz (2013).

Figure 1 Structure of Municipalities in Türkiye

From the perspective of municipalities, and as demonstrated in Table 2 below, between 2015 and 2021, the share of municipal expenditures within total public expenditures varied from 7,3-10,3 percent, whereas these were as low as 2,9-3,9 percent where own-source revenues were concerned in total revenues. This is a clear indication of the dependency of municipal spending on central tax revenue shares to both central government decision and also central government tax performance.

Table 2 Municipalities' Shares in General Government Revenues and Expenditures from 2015-2021 (Million TRY)

	2015	2016	2017	2018	2019	2020	2021
Total general government revenues	799.1	904.3	1.028.1	1.238.5	1.429.2	1.636.6	2.239.4
Municipal own revenues	28.4	32.7	40.1	43.3	43.1	47.6	65.2
Own revenue shares in total revenues (percent)	3,55	3,63	3,90	3,50	3,02	2,91	2,92
Total general government expenditures	801.5	940.4	1.085.4	1.327.1	1.560.8	1.835.3	2.430.8
Municipal expenditures	73.7	91.2	112.0	132.0	123.3	134.5	183.9
Share in total expenditures (percent)	9,2	9,7	10,3	9,9	7,9	7,3	7,5

Source: Compiled by the authors.

The primary issue with the metropolitan municipality model, revised under Turkey's Law No. 6360, is the absence of a legislative and administrative framework that considers the differences among municipalities. Major metropolitan cities like Istanbul, Ankara, and Izmir stand out from 27 other metropolitan cities in terms of population, economic development, and demand for local services. During the period in question, these three cities represent roughly half of the total expenditures of metropolitan municipalities. When municipal companies are included, this share rises to nearly 60 percent.

Additionally, some new metropolitan cities, particularly those with rural economies, experience difficulties delivering services across the entire province, planning and implementing rural and urban services, and investing in infrastructure under the new governance model. Therefore, the governance model's failure to consider the significant differences between metropolitan cities, along with disparities in institutional capacity and access to financing, also affects the quality of local services.

3. Research

3.1 Data and Model

Our study focuses on the main fiscal aspects of the budget balance of all 30 metropolitan municipalities in Türkiye from 2015 to 2021 following a change to the metropolitan municipal administration system in accordance with Law No. 6360. We use fiscal performance indicators together with expenditure and revenue data obtained from the following three sources:

- Ministry of Treasury and Finance Metropolitan Municipality Budget Statistics (Republic of Türkiye - Ministry of Treasury and Finance 2023).
- Turkish Court of Accounts Metropolitan Auditing Reports (Turkish Court of Accounts 2023).
- Metropolitan Municipalities' Activity Reports (Annual).

The dependent variable, municipal budget balance, and regressors to explain budget balance were derived according to economic classification. All variables are expressed as a share of the municipal GDP, the details of which are obtained from the Turkish regional accounts database of Turksat (Turkish Statistical Institute 2023). A detailed description of the fiscal indicators at the municipal management level is presented in Table 3¹.

Within the scope of our study, which aims to examine the fiscal performance of metropolitan municipalities through the impact of expenditure and revenue components, we employ panel models for both the linear and nonlinear analysis. It is important to note that in literature, total debt and budget balance series are considered the main indicators of fiscal performance. In our study, we prefer to define the budget balance as a proxy for fiscal performance in order to maintain a consistency between the dependent variable (*bb*) and the regressors in the model, which are also current variables.

The methodological approach of our study has two grounds, one of which is linear and the other nonlinear. In the first step, a linear estimation, which is the structural equation of interest, is specified as follows:

$$y_{it} = \mu_i + \alpha X_{it} + e_{it}, e_{it} \sim iid(0, \sigma^2), \quad (1)$$

¹ Henceforth, we include all variables at the metropolitan municipality level in all estimated models. For instance, our dependent variable, *bb*, implies the budget balance of metropolitan municipalities which is calculated as the difference between total expenditure and total revenue of metropolitan municipalities.

where X_{it} includes the vector of explanatory variables, which are cbb , the components of municipal total expenditures ($opexp$, $invexp$, $trexp$), and the municipal total revenues, composed of the share of central government tax revenues and total own-source revenues ($share$, $ownsource$). We use six regressors in the linear model to estimate the municipal budget balance.

Table 3 Data Description

Dependent variable	Description	Calculation
<i>bb</i>	budget balance	= total revenues – total expenditures (percent of municipal GDP)
Regressors		
<i>cbb</i>	current budget balance	= budget balance – capital expenditure (percent of municipal GDP)
<i>opexp</i>	operational expenditure	= personnel expenditures + social security premium expenditures + purchase of goods and services (percent of municipal GDP)
<i>trexp</i>	transfer expenditure	= current transfers + capital transfers (percent of municipal GDP)
<i>invexp</i>	capital expenditure	= capital expenses (percent of municipal GDP)
<i>totalexp</i>	total expenditure	= operational expenditure + transfer expenditure + capital expenditure (percent of municipal GDP)
<i>tax</i>	tax revenue	= tax revenue (percent of municipal GDP)
<i>share</i>	revenue share from central government	= tax revenue share transfer from central government tax revenues (percent of municipal GDP)
<i>otherrev</i>	other own revenues	= received donation and aid + the enterprise and property revenues + capital revenues (percent of municipal GDP)
<i>totalrev</i>	total revenue	= tax revenue + revenue share from central government + other own source revenues (percent of municipal GDP)
<i>ownsource</i>	Total own source revenue	= tax revenue + other own source revenues (percent of municipal GDP)

Source: Compiled by the authors.

In the second step of the methodological procedure, we proceed with the nonlinear approach in light of both the linear model findings and theoretical discussions to define the municipal budget balance dynamics at different levels of the variables indicated. This nonlinear methodology provides deep insight by analyzing fiscal performance through different levels of current budget balance and own-source revenues. This also leads to an empirical test of the fiscal theoretical background, literature, and practice mentioned in the previous sections. In this framework, we used the panel threshold model from (Hansen 1999) to determine the effects of municipal expenditure and revenue on municipal fiscal performance by considering certain thresholds. This approach enabled us to test the relationship at the threshold level by endogenously dividing the sample into regimes. Using this approach, we estimated two models differentiated according to our research questions regarding expenditure (*Model 1*) and revenue (*Model 2*). The threshold regression models can be presented as

Model 1:

$$y_{1it} = \mu_1 + \alpha_1 X_{1it} + \beta_1 invexp_{it} I(cbb \leq \lambda) + \beta_2 invexp_{it} I(cbb_{it} > \lambda) + e_{1it}, \tag{2}$$

Model 2:

$$y_{2it} = \mu_2 + \alpha_2 X_{2it} + \beta_3 ownsource_{it} I(share \leq \lambda) + \beta_4 ownsource_{it} I(share_{it} > \lambda) + e_{2it}, \tag{3}$$

where $I(\cdot)$ denotes an indicator function. In the specification of panel threshold model in (2), the slope parameters (β_1, β_2), identifying the impact of regime dependent variable, that is metropolitan municipal investment expenditure on the fiscal balance is differentiated between the regimes determined upon the threshold level (λ). The regimes in Model 1 vary depending on whether the threshold variable, *cbb*, is above or below the estimated level of λ . The second model presented in (3) examines the effect of metropolitan municipal own-source revenue, determined as the regime dependent variable on the budget balance for different levels of income dependency on the central government and is indicated by the threshold variable, *share*. The slope parameters (β_3, β_4) represent the effect of *ownsource* on the fiscal balance below and above the threshold level of *share*, respectively. X_{it} denotes the aggregate control variables that are the total revenue in *Model 1*, and the current budget balance and total expenditure in *Model 2*.

3.2 Findings and Discussion

In the linear framework, we estimated the fiscal performance impact of metropolitan municipal expenditure and revenue using a fixed-effect panel data approach. In the model, we considered the impact of the current budget balance, which can be considered as a fiscal prudence indicator for municipalities, to measure performance in budget sustainability. While conventional budget deficits measure the difference between public investment and public saving, current budget deficit calculations omit investment outlays and capital revenues to determine the available own-source funds for the capital budget (Blejer and Cheasty 1991).

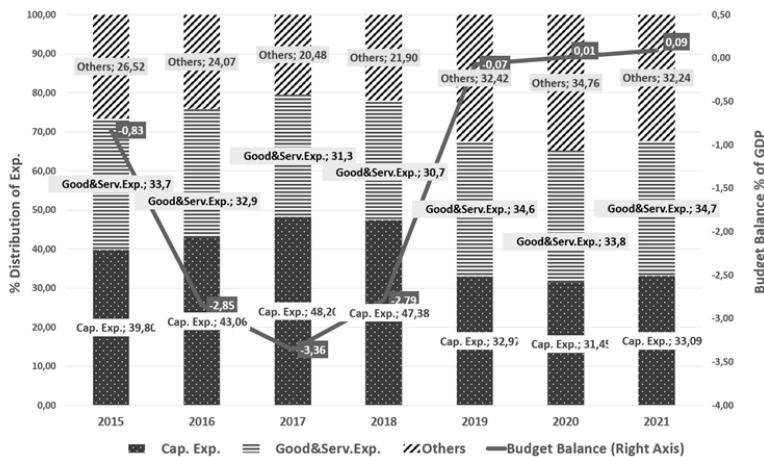
Table 4 Fixed Effect Regressions

	Coefficient	Standard error
constant	0,0011**	0,0003
cbb	0,8291***	0,0382
opexp	-0,6658***	0,0528
trexp	-0,5355***	0,1042
invexp	-0,9861***	0,0248
ownrev	0,4501***	0,0446
share	0,1823***	0,0391
number of observations	210	
number of groups	30	
F-statistic	228.36 (p-value: 0.00)	

Notes: *** and ** indicate significance at the 1 and 5 percent levels, respectively.

Source: Authors' calculations.

The linear model estimation results in Table 4 reveal the significant effect of the operational, investment and transfer expenditures, which are the main components of municipal expenditure. However, as shown in Figure 2, it is striking that the impact of investment expenditure, which is a large component of the total metropolitan municipal expenditures on the budget balance, is substantially more than the other expenditure components. When we look at the expenditure distribution of the metropolitan municipalities between 2015 and 2021 using economic classification, on average almost 40 percent of the total expenditure goes to investment. This is a large proportion in itself, and it also shows an upward trend, especially in pre-election periods.

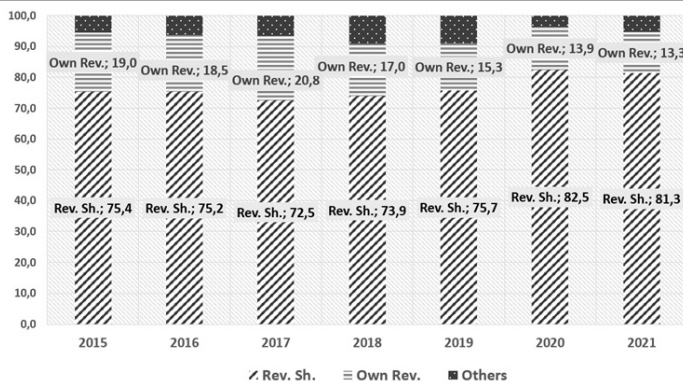


Source: Compiled by the authors.

Figure 2 Metropolitan Municipalities' Expenditure Composition by Economic Classification (Percent) and Budget Balance (% of GDP)

However, it is important to note that the figure also draws attention to the healing effect of the current budget balance on the fiscal performance and the credibility level of the municipalities through the period, which represents the balance before the capital expenditures of the institutions.

When the issue is evaluated in terms of revenue (Table 4), the components of municipal total revenue, which are classified as total own-source revenues, and the municipal revenue share from central government taxes, have a significant and corrective effect on the budget balance. Accordingly, Figure 3 indicates that a large portion of revenue is transferred from the central government as a tax share (76.6 percent on average). This ratio exceeded 80 percent in small metropolitan municipalities, particularly those established in 2014.



Source: Compiled by the authors.

Figure 3 Metropolitan Municipalities' Revenue Composition (% of GDP)

When comparing the effects of expenditure and revenue, the expenditures of metropolitan municipalities possess a potentially more dominant fiscal impact than the revenues. This is based on the grounds that metropolitan municipalities have a low potential capacity to generate their own revenue sources due to a high dependency on central government budget revenue transfers resulting from the revenue sharing formula.

The results of linear panel estimations provide important insights into the initial stages of the methodological procedure. The second stage of the methodological procedure focused on two main research questions arising not only from our linear model results but also from the literature, theoretical background, and practice. In this regard, the two questions below provide an expenditure- and revenue-related approach to analyzing the fiscal performance of municipalities.

1) On the expenditure side, could the effect of metropolitan investment expenditure, which is found to have a relatively more notable effect on budget deficits, be associated with different levels of the current budget balance? Specifically, does an increase in the expenditure allocation efficiency of municipalities with regard to current expenditures alleviate the disruptive effect of investment expenditure on fiscal performance?

2) From a revenue perspective, is the healing effect of metropolitan municipal total own-source revenue on fiscal performance associated with dependency levels on the central government?

Thus, the following nonlinear step provides a more comprehensive approach to examining the effects of expenditure and revenue on the estimated thresholds in response to the two critical questions. In this non-linear framework, we initially analyze the effect of investments on fiscal balance in relation to the current account balance threshold (Table 5).

Table 5 Threshold Regressions: Expenditure Dimension

Dependent variable: bb	
Threshold variable: cbb	
Threshold estimate: 1,10 percent	
95 percent confidence interval: [1,09 percent, 1,17 percent]	
<i>The effect of investment expenditure</i>	
Regime 1: β_1	-1,2021*** (0,042)
Regime 2: β_2	-0,7061*** (0,055)
totrev	0,9493*** (0,018)
constant	-0,0095*** (0,0003)
number of observations	210
number of groups	30

Notes: *** indicates significance at the 1 percent level. Values in parentheses indicate standard errors. Feasible thresholds are valid for the estimations, thus between 95 percent confidence intervals.

Source: Authors' calculations.

The estimation results in Table 5 shed light on the first research question. For two different regimes defined according to the current budget balance, the effect of municipal investment expenditure on the budget balance varies in size, although not

as a sign. In the second regime, where the municipalities are more economical, that is, where the current budget balance has a value above the threshold, the investment expenditure of the municipalities has a less deleterious effect on the fiscal balance.

As the current budget performance rises above the threshold level, the deterioration in budget balance due to the increase in investments remains limited. The current budget performance of institutions, which differs positively according to the threshold value, covers a larger part of the investment resources with their available own-source funds for the capital budget. In contrast, if the current budget performance is below the threshold level, the deterioration of the budget balance is relatively high and will lead to fiscal sustainability.

Table 6 Threshold Regressions: Revenue Dimension

Dependent variable: bb	
Threshold variable: share	
Threshold estimate: 1,41 percent	
95 percent confidence interval: [1,13 percent, 1,44 percent]	
<i>The effect of total own source revenue</i>	
Regime 1: β_3	0,1746*** (0,069)
Regime 2: β_4	-0,4603*** (0,075)
totexp	-0,7122*** (0,031)
cbb	0,9491*** (0,017)
constant	0,0059***(0,001)
number of observations	210
number of groups	30

Notes: *** indicates significance at the 1 percent level. Values in parentheses indicate standard errors. Feasible thresholds are valid for the estimations, thus between 95 percent confidence intervals.

Source: Authors' calculations.

The estimation results presented in Table 6 are striking in terms of our second research question. While the effect of municipal own-source revenue on the budget balance is positive in the first regime where the revenue share from the central government is below the threshold value, in the second regime where the revenue share exceeds the threshold, the improving effect of total own-source revenues of metropolitan municipalities on the budget balance is reversed. Therefore, budget performance deteriorates by the decrease in own-source revenues when the level of fiscal decentralization decreases, i.e., when the level of dependency on the central government increases.

In both Models 1 and 2, the control variables are significant, and the size and direction of the effect on the budget balance are consistent with the linear model.

The results indicate that the differentiation of fiscal dependence on the central government according to the threshold level has different effects on the deterioration of the budget balance. As the level of fiscal autonomy increased, the deterioration in budget balances decreased. The opposite is true when fiscal autonomy decreases; in other words, when own revenue is more limited. Therefore, in addition to the deterioration in the budget balance caused by a decrease in own-source income performance, the significant level of dependency on the central government drives municipalities

away from fiscal discipline. This finding also confirms the flypaper effect discussed in the theoretical background section.

The empirical findings shown in Tables 5 and 6 have crucial implications for fiscal policy. Accordingly, to enhance the fiscal performance of municipalities, the following suggestions should be considered: i) optimize their expenditure and savings levels, ii) reduce their dependency on the central government, and iii) increase their potential to generate self-esteem through better fiscal management.

4. Conclusion

In 2014, Türkiye switched to a new local government system, called the metropolitan municipality model. As a result of this structural change, the service responsibilities of metropolitan municipalities expanded to cover the entire province. In addition, the responsibility for infrastructure investments in local services was transferred to metropolitan municipalities. Regulations regarding local revenue were not implemented during this period, and only the revenue-sharing formula was amended among local governments. Therefore, regulations that would lead to an increase in the own-source revenues of municipalities have not been enacted or improved to grasp economic and technological developments. This increased the dependence of metropolitan cities on the center during the interim period.

In addition to fiscal management issues, the constitutional referendum for a change in the government system (2017), presidential elections (2014, 2019), general elections (2015, 2018), and local elections (2014, 2019) led to political parties putting fiscal pressure on local governments to spend more on service programs and collect less revenue.

Our empirical approach showed that the deterioration in the fiscal structure of metropolitan cities differed, observing that budget balance deteriorates more when it is below the threshold value. The lower fiscal performance on the current budget provided a measure of the extent the government strayed from “prudent management”. (Blejer and Cheasty 1991). The study also revealed that local governments move away from fiscal discipline when fiscal dependency is high (i.e., when own-source revenues are lower).

The impact of metropolitan municipal expenditure and revenue on the fiscal performance of local authorities was examined using linear and nonlinear panel data analyses. In the first stage of the methodological procedure, the fixed effects model provides evidence supporting the corrective effect of all components of municipal revenues on budget balance and, unsurprisingly, the opposite for expenditures. The findings of the nonlinear analysis of the panel threshold model proposed in (Hansen 1999) provided further insight into the impact of municipal expenditures and revenues on fiscal performance. Our empirical results indicated that the deterioration in fiscal performance due to the volume of capital expenditure is less when the current budget balance exceeds the estimated threshold level, which constitutes an original contribution to the literature in terms of the current budget balance. On the other hand, the effect of municipal own-source revenue on budget balance differed in terms of the level of dependency on revenue shares from the central government. Our findings are consistent with the literature supporting the existence of the flypaper effect (Table 1).

However, it carries original value with regard to the special emphasis on the relevant relationship through the level of fiscal dependency on the central government.

To secure sustainable financing for local services, municipalities must implement their own revenue-generating strategies, including strengthening institutional capacity, increasing urban awareness, and encouraging cost-sharing mechanisms. Updating fixed taxes (inflationary adjustment), bringing property tax values closer to market values, and modernizing existing local taxes, fees, and tariffs, such as environmental taxes, are critical steps, along with exploring new revenue sources where possible. Additionally, in large metropolitan cities with rapid population growth, the central government should contribute to financing infrastructure investments along with multiyear investment programs that have not yet been prepared and develop policies to support access to long-term financing options.

It is essential to develop fiscal standards to measure the fiscal performance of metropolitan municipalities whose roles and responsibilities have changed extensively within the framework of effective and accountable management. This should also be considered when applying fiscal rules as an incentive parameter, especially in borrowing permissions and revenue-sharing formulations. In the development of standards, it is important to consider differentiation among metropolitan municipalities, such as Istanbul, as well as regional inequalities that impact own-source revenues and local service needs.

Finally, the need to enhance municipalities' own source revenue, particularly through local taxes, is a significant topic for fiscal policy in developing economies. Improving the collaborative framework between municipalities and the central government is essential to ensure that infrastructure projects are effectively planned, financed, and executed in countries such as Türkiye. This collaboration could contribute to the effective allocation of resources and the determination of investment priorities, which are crucial for optimizing the use of funds and achieving coherent development goals across regions. Future research should focus on the fiscal and administrative management capacities of municipalities and intergovernmental fiscal coordination. This could provide actionable insights to boost local revenue generation and enhance infrastructure development.

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