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The Flypaper Effect: "Reality" or "Myth"? Evidence from Turkey

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Sinek Kâğıdı Etkisi: "Gerçeklik" mi, "Efsane" mi? Türkiye Örneği

Abstract

Several empirical observations in the local government economics literature point out that the effect of an increase in intergovernmental transfers on local public expenditures is more than that of increased personal income. This situation is called the "flypaper effect." This study aims to reveal the relevant literature and to test the flypaper effect for Turkey. In this context, using panel data techniques, the flypaper effect is evidenced at the provincial level in Turkey from 2008-2017. At the same time, our findings indicate that grants have a stimulatory effect in Turkey.

Keywords : Local Government Expenditures, Intergovernmental Grants, the Flypaper Effect, Turkey.

JEL Classification Codes : C23, H72, H77.

Öz

Yerel yönetimler iktisadı literatüründeki birçok ampirik gözlem, yönetimler arası transferlerdeki artışın yerel kamu harcamaları üzerindeki etkisinin, kişisel gelirdeki artışın etkisinden daha fazla olduğuna işaret etmektedir. Bu duruma "sinek kâğıdı etkisi" denilmektedir. Bu çalışmanın amacı, ilgili literatürü ortaya koymak ve Türkiye için sinek kâğıdı etkisini test etmektir. Bu bağlamda, Türkiye'de 2008-2017 dönemi için il düzeyinde panel veri teknikleri kullanılarak sinek kâğıdı etkisinin varlığına dair kanıtlar bulunmuştur. Aynı zamanda bulgularımız, hibelerin Türkiye'de uyarıcı bir etkiye sahip olduğunu göstermektedir.

Anahtar Sözcükler : Yerel Yönetim Harcamaları, Yönetimler Arası Hibeler, Sinek Kâğıdı Etkisi, Türkiye.

1. Introduction

Two of the most important financing ways of expenditures of subnational governments are local taxes and intergovernmental transfers. The relationship between intergovernmental transfers and local public expenditures is a widespread field of research within the framework of the local government economics. Empirical observations give a different result, although the traditional approach claims that transfers to local governments and transfers to local residents (in other words, increase in personal income) have an equivalent effect on local public spending. This empirical result, labeled as "the flypaper effect", shows that the effect of increase in intergovernmental transfers on local public expenditures is more than that the effect of increase in personal income. In the case of the flypaper effect, it would be possible to provide a local service above the optimum level where the marginal tax cost is equal to the marginal benefit.

The flypaper hypothesis is discussed from different aspects in the literature. The income and/or substitution (price) effects of this hypothesis and the sources of these effects are widely discussed. The effects of the bureaucrat and voter behavior on the flypaper hypothesis and accordingly fiscal illusion discussions, whether the flypaper effect is an anomaly or not, and the symmetric or asymmetric results of the flypaper effect are the main discussion areas in the literature.

The aim of this study is to examine the flypaper effect literature extensively by covering the above discussion areas, and to test the evidence of the flypaper effect in Turkey. In this framework, after the theoretical and empirical literature review, the flypaper effect is tested by using panel data analyses techniques for all local governments at the provincial level in Turkey in the period 2008-2017.

2. An Overview of the Flypaper Effect

Intergovernmental fiscal transfers are used to achieve goals such as vertical and horizontal equality, internalization of spillover effects, influence on local government's spending and taxation policies, and local economic stability (Gamkhar & Shah, 2007: 225).

Gramlich et al. (1973) have one of the first studies about the effects of intergovernmental transfers on local public spending. According to the authors, intergovernmental transfers can be classified into three types: (a) open-end matching grants which include some parts of the cost of certain local expenditures, (b) closed-end lump-sum transfers which include a fixed amount of money to local government without any restrictions, (c) closed-end categorical grants which include a limited amount of money for a specific program. Shah (2007) classifies transfers similar to this classification, but with an additional difference: non-matching transfers. Accordingly, intergovernmental transfers are divided into two as general-purpose transfers from the general budget without any conditions and specific-purpose (i.e. conditional) transfers aimed at encouraging local governments to offer specific services. Conditional transfers are of two types: non-matching transfers and

matching transfers (cost-sharing) consisting of open-ended grants without a limit and closed-ended grants with a certain limit.

Intergovernmental fiscal transfers are one of the determinants of the output level of local public goods and services. The efficient output level of a local public good (in other words, the level where the marginal benefit of all local residents is equal to the marginal cost) varies between jurisdictions as a result of differences in preferences and costs. For this reason, local outputs should vary to maximize total social welfare (Oates, 1999: 1122). However, the issue of what is the source of increase in local output is related to the flypaper effect.

While the first-generation theories on intergovernmental transfers examined the flypaper effect more frequently, second generation theories have tended to focus on the efficiency and equity of these grants (Gamkhar & Shah, 2007: 226).

2.1. Theoretical Literature Review

Bradford and Oates (1971) argue that unconditional intergovernmental grants (revenue sharing) are equivalent to lump-sum grants to individuals in a community. This indicates that intergovernmental transfers mean a tax rebate to individuals in the community, and this is a "veil" of local tax cuts. Bradford and Oates (1971) laid the foundations of the discussions before the flypaper effect from the traditional perspective by mentioning the effects of this equivalence on decreasing the unit price of the local public service, on increasing public output, and on increasing disposable income. Gramlich et al. (1973) added a new dimension to the discussion about the impact of intergovernmental grants and personal income on local public spending, unlike the traditional perspective.

Gramlich et al. (1973) assume that one of the local budgetary policy objectives is higher private disposable incomes. This objective results from either higher pretax income (Y) or lower local taxes (T). The public services associated with the disposable income objective are formulated as follows (abiding by the original notations):

$$Q_2 = \gamma_2 Y/P - T/P \tag{1}$$

where γ_2 is the relative weight of both independent variables, and P is the price level which is used for deflating variables. If γ_2 equals 1, the effect of pretax income increases is the same as the effect of local tax reductions. So, there is nothing different for decision makers. If γ_2 is less than 1, they prefer local tax reduction in order to rise disposable income. Increasing income through local tax reduction results in local public spending being dependent on lump-sum transfers. The strength of this dependency relationship changes by parameter γ_2. According to Gramlich et al. (1973), "lump-sum transfers, which are already in the public treasury and therefore do not require the painful act of taxation, have a greater impact on spending if γ_2 is less than 1". Gramlich et al. (1973) expresses this situation as the flypaper effect by using the "money sticks where it hits" motto. This motto means that

"money received in the public sector tends to remain in the public sector, while money received in the private sector tends to remain there" (Fisher, 1982: 324).

The flypaper effect can be defined as the increase in lump-sum intergovernmental grants stimulating local public spending more than the equivalent increase in personal income. See Fisher (1982), Megdal (1987) and Bailey and Connolly (1998) for similar definitions. Under the flypaper effect, it is assumed that individuals in a community will be under the illusion that the increase in their welfare due to benefits from local services is bigger than their cost incurred due to local taxes. Therefore, the demand for local public services will increase.

The relationship between intergovernmental transfers and local spending has some effects. When intergovernmental transfers reduce the average price of the services provided by local governments, there is a price effect (or substitution effect). Intergovernmental transfers have an income effect when they do not change the relative price of the service provided by local governments and increase the consumption of both private and local public services. The increasing effect of intergovernmental transfers on local public expenditures is called a stimulatory effect. For a graphical explanation of these effects, see Shah (2007: 2-9) and Bailey (1999: 185-190).

The traditional explanations on intergovernmental transfers suggest that both general and specific lump-sum grants only have an income effect and not a price effect. Bailey and Connolly (1998) draw three conclusions in the traditional perspective: (a) both general lump-sum and specific lump-sum grants have the same effect (income effect only) on local spending, (b) a stimulatory effect of open-ended matching grants on local spending is greater than that of lump-sum grants (because open-ended matching grants have both income and substitution effects), (c) a stimulatory effect of lump-sum grants and personal income on local spending is similar or identical. In addition to these views, Gramlich et al. (1973) and Shah (2007) state that closed-ended grants stimulate the spending on assisted public goods and services more than open-ended grants.

Unlike other traditional explanations, Oates (1979), Courant et al. (1979) and Borge (1995) argue that lump-sum intergovernmental grants have a price effect due to lowering the average price of the local public service, not the marginal price. According to the authors, while voters determine the local public service that they demand, they consider its average price. Therefore, lump-sum grants reduce the average price of local public services and cause a price effect.

Dahlby (2011) is one of the authors who argue that lump-sum grants have a price effect. However, Dahlby (2011) differs from Oates (1979), Courant et al. (1979) and Borge (1995), claiming that lump-sum grants can reduce the marginal cost of public services. Dahlby (2011) demonstrated using distortionary taxes that lump-sum grants do not require fiscal illusion to have a price effect. Dahlby (2011) argues that the (a) and (c) proposals of Bailey and Connolly (1998) are not valid when local governments finance their spending

with distortionary taxes. According to Dahlby (2011), lump-sum grants also have a price effect in the case of financing with distortionary taxes. Mainly because the marginal cost of public funds of a local government and the marginal production cost of a local public service determine the effective price of the public service. If a local government receives a lump-sum grant, it can lower the local tax rate while providing the same level of public service. This reduces the effective price of local public services, as it reduces the marginal cost of public funds. The higher ratio of lump-sum grants to local own-source tax revenues and the higher marginal cost of public funds will result in the greater price effect of a lump-sum grant. In order for lump-sum transfers not to have a price effect, the marginal cost of public funds must be equal to 1 (such as financing local expenditures only with lump-sum taxes, not distortionary taxes) or the elasticity of the semi-elasticity of the tax base with respect to the tax rate must be equal to -1. The large effective price reduction of public services due to lump-sum grants (in other words, a greater price effect) can help to explain the flypaper effect.

Hamilton (1986) also claims that the flypaper effect may occur due to distortionary taxes used in financing the expenditures of local governments. According to Hamilton (1986), when local governments use distortionary taxes, local taxes have a deadweight loss rather than central taxes. For this reason, grants are an efficient method for local governments. Becker and Mulligan (2003) argues that the flypaper effect proves convex deadweight costs of taxes and spending. The second derivative of deadweight costs determines the size of the flypaper effect in their models of interest group and social planner. In contrast, Hines and Thaler (1995) reject distortionary taxes in explaining the flypaper effect and consider it a specification error. According to Hines and Thaler (1995), the grant money received should have a greater stimulatory effect on local spending, as it does not create deadweight loss for local government. The marginal deadweight losses from taxes are not enough to adjust the large differences between spending tendencies of changes in grants and changes in personal incomes.

The bureaucracy model of Niskanen (1968) can be associated with the flypaper effect. According to the bureaucracy model, bureaucrats aiming to maximize bureau budget have a monopolistic position as they have more knowledge about demand and cost than politicians. From the perspective of local governments, a grant request may result in higher local spending than grants due to budget maximization. According to Shah (2007), the flypaper effect can be explained for political and bureaucratic reasons. The hypothesis that bureaucrats try to maximize their institutional budgets in order to gain more power and influence is shown as the main reason for the flypaper effect. Hamilton (1986), however, claims that due to the increasing marginal deadweight loss of taxation, the flypaper effect does not need to be explained through models of strategic bureaucratic behavior or voter misperceptions.

Brennan and Pincus (1996), through a model that deals only with federal grants, explain that the flypaper effect can occur without manipulations of agenda-setting politicians and bureaucrats, voting intransitivity, asymmetric information, and fiscal illusion. The

model assumes that median voters are decisive in fiscal matters, grants are lump-sum, and federal grants are financed by federal taxes. Therefore, unlike the traditional explanation, Brennan and Pincus (1996) argue that an increase in lump-sum grants will not cause an increase in community income. The cost (burden) of the tax mix (federal and local) cannot be minimized in each state when the federal tax rates are the same and the federal grants are different. According to the model that indicates grants are endogenous, these changes in tax mixes can cause the flypaper effect without fiscal illusion.

Whether the flypaper effect is a fiscal illusion or not is also one of the discussions in the literature. The debates of the flypaper effect as a fiscal illusion are generally based on incoherency with the median voter models. Worthington and Dollery (1999) collects empirical studies on the flypaper effect in three groups within the framework of fiscal illusion. The first is studies that connect the distortions created by the flypaper effect to other fiscal illusions such as revenue-complexity and revenue-elasticity hypotheses. The second is studies that assume that voters see grants as an opportunity to transfer their tax burdens to other jurisdictions, and therefore tend to increase public spending. The third is studies that assume that grants lower the average price of public goods, and that voters consider the average price, not the marginal price.

According to Oates (1979) and Courant et al. (1979), the reduction in the average price of the local public services due to lump-sum grants leads to fiscal illusion for voters. There is a price effect due to this fiscal illusion. Alternatively, Filimon et al. (1982) suppose a model in which voters do not have full information about grants and this interests the public service providers. In the model, voters perceive the amount of grant less than it is and determine their preferences accordingly. Therefore, the expenditure of bureaucrats, who tend to maximize their budget, is greater than the spending amount preferred by the median voter. In this case, intergovernmental grants create the flypaper effect as a fiscal illusion. Turnbull (1992) explains that the asymmetry created by the flypaper effect is an empirical observation that can be explained through fiscal illusion. Unlike voter behavior models which assume that taxpayers misperceive the marginal tax prices, Turnbull (1992) assumes that rational voters actually know the marginal tax prices. However, the uncertainty in the price level of public goods causes excessive spending. Therefore, rational voters must make tax and expenditure plans under conditions of imperfect information or uncertainty. According to Becker (1996), the flypaper effect is beyond being a fiscal illusion due to the misspecification of the estimating equations. In other words, it is "the illusion of fiscal illusion". Therefore, there is no flypaper effect.

The issue of whether the flypaper effect is an anomaly or not is also controversial. Hamilton (1983) explains that the flypaper effect is an anomaly through a hypothesis that local governments' own income is accepted as an input. According to the hypothesis, the reason for the flypaper effect is that the transfer income of local governments is not an input in the production function for local public services. Since own income is a substitution of purchased inputs, the tendency to spend on purchased inputs with own income is lower than the tendency to spend with grants. Zampelli (1986) suggests that the flypaper effect is an

anomaly due to a variable misspecification. Therefore, the author explains the situation through a model in which local governments can convert some of the conditional grants into fungible resources.

Megdal (1987) and Becker (1996) show the misspecification of models related to the flypaper effect in the literature. However, they also emphasize that the findings obtained from these models are not invalid. Megdal (1987) explains the idea that the extent of the flypaper effect is overstated with this misspecification. According to Becker (1996), the reason for the overestimation of the flypaper effect is the use of linear functions instead of logarithmic functions.

Hines and Thaler (1995) explain that the flypaper effect is an anomaly based on four specification errors. The first is that an additional expenditure of local governments who receive matching grants with an upper limit will not have an effect as if it is a matching grant since the grant limit has been reached. Therefore, matching grants can be classified as unconditional grants. The second is about the demand function for government expenditures. When the median voter's share of tax burden is below the community average, intergovernmental grants effectively benefit the median voter. Therefore, the behavior of the median voter, who has the power to determine fiscal outcomes, can lead to a greater impact of grants on local spending. The third is the neglect of some important variables, such as the characteristic differences between communities or the behavior of other governments. The fourth specification error is the tendency of local governments to maintain high spending levels in order to continue to receive discretionary grants. This situation, explained by the budget maximization behavior of bureaucrats, is a nature of the budgeting process that determines the amount of grants.

Deriving from Hines and Thaler (1995), Inman (2008) compiles four different explanations for the concept of flypaper effect as an anomaly. The first is related to data. Researchers can confuse matching grants and lump-sum aid. Whereas, the first one has a price effect as it lowers the marginal prices of public services; the second one has an income effect as it shifts the budget line of the citizen to the right. Therefore, consumer theory predicts that a matching grant encourages public services more than a lump-sum aid. The second explanation is an econometric problem. The reason for this problem may be the negligence of important determinants of local spending correlated with personal income or intergovernmental aid. The third explanation is the possibility of misunderstanding the model of citizen fiscal choice due to the complexity of the grant programs. For example, citizens may misunderstand the income effect of lump-sum aid as an average price effect. The fourth explanation is about politics. Voters, who are assumed to be rational, may strategically hide their preferences if it is useful. Therefore, the flypaper effect may be due to the lack of a "political contract" between citizens and elected officials.

Roemer and Silvestre (2002) claim that it is naive to express the flypaper effect as an anomaly. Because the literature is generally based on the single-consumer theoretical model. However, when there is no single-consumer assumption, collective decision-making models

forecast the non-equivalence of the effects of in-kind subsidies and income increases. Therefore, Roemer and Silvestre (2002) developed a politico-economic model to explain that the flypaper effect is not an anomaly. This model is based on assumptions that two parties compete and that the amount of subsidy and income increase are independent and exogenous parameters. According to the model, the flypaper effect is an exception, not an anomaly. Dahlby (2011) opposes the idea that the flypaper effect is an anomaly to be explained by the politician's or bureaucrat's failure. According to Dahlby (2011), the flypaper effect is a natural consequence of the local governments' use of distortionary taxes to finance their spending and an "intrinsic" aspect of their fiscal behaviour.

With the presupposition that the flypaper effect exists, second generation studies have discussed whether the flypaper effect is asymmetrical, focusing on the effect of grant reductions or instability in the grant programs. The asymmetry of the flypaper effect means that local governments treat grant decreases or increases differently. In other words, the fact that a decrease in grants does not change in local spending and taxes as in the case of the increase in grants shows the asymmetrical effect. Asymmetry in the flypaper effect is important because it can cause uncertainty. Although Gamkhar and Oates (1996) achieved a symmetrical relationship, Stine (1994), Heyndels (2001) and Deller and Maher (2006) emphasized the asymmetrical relationship.

Gamkhar and Oates (1996) explain that the flypaper effect has two types of asymmetry. "Fiscal replacement" form of asymmetry means that local expenditures react less to grant reductions than to grant increases. "Fiscal restraint" form of asymmetry means that the decline in grants is accompanied by a decrease in both local spending and own-source revenues. Heyndels (2001) has a graphical explanation of these asymmetry forms. Heyndels (2001) shows that in the case of fiscal replacement, the decrease in local spending is less than the decrease in grants (in comparison to the symmetrical situation) and the difference is compensated by the increase in local taxes. However, in the case of fiscal restraint, the decrease in local expenditures is higher than in the symmetrical situation and the taxes increase less.

2.2. Empirical Literature Review

The traditional approach claims that an increase in personal income and an increase in lump-sum transfers have an equivalent effect on local government expenditures due to the assumption that local governments use lump-sum taxes to finance their expenditures. In reality, however, local governments can use distortionary taxes as well as lump-sum taxes to finance their spending. Therefore, empirical studies on the flypaper effect show that intergovernmental transfers may have more impact on local spending. There is a large empirical literature on the flypaper effect that obtains different results using different models for many countries. In this section, studies that directly examine whether the flypaper effect is valid or not, and studies that examine whether the flypaper effect has an asymmetrical structure are distinguished into two separate groups.

Gramlich et al. (1973), one of the leading studies examining the flypaper effect directly, found that each dollar of lump-sum transfers increases local public spending between $0,25 and $0,43, using both quarterly time series observations from 1954 to1972 and pooled cross-section estimates for ten large urban governments in the USA. Schneider and Ji (1987) related the flypaper effect to the bureaucrats' ability to control local resources above local demand and investigated how competition in the local public goods market limited this power of bureaucrats from the public choice perspective. A cross-section analysis was conducted on the basis of 1982 using a database for 1165 suburban municipalities in the USA and it was concluded that the flypaper effect exists, and competition does not limit this effect consistently. Worthington and Dollery (1999) used panel regression method for 176 local governments in the Australian state of New South Wales from 1992 to 1993 and found that the elasticity of local spending to local income was greater than that to intergovernmental grants. In other words, the flypaper effect was not found in the Australian institutional milieu. Tovmo and Falch (2002) analysed the flypaper effect in the context of the heterogeneity of local councils and the strength of political leadership. In the analysis using the data of all Norwegian rural municipalities in the period 1934-1935, it was found that the flypaper effect decreased in a situation where there was strong political leadership and one-party local councils. Melo (2002) conducted panel data analysis using the Colombian public sector fiscal data for the period 1980-1997 and concluded that the determinants of the flypaper effect differed by the inter-municipal differences in development, size and institutional capacity. The flypaper effect is generally observed when local public revenues are highly dependent on inter-governmental transfers. Bae and Feiock (2004) proved that there was not the flypaper effect in their analysis for medium-sized cities in the USA. In addition, it has been determined that there is an interaction between the local government type and grants. Accordingly, intergovernmental transfers affected the government spending of mayor-council cities (a strong mayor system where the elected mayor and his/her employees are responsible for policy making and administration) more than that of council-manager cities (a system where an elected council and their employee responsible for policy making and administration, and where a city manager implements policies such as the corporation manager). In other words, if the flypaper effect was valid, this effect would strongly show existence in mayor-council cities than council-manager cities. Deller and Maher (2005) analysed the effects of grants on ten different types of municipal expenditures by using cross-section data of cities and villages in Wisconsin, USA, to show that there can be different flypaper effects according to public expenditure types. They found a positive flypaper effect on eight types of expenditure (except per capita police and fire protection). Widarjono (2006) used panel data of Indonesian provinces for the period 1995-2002 and determined that there was the flypaper effect in Indonesia. The effect in the east region of the country was stronger than it was in the west region. Pevcin (2011) used a cross-sectional analysis for 210 Slovenian municipalities in 2009 and obtained different results compared to common findings in the literature. When the total transfers are taken into consideration as an independent variable, there is a flypaper effect, while the transfers from central budget are considered, there is no flypaper effect. Kakamu, Yunoue, and Kuramoto (2014) tested the flypaper effect in various

expenditure categories in Japan, using a seemingly unrelated regression with a spatial error model within a Bayesian approach. The results of the model showed that there was a flypaper effect in land development, police, education, and debt expenditures. Allers and Vermeulen (2016) found that there was a flypaper effect in the Netherlands and that the changes in grants to municipalities fully capitalized into housing prices. This result ensures that politicians and bureaucrats' rent-seeking activities are improbable. At the same time, the lack of a positive effect of grants on municipal staff supports the bureaucratic flypaper effect. Siregar and Badrudin (2017) tested the different flypaper effects that vary according to the fiscal decentralization levels, using the 2010-2013 period data of all counties and cities in Indonesia (excluding Jakarta). According to the results of the analysis based on the effects of the general allocation fund and district own-source revenue on capital expenditure, the flypaper effect is valid at all fiscal decentralization levels except at very high degree of fiscal decentralization. At the same time, it is concluded that capital expenditure has a positive effect on society welfare in district with extreme degree of fiscal decentralization. Yacoub and Lestari (2019) also found that the flypaper effect was valid for districts and cities in Kalimantan Island of Indonesia in the period 2013-2016. Acar (2019) reached the conclusion that there was the flypaper effect in Turkey and that the unconditional fiscal transfers had substitution effect on revenue collection efforts of municipalities through panel data set of municipalities in the period of 1997-2005.

There are also studies on the symmetrical or asymmetrical structure of the flypaper effect. Stine (1994) tested the asymmetric structure of the flypaper effect using the sixty-six county governments in Pennsylvania, USA, and panel data techniques for the period of 1978-1988. According to the results of the analysis, both the expenditures and own-source revenues' response to the decrease in federal aid received is asymmetric. Therefore, there is an asymmetry in the fiscal restraint form. Gamkhar and Oates (1996) concluded that the flypaper effect is symmetrical using the time series method with the United States data for the period 1953-1991. Accordingly, local spending responds to an increase or decrease in grants. Heyndels (2001) used panel data for the period 1989-1996 to test asymmetries in the flypaper effect for Flemish municipalities and found that the asymmetric effect was in the form of fiscal replacement. Lalvani (2002), using the pooled cross-section time series technique for 14 Indian states in the 1980s and 1990s, found that increase in grants stimulated total expenditures, including expenditures on revenue accounts and on capital accounts, more than the equivalent increase in income, and that the flypaper effect was asymmetrical. Deller and Maher (2006), using the unconditional income sharing data of Wisconsin, USA, concluded that the flypaper effect was asymmetrical, that is, local governments did not systematically treat grants during periods of stability and instability. Using a model that allows identification of structure shifts, they found that when grants are reduced, policymakers tend to cut services such as parks and recreation rather than police and fire services. Cárdenas and Sharma (2011) demonstrated the presence of the flypaper effect and the asymmetric effect of transfers through the panel data set of about half of the municipalities in Mexico for the 1993-2005 period. Moreover, the analysis showed that the level of wellbeing of municipalities had an inverse relationship with both the level of tax

effort (due to the substitution effect) and the magnitude of the flypaper effect. Sour (2013), using the panel data set of the Mexican municipalities for the period of 1990-2007, found that the flypaper effect exists, and this effect is asymmetric. In other words, municipal spending in Mexico is more sensitive to an increase than a decrease in grants.

3. Testing the Flypaper Effect in Turkey

There are 81 provinces in Turkey, in which there are metropolitan municipalities in 30 provinces with a population of over 750000 and alternatively special provincial administrations in 51 other provinces. There are also county municipalities in all provinces. The budget structure of all local governments as a whole for the 2008-2017 period in Turkey shows that an average of 10,48% of the local government revenues consist of tax revenues and an average of 40,9% of the local government revenues consist of the central government grants (Republic of Turkey, Ministry of Treasury and Finance, 2019). Because taxes are mostly collected by the central government in Turkey; the authority to collect sanitation tax, property tax and some fees is left to local governments. The transfers to local governments consist of the shares allocated from the general budget tax revenues collected by the central government (in other words, revenue sharing). Thus, it is possible to say that the level of fiscal decentralization on the revenue side is low in Turkey.

When the relationship of budgetary expenditures of local governments with local tax revenues and intergovernmental grants is tested, the flypaper effect is also examined. In this study, therefore, it is aimed to test the correlation of local public spending with local tax revenues and grants through local fiscal data of Turkey's 81 provinces for the 2008-2017 period.

3.1. Model and Data Set

In order to identify the source of motivation in determining of local spending in Turkey, our study is tested the flypaper effect. The equation of our model using the panel data method is as follows:

$$LGE_{it} = \beta_0 + \beta_1 LGTR_{it} + \beta_2 GRANT_{it} + \varepsilon_{it} \quad (2)$$

where LGE is per capita expenditure of local government, $LGTR$ is per capita tax revenue of local government, $GRANT$ is per capita unconditional grants (revenue sharing) from central government to local governments, and ε is the error term. In the model, $i = 1, 2, \dots, N$ denotes cross-section units (i.e. 81 provinces), $t = 1, 2, \dots, T$ denotes time series.

The variables used in the model consist of the sum of the data at the provincial level of the metropolitan municipalities, county municipalities and special provincial administrations. The variables were derived by deflating provincial local public expenditures, local tax revenues and grants using the CPI (2010=100) and by proportioning them to the population of the province in the relevant year. Expenditure and revenue data of local governments by provinces were obtained from the Republic of Turkey, Ministry of

Treasury and Finance (2019), CPI data was obtained from the Turkish Statistical Institute (2019a) and provincial population data of relevant years were obtained from the Turkish Statistical Institute (2019b). One of the factors affecting the dependent variable of LGE is, of course, the population variable. However, since all the variables are obtained at the level of per capita by dividing the population, the population was not used as a separate independent variable in the model in order not to cause internality problem.

Descriptive statistics for variables are shown in Table 1.

Table: 1
Descriptive Statistics for Variables

Variables	Obs.	Min.	Max.	Mean	Std. Dev.
LGE	810	1,1321	19,2754	7,0092	2,2606
$LGTR$	810	0,0299	1,9720	0,5089	0,3477
$GRANT$	810	0,7033	8,0210	3,0621	1,1057

The comparison of the coefficients of the two independent variables used in the model enables to determine the flypaper effect. If $\beta_1 < \beta_2$ (in other words, $\frac{dLGE}{dLGTR} < \frac{dLGE}{dGRANT}$) is valid, the effect of local tax revenues on local expenditures is less than the effect of grants. In this case, the flypaper effect can be mentioned. If $\beta_1 > \beta_2$ (in other words, $\frac{dLGE}{dLGTR} > \frac{dLGE}{dGRANT}$) is valid, the effect of local tax revenues on local expenditures is more than the effect of grants. In this case, the flypaper effect cannot be mentioned.

3.2. Method and Findings

In order to test the flypaper effect, panel data analysis techniques are utilized for 81 provinces of Turkey in the 2008-2017 period. Thus, the opportunity to examine the heterogeneity between the provinces is obtained by taking into account the shifting effects that are not included in cross-sections. Stata 14 software was used to test the variables in panel data analysis.

As it is known, depending on the structure of the data set, panel data analyzes are divided into macro panel data and micro panel data. Nonstationary must be considered in asymptotic macro panels with large cross-section and large time series, whereas nonstationary does not need to be considered in asymptotic micro panels with large cross-section and small time series (Baltagi, 2005: 237). In other words, there is no need to apply unit root test on micro panels with small time series. For this reason, micro panel data analysis was accepted within the framework of panel data set with cross-section of 81 provinces and 10-year time series, and unit root test was not used in this study regardless of the stationary assumption of the series.

Before estimating Equation (2), it is necessary to determine the appropriate panel data model type. Hausman (1978) test was used to choose between the random effect and fixed effect models. The Hausman test derives the hypothesis that the H_0 hypothesis (there is no

correlation between the independent variables and the unit effect) implies the random effect, while the H_1 hypothesis (there is a correlation between the independent variables and the unit effect) implies the fixed effect. As can be seen from Table 2, H_0 hypothesis cannot be rejected because the probability value of Hausman test is greater than 0,05 (statistically insignificant at the 5% level). Therefore, in our study, the panel data model is analysed by the random effect method.

Table: 2
Results of Hausman Test

	Coefficients			
	(b) Fixed Effect	(B) Random Effect	(b-B) Difference	S. E.
LGTR	0,5124593	0,5499784	-0,0375191	0,1626735
GRANT	1,321254	1,333923	-0,0126689	0,0116353
chi2(2) = 1,45 Prob>chi2 = 0,4841				

Variances of error terms obtained in a regression analysis are expected to be constant. When the variances of error terms differ from each other, there is heteroskedasticity. The test developed by Levene (1960) and Brown and Forsythe (1974) was used to determine whether there is heteroskedasticity in the random effect regression model. The test results are given in Table 3. Comparing the test statistics and Snedecor F table with (80, 729) degree of freedom, it is seen that the H_0 hypothesis which is implied as "the variances of the units are equal" is rejected. Therefore, there is a heteroskedasticity problem in the model.

In a regression analysis, it is also expected that there are no correlations (i.e. no autocorrelation) between error terms. The Modified Durbin-Watson test suggested by Bhargava, Franzini and Narendranathan (1982) and the LBI (Locally Best Invariant) test derived by Baltagi and Wu (1999) were used to investigate whether there is autocorrelation in the data set of our study. As can be seen from Table 3, the H_0 hypothesis, which means that there is no first-degree autocorrelation, is rejected since both test statistics are below the threshold value of 2. Therefore, there is an autocorrelation problem in the model.

Table: 3
Results of Diagnostic Tests

Heteroscedasticity	
Levene, Brown and Forsythe Test W0 = 3,1266114 df(80, 729) Pr > F = 0,00000000 W50 = 2,0493426 df(80, 729) Pr > F = 0,00000088 W10 = 2,4890351 df(80, 729) Pr > F = 0,00000000	
Autocorrelation	
Modified by Bhargava et al. Durbin-Watson Test Statistic 1,3361073	Baltagi-Wu (LBI) Test Statistic 1,5598247
Cross-Sectional Independence	
Pesaran's Test Statistic = 34,242	Pr = 0,0000

The results of Pesaran (2004) test, which is used to determine whether there is cross-sectional dependence in the random effect regression model, are also shown in Table 3. According to the results, due to the probability value having a statistical significance at the

level of 1%, the H_0 hypothesis, which shows that there is no cross-sectional dependency for the variables, is rejected. In other words, there is cross-sectional dependency.

In a model estimated by the random effect estimator of Arellano (1987), Froot (1989) and Rogers (1993), it is obtained robust estimators in the case of heteroskedasticity and autocorrelation. Therefore, the random effect model was tested through Arellano, Froot and Rogers' estimator and the results are shown in Table 4.

Table: 4
Arellano, Froot and Rogers' Estimator Results

Dependent Variable: *LGE* Method: Random-effects GLS regression Sample: 2008-2017 Periods: 10 Cross-sections: 81 Number of Observations: 810				
Variables	Coefficients	Robust Std. Err.	z	P>|z|
LGTR	0,5499784	0,3308834	1,66	0,096*
GRANT	1,333923	0,0839281	15,89	0,000***
Constant	2,644687	0,2193151	12,06	0,000***
R^2 = 0,54 Wald chi2(2) = 420,23 Prob>chi2 = 0,0000				

*Note: *, **, and *** express the level of statistical significance at the level of 10%, 5%, and 1%, respectively.*

According to the analysis results, $LGTR$ variable is statistically significant at the level of 10%, $GRANT$ variable and *Constant* are statistically significant at the level of 1%. One-unit increase in local tax revenues increases local government expenditures by 0,549 units. One-unit increase in grants (i.e. revenue shares which is allocated from central government tax revenues to local governments) increases local government expenditures by 1,333 units. The effect of local tax revenues on local public expenditures is less than the effect of grants. In other words, the status of $\beta_1 < \beta_2$ is valid. Accordingly, evidence of the flypaper effect is obtained in 81 province-level of Turkey during the period of 2008-2017. Also, since $\beta_2 > 1$, the stimulatory effect of intergovernmental grants can be acknowledged.

4. Conclusion

The traditional approach in the local government economics literature claims that the effect of transfers to local governments and transfers to local residents (i.e. increase in personal income) on local government expenditures is equivalent. On the other hand, the fact that the effect of intergovernmental transfers on local public expenditures is greater than the effect of personal income is called "the flypaper effect". The flypaper effect is a fact achieved by empirical findings. Of course, these findings vary depending on location, time and models. In this study, it is obtained evidence that intergovernmental grants have the flypaper effect and stimulation effect for all local governments at the provincial level in Turkey in the 2008-2017 period. According to the findings of the study, the effect of a one-unit increase in per capita tax revenue of local governments on per capita expenditure of local governments (0,549 units) is less than the effect of a one-unit increase in per capita unconditional grants (revenue sharing) from central government to local governments on per

capita expenditure of local governments (1,333 units). Determinative in our findings is the structure of Turkey's intergovernmental revenue sharing mechanism. In Turkey, where there is a unitary administrative structure, it is a fact that local government expenditures greatly depend on grants received from the center. This is related to the low level of fiscal decentralization in terms of local tax collection capacity.

The presence of the flypaper effect and its symmetrical or asymmetrical aspect can be tested by econometric methods. In addition to the discussions that the flypaper effect of intergovernmental grants on local public spending is a fiscal illusion or anomaly, its income and price effect are generally discussed through empirical models. In addition to all of these discussions, we think that the effort to standardize the income and price effects of intergovernmental transfer types with mathematical formulas does not make sense in practice and only serves the understanding of mono-economics. All because, these effects can vary in every economy according to the administrative structure, supply and demand structure, intergovernmental fiscal structure, ways of local governments' providing service, democratization culture, and norms and value judgments that affect the behavior of individuals. For this reason, perhaps, a structuralist approach should be developed regarding the local government economics.

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