

NÚMERO 217

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The Flypaper Effect in Mexican Local
Governments, 1990-2006

DICIEMBRE 2008



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Abstract

This work finds evidence of the flypaper effect of the unconditional federal transfers on the level of local public expenditure of 2,410 municipalities of Mexico during the period from 1990 to 2006, which suggests asymmetric information between local governors and citizens with respect to the amount of transferences received from the Federation such that the provision of public goods is greater than the socially optimal one (Oates, 1979). The flypaper effect found is asymmetric. In other words, the municipal governments use the transfers for certain programs that later, when these are reduced, are politically difficult to eliminate (Gamkhar, 1987).

Resumen

Este trabajo presenta evidencia del efecto flypaper que las participaciones federales ocasionan en el gasto público de 2,410 municipios de México durante el periodo comprendido entre 1990 y 2006. Esta evidencia permite conjeturar sobre la asimetría en la información que existe entre los presidentes municipales y los ciudadanos respecto a la cantidad de participaciones recibidas de la Federación. Esta asimetría explican que la provisión de bienes públicos sea mayor a la socialmente óptima (Oates, 1979). El efecto flypaper encontrado es asimétrico. En otras palabras, los gobiernos municipales emplean las participaciones para financiar programas a nivel local que son políticamente difíciles de eliminar, cuando el nivel de participaciones disminuye (Gamkhar, 1987).

Introduction

As scholars started to study the effects of intergovernmental transfers, they noted that at the theoretical level a number of equivalences were beginning to arise. Among these is the proposition that a local government will choose the same basket of public and private goods when its income increases due to either the presence of an intergovernmental transfer or a boost in the income of individual members of the community, equivalent to the amount of the transfer.

In contrast with this theoretical hypothesis, there is an empirical finding that intergovernmental transfers stimulate local governments to spend more than an increase of equal amount in the income of individual members of the community. To the extent that the established theoretical models—which assumed benevolent policy-makers—lacked explanatory power, the constant corroboration of such an empirical finding has been considered an anomaly. In fact, many observers have highlighted the tendency of local governments to increase their spending at a faster rate than the increase in the transfers received, thus generating a level of public expenditures that was later difficult to cut down, even if the intergovernmental transfer ceased to exist. At that point, the public finance literature began to categorize this inflexibility in public spending as an anomaly, that is, a “purely empirical phenomenon” named the flypaper effect.¹

The gap between the theory and the empirical evidence motivated many researchers to solve this theoretical inconsistency through the generation of a model, which assumes that the individual members of the community have imperfect information about the total amount of transfers received by their local government. In these cases, there is a fiscal illusion such that the individual members of the community perceive that the costs of the provision of public goods are less than what they actually are; and consequently, the provision of public goods is greater than what is socially optimal (Oates, 1979).

The objective of this paper is to test empirically for the flypaper effect and its asymmetries in Mexico’s local governments during the 1990-2006 period of time. Using the model of the benevolent policy-maker, the theory suggests that the impact of the unconditional intergovernmental transfers of Branch 28 on the level of local governments’ public spending would be similar to the one observed if the income of individual members of the community increased by the same amount as the transfers.

The hypothesis is that Mexico’s municipalities offer some important evidence for the flypaper effect as well as for the asymmetric behavior of

¹ Arthur Okun was responsible for naming such a result (Hines and Thaler, 1995, 218), identifying the phenomenon with a sticky paper that is usually used as a pesticide to exterminate not only insects but also rodents.

such effect observed during the period under analysis. The corroboration of this hypothesis indicates that local governments hide the true level of intergovernmental transfers so that individual members of the community perceive that the costs of providing public goods is lower than the real costs (fiscal illusion), and as a result, they choose a level of public goods that is higher than what is socially optimal. In addition, this study finds the presence of an asymmetric behavior that confirms Gamkhar and Oates' (1996) argument for the Mexican case: given the reduction of intergovernmental transfers, municipalities will try to replace them either with their own resources or through higher levels of public debt.

The article is organized as follows. In the first section, we present a literature review, which allows the reader to become familiar with the concept of the flypaper effect. Then, we describe how researchers have recently debated whether or not the flypaper effect is symmetric; that is, whether local governments' responses are the same when intergovernmental transfers increase or decrease. In the second section there is a description about the Mexican intergovernmental transfer system. We describe the data and variables used in the econometric model in the fourth section. The fifth section shows the results of the analysis. Finally, the last section offers some conclusions and implications of this study.

The Flypaper Effect

The Model of Collective Decision

According to the Bradford and Oates (1971a) theoretical framework of intergovernmental transfers the assignation and distribution of resources will be the same when local income increases, either because an unconditional transfer was granted to a group of people or because the transfer is given directly to each member of the group. This phenomenon is known in the literature as the "veil hypothesis" because it involves a transfer towards a region that is equivalent to a decrease in the collection of taxes of each member of the community (Hines and Thaler, 1995).

Bradford and Oates' (1971a) theoretical framework considers that local governments' allocation of resources to buy public and private goods is favored by simple majority rule; that is, the government implements only those policies that are "socially favored" by the community. The models that assume that governments make their choice following this rule are known in the literature as "benevolent" because they make their choice based on citizens' well-being. Even though Bradford and Oates' model of collective decision is not explicitly a median voter model, their implicit employment of

Duncan Black's (Bailey and Conolly, 1998) theorem allows us to consider their conclusions as though they were the result of a median voter model.²

Consequently, it is possible to affirm that according to the "benevolent ruler" models and those of the median voter, the flypaper effect should not happen in any economy under the justification that public spending is equally stimulated either by unconditional transfers or by an increase in the income of individual members of the community.

Unfortunately, empirical studies have continually rejected the hypothesis that the observed effect on the allocation of public budget is the same either when there is a transfer from the federal to the local government, or when the transfer is done directly to the individuals. Instead, it is claimed that the expenditures related to public goods always respond better to the intergovernmental transfers than to the increases in the income of each one of the individuals. That is, the free resources granted to local governors have a larger positive effect on public expenditures than what in theory should exist.

The constant repetition of this empirical result created a challenge for scholars interested in the issue. Moreover, there were a series of public programs built with intergovernmental transfers that were difficult to eradicate even when the transfers disappeared. In other words, once a local government was benefited by intergovernmental transfers, it would begin to finance a series of public programs that well adhered to the public agenda, becoming impossible to eliminate them, even if the intergovernmental transfer no longer existed. For this reason, this phenomenon was identified with a paper covered with sticky glue usually used to exterminate insects or rodents. This is how the flypaper effect of intergovernmental transfers was born.

Model of Bureaucratic Behavior

The empirical observation that local governments' public spending is more stimulated by an increase in unconditional federal transfers than by an increase of equal magnitude in individuals' income contradicts Bradford and Oates' (1971a) theoretical model of a benevolent ruler which is equivalent to a median voter model.

In order to reconcile the theory with the empirical evidence, Acosta and Loza (2001) developed a model based on two Niskanen's (1968) premises regarding rulers' bureaucratic behavior. The first premise states that the local government maximizes its budget, taking as given citizens' public spending demands (otherwise, citizens would not vote for the government). Such maximization is subject to the fact that the budget must be equal to or greater than the minimum total costs of the provision of goods in equilibrium.

² The Duncan Black theorem shows that the equilibrium level of a collective good is the median point, that is, the median of the levels of budget preferred by the individuals. In practice, this is the median voter theorem.

The second premise affirms that the local government exchanges the provision of goods only for its total budget, rather than do it at a “one to one” rate. This characteristic allows the local government to have a market power similar to that of a monopoly, such that its decision is “all or nothing.” This scheme is essential to let the ruler seize consumers’ surplus from each one of the members of the community.

The bureaucrat maximizes not only individuals’ utility but also the level of the budget. Consequently, the bureaucrat’s welfare function depends on multiple variables such as her salary, the benefit of the local office, her reputation and power. All of these variables constitute a positive monotone function of the budget. As a result, the objective of the local ruler is similar to that of the bureaucrat, consisting in maximizing her local budget.

The bureaucratic ruler will elect a combination of goods such that the level of public goods is greater than the social optimum obtained in the median voter model of collective decision with a benevolent ruler put forth by Bradford and Oates. As a result, the bureaucratic government moves away from citizens’ preferences because it has as an objective the maximization of the budget. Acosta and Loza (2001) assume that bureaucratic governments’ preferences as well as those of the individuals of the community are quasi-linear, which allow them to mathematically derive the flypaper effect.³

The quantity of public good provided is larger than what the community would vote in a model that assumes a benevolent ruler and, as a result, it is greater than it is socially optimal. This is how the flypaper effect can be consistent at the theoretical level.

The Model of Fiscal Illusion

An interesting question to be asked is why do citizens vote for a budget that is socially greater than the optimal, allowing the government to have a bureaucratic behavior? The literature offers an explanation, the so-called “fiscal illusion.” Oates (1979) establishes that the key to answer the previous question is the asymmetric information permeating individuals’ decision-making process. The idea behind the model is that the local government receiving federal transfers is capable of hiding information about the amount received. The flypaper effect can thus be observed in the model where individuals use the collective decision rule to elect their consumption basket of both public and private goods, with asymmetric information. This asymmetric information allows the individual to perceive a cost that is lower than the real one for the provision of public goods. For this reason, the median voter will choose a basket composed of public and private goods that does not coincide with the one observed in the benevolent ruler model.⁴

³ Acosta and Loza (2001) mention that the conclusions are maintained, even if we drop this assumption. In this case, they only use the assumption to facilitate the mathematical development of the model.

⁴ In order to see a slight modification to this model, also see Turnbull (1992).

Shaw (2005) developed a model of fiscal illusion originally proposed by Oates in 1979 and the main conclusions show the presence of the flypaper effect. It is important to mention that while the model of bureaucratic behavior derives the flypaper effect through the maximization of the bureaucratic government's utility function, the model of fiscal illusion does it through the maximization of the individuals' utility function.

When the median voter systematically perceives an amount of federal transfers that is lower than what the local government actually receives, she underestimates the level of intergovernmental transfers, perceiving that the necessary taxes to maintain the level of public expenditures are lower than what in reality is needed. As a result, the greater the fiscal illusion of the median voter, the greater will be the flypaper effect as well as the levels of public spending (Shaw, 2005).

The Symmetry of the Flypaper Effect

The unconditional federal transfers to local governments are not always the same and they can even increase or decrease according to the availability of annual federal resources or due to the economic or demographic changes in the municipalities. In this context, it is interesting to analyze whether the effect of intergovernmental transfers on public spending is the same in the case of either a reduction or an increase in the amount of transfers (Melo, 2002). The analysis that answers this question is known as the symmetry of the flypaper effect.

In the collective decision model with a benevolent ruler, a reduction in federal transfers would contract the budget restriction. If a reduction in the transfers were in the same magnitude as the previous increase, then the allocation of income between public and private goods should be equal to the observed initial equilibrium. However, the empirical evidence shows that local governments react differently when there is an increase and a decrease in transfers (Deller and Maher, 2006).

The empirical analysis of the flypaper effect estimates a coefficient for the impact of unconditional transfers on public spending. The symmetry hypothesis suggests that such a coefficient describes the reaction of public expenditures *vis-à-vis* either an increase or a decrease in the level of transfers. A coefficient of 0.5 implies that an increase of one per cent in transfers generates an increase of 0.5 per cent in public spending, while a decrease of one per cent in transfers produces a 0.5 per cent decrease in public spending (Gamkhar and Oates, 1996).⁵ When this situation holds the flypaper effect is symmetric.

However, one cannot assume that the coefficient by itself reflects the symmetry of the flypaper effect in both directions. In order to test it, one

⁵ This example assumes that the coefficient is the elasticity given that the variables of the econometric estimation are measured in logs. In fact, this is how this study measured the variables used in the empirical analysis.

should estimate a new coefficient within the same econometric estimation that could capture the exclusive impact of a reduction of federal transfers to a local government. A non-significant coefficient would suggest that a reduction and an increase in transfers have the same impact. Conversely, if the coefficient is significant, independently of its sign, it is sufficient evidence to claim that the flypaper effect is asymmetric.

When the asymmetric coefficient suggests that the reaction of public spending to a reduction in transfers is smaller than its response to an increase in transfers, one can call it asymmetry of "fiscal replacement." That is, the local government is somehow able to collect resources to meet its obligations at a certain level of public expenditures, even if they are no longer financed by intergovernmental transfers.

Fiscal replacement refers to the transfers that the federal government ceases to send to the municipality and that are replaced by higher levels of taxes or public debt issued by the local government. There are several explanations for why there is this type of asymmetry in the flypaper effect. Gramlich's (1987) explanation, the more widely accepted, proposes that governmental programs take "roots" and generate "clients," making them politically difficult to be cut off or removed when there is a reduction in intergovernmental transfers. In the following section, we will review the various cases of symmetric as well as asymmetric behavior of the flypaper effect.

The Empirical Evidence

Hines and Thaler (1995) elaborate a table citing a few of the pioneer studies about the flypaper effect and they show that the lower limit of the impact of an increase in intergovernmental transfers on the level of public spending is 25 cents, even though they recognize that there are studies where the relationship goes up to one to one. In contrast, Becker (1996) claims that there are endogeneity problems in the linear estimations of the flypaper effect, because many studies have shown that the level of transfers is influenced by the level of spending at the subnational level. Becker (1996) thus argues that these studies overestimate the impact of the transfers on the level of public expenditures and he shows that the flypaper effect is highly sensitive to the specification of the empirical model.

Megdal (1987) finds endogeneity problems in conducting a Monte Carlo simulation with a log-linear econometric model. He concludes that when a variable of intergovernmental transfers is constructed ad hoc, there is an overestimation of the propensity to spend lump-sum transfers due to the presence of endogeneity in the variables. However, he recognizes that given the fact that he used data that were artificially generated through a Monte Carlo simulation, it is not possible to conclude that this bias will generally be present in all cases. Knight (2002), in turn, studies the impact of federal

transfers on public spending in the federal aid program for roads at the state level in the United States. In a first approximation, the author finds evidence of the flypaper effect for the 1983-1997 period. However, in using instrumental variables, he rejects the evidence previously found, suggesting that the endogeneity in the transfers is what is actually driving the flypaper effect.

The large availability of data at the local level in the developed countries allows us to test for the presence of the flypaper effect while disaggregating it into the different programs of public spending. Deller and Maher (2006), for instance, conducted a study about the flypaper effect according to the type of expenditure in Wisconsin counties (United States). They conclude that the presence of the flypaper effect as well as its asymmetric behavior vary significantly according to the expenditure category. Pallesen (2006) conducts a comparable analysis for Danish municipalities, obtaining similar results, even though the country was in a transition from conditional to unconditional transfers.

Shaw (2005) finds evidence of the flypaper effect in the Canadian provinces during the 1981-2000 period. In addition, he finds asymmetries corroborating the argument of fiscal replacement. In contrast to the large number of studies that confirm the asymmetric effect, Gamkhar and Oates (1996) find that at the state and the municipal levels, the flypaper effect operates in both directions. That is, there is symmetry in the sense that expenditures respond in a similar manner to either increases or reductions in intergovernmental transfers.

Among the available studies for Latin American countries, it is possible to cite Acosta y Loza (2001). These authors test for the existence of this phenomenon in the provinces of Buenos Aires for the 1995-1997 period. Moreover, they find evidence that not only is local government's spending excessively pressured with an increase in transfers but also the government will increase the collection of taxes. For Colombia, Melo (2002) and Trujillo (2006) find evidence that the flypaper effect is present in municipalities that are highly dependent on intergovernmental transfers and that it has an asymmetric behavior.

The flypaper effect has been scarcely studied in the Mexican case, but only at the state level. Ibarra and Varela (2003) can be considered the first attempt. They employ time-series variables from 1975 to 2000 to conduct a linear and first-difference analysis, due to the fact that the series are not stationary. They conclude that the results can be justified because during the period of analysis local governments faced a rather lax budget restriction. Furthermore, during the financial crisis of 1994, governments granted large amounts of transfers that were allocated in a discretionary manner. This considerably increased expenditures as a reaction to the unconditional transfers.

Unconditional Intergovernmental Transfers in Mexico

Mexico is a federation constituted by 31 states and a Federal District. The capacity of the local governments to generate their own income is much smaller than the observed in Argentina and Brazil, the other two Federations in Latin America: 92 per cent of the total income of the Nation is generated mainly from the oil revenue by the central government.

The Mexican Constitution dictates government's responsibilities in the redistribution of income at three levels: federal, state, and municipal. More specifically, Constitutional Article 115 establishes the composition of the municipal government, its functions, and the unlimited administration of its resources.

The current fiscal arrangement in the different levels of the government in Mexico begins in 1980 with the creation of the National System of Fiscal Coordination that introduces the value added tax called IVA (Impuesto al Valor Agregado in Spanish). Since then, there have been a series of changes that have modified the intergovernmental fiscal relations in the country. In 1991 a new the criteria for the Fondo General de Participaciones, Branch 28, was established in the Fiscal Coordination Law to include variables such as population size, collectable taxes and a compensatory mechanism. Actually, 20 per cent of the tributary resources, including those resources obtained from oil revenues, are distributed to the states as unconditional transfers through the Fondo General de Participaciones, or Branch 28. State governments have plenty of autonomy to spend these resources, and local governments are responsible for allocating these resources in the most beneficial way for the municipalities. Unconditional transfers have increased more than 200 per cent in real terms during the period of analysis.

Data and Methodology

Description of the Sample

The objective of this research is to verify, for the first time in the literature the existence of the flypaper effect as well as its behavior within the context of a reduction in the transfers to Mexican municipalities during the 1990-2006 period. We use panel data for a sample of 2,410 local governments. All of the Mexican states are represented in the sample except the Federal District because the National Institute of Statistics, Geography and Data Processing (INEGI) does not provide information about income and expenditures for it. The representativeness of the sample is high because it contains 98.6 per cent of the total number of Mexican municipalities.

Variables

The municipal population was collected using data from the Housing and General Population Census for 1990, the Calculation of Housing and Population of 1995 and the Local Government Population Projections 2000-2003 conducted by the National Council of Population (CONAPO). However, to construct a panel database, it is necessary to have data from the municipalities for each one of the years of the period under analysis. For this study, it is necessary to estimate the municipal population for the intermediate years such that the whole period 1990-2006 is covered.

We estimate the rate of population growth for the periods 1991-1994 and 1996-1999. Taking as reference the document *Demographic Indicators by Federal Entities*,⁶ we calculate the average of total growth for each federal entity for these periods.⁷ Once this rate is calculated, we apply it to the population values of 1990 and 1995 for each local government. The results represent the variable of municipal population for the 1990-1999 period. From 2000 to 2006 the CONAPO projections are used.

The dependent variable is public spending. The values were taken from INEGI who offers public finance data (income, expenditures, and public debt) at the municipal level for the 1990-2006 period. The public spending variable is composed of gross municipal expenditures,⁸ because we consider that all of the expenditures by the governmental authorities will have as an ultimate objective the provision of public goods and services. The variable was deflated with the National Producer Price Index (INPP) and converted to per capita terms.⁹

In the case of the independent variable “unconditional federal transfers” we gathered the data on federal participations of SIMBAD. These federal participations represent the transfers that the federal government offers to the municipalities through Branch 28. Similar to what was done with the dependent variable, the unconditional federal transfers were deflated with the INPP and divided by the municipal population to be converted in per capita terms.

The other independent variable required by the model is the municipal per capita income. Unfortunately, in Mexico, a large part of the municipal level data is not available as historical series. This is the case of municipal level income, fact that justifies the search for a proxy that captures the behavior

⁶ Estimations come from the National Council of Population, August 2006. Historic series is based on the demographic conciliation since the XII Housing and General Population Census of 2000 and the Calculation of Housing and Population 2005.

⁷ The total growth rate is the average annual growth rate once we have considered the net migration balance.

⁸ The gross municipal expenditures are composed by the sum of the following: Personal Services; Materials and Supplies; General Services; Subsidies, Transfers and Aid; Acquisition of Furniture and Property; Public Works and Social Programs; Financial Investment; Federal and State Resources to Municipalities; Other Expenditures; Public Debt and Disposability.

⁹ The INPP series we used was collected from Banco de México.

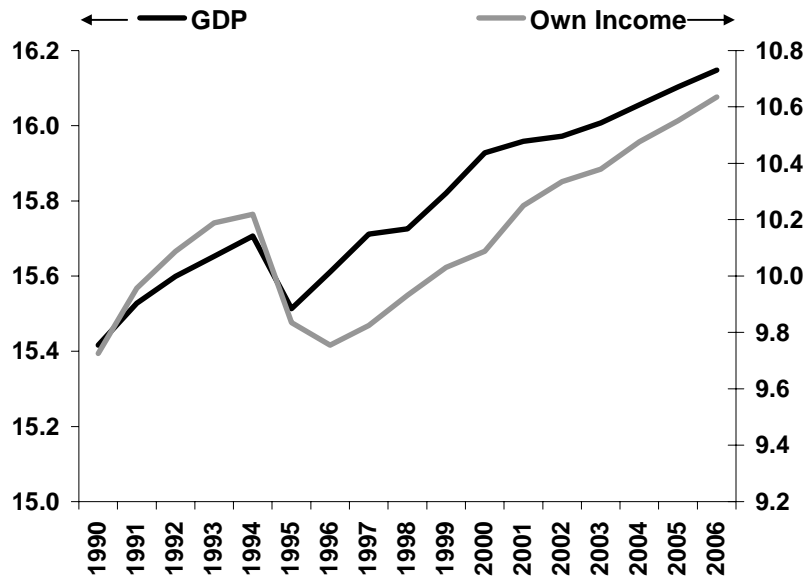
of the non-available variable. Using the available municipal income information for the period under analysis (1990-2006) offered by INEGI, we took their own per capita municipal income information as the best proxy for municipal per capita income.

Municipalities' own income is composed of taxes, rights, products, and interests. To a certain extent, this income represents individuals' income behavior; government's income comes from taxpayers, capturing the economic cycle of the population. In other words, in case of a negative shock on income, municipalities' own income decrease reflecting the economic behavior of the agents in the local community.

Although municipalities' own income can be used as the best possible proxy, it is important to mention that there could be a bias in the results. The challenge of using available data as proxy of variables that lack information is to choose an alternative variable showing a similar trajectory over time. In addition, it is important that the changes in the economic context reflect the expected impact on the unavailable variable.

Figure 1 represents the behavior of government's own income and Gross Domestic Product (GDP) at the national level. It is possible to observe how government's own income follows the same tendency as GDP. For the 1994-1996 period (Mexican Financial Crisis), it is clear that there was a sharp decrease in government's own income, which is also reflected in GDP and for the other years the behavior is more parallel. Similar to the other variables, government's own income is deflated by the INPP and it is divided by the municipal population to obtain the result in per capita terms.

FIGURE 1 GDP AND STATES' OWN INCOME, 1990-2006 (LOGARITHMS)



Source: INEGI

Finally, we construct a variable called asymmetry, which is a variable is dichotomous and it is constructed using the difference between the transfers in year t and that of year $t-1$. It takes the value of 1 when this difference is negative, that is, when the municipality experiences a reduction in unconditional transfers regarding the preceding year, and the value of zero in all other cases. Table 1 shows the basic descriptive statistics of the variables used in the model.

TABLE 1 BASIC DESCRIPTIVE STATISTICS OF THE ESTIMATION VARIABLES

Variable	Description of Variable	Mean	Maximum	Minimum	Standard Deviation	Variance
<i>E</i>	Per Capita Public Expenditure	1194.5	21723.0	0	1212.3	1469715.0
<i>T</i>	Per Capita Unconditional Transfers	646.8	16699.1	0	760.7	578643.2
<i>I</i>	Per Capita Municipal Income	140.6	7116.4	0	259.2	67176.3
<i>A</i>	Asymmetry of the Flypaper	0.5	1.0	0	0.5	0.2
Population	Municipal Population	39048	1868809	0	117193	1.4.E+10

Econometric Specification

The model to be estimated is the following:

$$\log E_{it} = \beta_0 + \beta_1 \log T_{it} + \beta_2 \log I_{it} + \beta_3 [A_{it} (\log T_{it} - \log T_{it-1})] + e_{it}$$

where: $i = 1, \dots, 2410; t = 1990, \dots, 2006$

In the specification, E represents the level of per capita public expenditure; T the per capita unconditional federal transfers that the local government receives; I is the per capita municipal income; A is the dichotomous variable asymmetry and e represents the error term.

There are different models that can be used for panel data. We select the best of these models by testing the behavior of the variables used. According to the results, the best panel model to be used is the fixed and temporal effects model because they deal with the problems of group autocorrelation and heteroskedasticity. To achieve robust and reliable results, we use a Prais-Winsten regression with Panel Corrected Standard Errors (PCSE). This model allows us to correct for autocorrelation, heteroskedasticity, and temporal effects, but not for fixed effects. However, given that the tests show that the fixed effects are relevant in the panel of municipal data, we can construct variables that contain such effects. This is done by calculating the average for each individual during the period under analysis, for each variable. Formally, the new variables for the PCSE model are calculated in the following manner:

$$\hat{y}_{it} = \left(\log y_{it} - \overline{\log y_i} \right) \quad i = 1, \dots, 2410; t = 1990, \dots, 2006$$

Where \hat{y}_{it} is the new variable which already takes into account the fixed effects and $\overline{\log y_i}$ is the average of the logarithm for each individual during the period under analysis.

Results

The six estimations conducted to calculate the flypaper effect in the Mexican municipalities are shown in Table 2. The variables are measured in logarithms, so the coefficients can be interpreted as elasticities. The six regressions offer evidence for the flypaper effect in the Mexican municipalities for the period under analysis. The coefficient for the unconditional per capita federal transfers, T , is larger than the coefficient for

the municipal per capita income, I , at the 1 per cent significance level in all cases.

The tests conducted with the variables under analysis show that the best estimation model is number six (PCSE Fixed and Temporal Effects), which suggests that a one per cent increase in the level of federal transfers is associated with a 0.4 per cent increase in public expenditure, whereas a one per cent increase in municipal per capita income (increase of the same magnitude) increases public expenditure by 0.15 per cent. Both coefficients are highly significant, and as a result, it is possible to conclude that during the 1990-2006 period, public spending in Mexican municipalities were more stimulated by increases in the transfers received from the federal government through Branch 28 than by increases in individuals' income.

As we have already mentioned, due to the fact that we have used government's own per capita income as a proxy for municipal per capita income, it is possible that there is a bias in the results. The main argument for such a bias is that the transfers to the local governments have generated a crowding out effect of its own income (Oates, 1999).

TABLE 2

Estimations of the Flypaper Effect in Mexican Local Governments						
	(1)	(2)	(3)	(4)	(5)	(6)
	Cluster	Random Effects	Fixed Effects	Fixed and Temporal Effects	PCSE Fixed Effects	PCSE Fixed and Temporal Effects
<i>E</i>	Dependent Variable					
<i>T</i>	0.794*** (0.004)	0.846*** (0.005)	0.931*** (0.006)	0.495*** (0.005)	0.687*** (0.007)	0.386*** (0.007)
<i>I</i>	0.167*** (0.002)	0.192*** (0.002)	0.245*** (0.003)	0.158*** (0.002)	0.223*** (0.004)	0.153*** (0.003)
$A(\log T_i - \log T_{i-1})$	-0.080*** (0.006)	-0.118*** (0.006)	-0.193*** (0.007)	-0.076*** (0.005)	-0.110*** (0.006)	-0.055*** (0.004)
<i>Constant</i>	1.141*** (0.023)	0.710*** (0.030)	-0.069* (0.040)	2.498*** (0.033)	-0.034*** (0.004)	-0.666*** (0.009)
No. of Observations	34121	34121	34121	34121	34121	34121
R-squared	0.74	0.64	0.64	0.81	0.57	0.78
No. of Local Governments		2410	2410	2410	2410	2410

Standard Errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

These results show evidence that local governments maintain levels of public spending that are larger than the socially optimal. Salazar and Mollick (2003) attribute this situation to the fact that in Mexico local governments have had rather lax budget restrictions. Thus, when governments decide the level of public spending they are not completely subject to their own resources

coming from tax collection, because they also depend on federal transfers and a certain amount of debt. This situation allows the municipalities to widen their budget restrictions by acquiring debt or negotiating a higher level of unconditional transfers.

The collective decision model proposes, however, that a widening of the budget restriction via unconditional transfers would result in the same level of public and private goods as the median voter would choose if she maximized her utility function. This paper has empirically shown that in practice such an expectation does not hold in the Mexican case, suggesting that members of the community have problems of fiscal illusion related to the amount of intergovernmental transfers received in their communities.

The government is thus able to alter individuals' perception regarding the correct amount of intergovernmental transfers to the extent that individuals perceive a cost of providing a public good that is different from the real one. The result is that individuals choose a level of public goods that is higher than what is usually desired in a context of perfect information.

Concerning the analysis of the symmetry of the flypaper effect, in Table 2 we observe the presence of asymmetries in all estimations at the 1 per cent level of significance. It should be clear that given the construction of the econometric model, the negative sign of the coefficient in the interaction $A(\log T_i - \log T_{i-1})$ implies a positive impact on public spending. This is due to the fact that A is a dichotomous variable that takes the value of 1 when the difference in the transfers from one year to another is negative. As a result, the interaction generates a series of values that are always negative and, if the coefficient is also negative, the impact of a one per cent reduction in federal transfers yields an increase in public spending of the magnitude of 0.1 per cent. This result corroborates Gamkhar and Oates' (1996) hypothesis, which suggests that asymmetries arise because municipal governments use the transfers to finance programs that are politically difficult to eliminate when there is a reduction in federal transfers. In order for that to happen, governments must replace the resources that were eradicated with their own resources, coming from either a more strict tax collection scheme or higher levels of public debt.

According to Salazar and Mollick's (2003) this replacement of resources is possible given that the budget restriction of the municipalities is lax. This paper has empirically shown that even when unconditional federal transfers decrease, a certain level of public spending is maintained at a higher level than the socially optimal.

Conclusions

Mexico has recently experienced an important process of fiscal decentralization in which the unconditional transfers, granted via Branch 28, have remarkably increased towards the municipalities with the objective of stimulating their development and improving the living conditions of the population.

In this context, this paper conducts an analysis of the impact of unconditional federal transfers on local public spending for a sample of 2,410 municipalities in Mexico during the 1990-2006 period. We find evidence of the flypaper effect; that is, local governments' public spending is more stimulated by the unconditional federal transfers than by an equivalent increase in the level of income of individual members of the community. This situation suggests that there is an asymmetry of information between local governments and their citizens regarding the amount of transfers received. Individuals perceive a lower marginal tax (individual cost for the public good) than the real one. To the extent that the illusionary effect increases, this effect is larger, causing the provision of public goods to be greater than the social optimum (Oates, 1999).

We also find evidence that the flypaper effect in the Mexican municipalities is asymmetric; that is, public spending does not respond to the increases in transfers the same way that it does in the case of a decrease in transfers. This result corroborates Gamkhar and Oates' (1996) hypothesis regarding resource replacement, which suggests that municipal governments employ the transfers for certain programs that are politically difficult to eliminate, even when there is a reduction in federal transfers. This resource replacement is possible thanks to the fact that the budget restriction in Mexican municipalities is rather lax, to the extent that governments have the option to collect their own resources via public debt, for example.

Empirical analyses at the municipal level in developing countries are difficult to undertake due to the fact that a large part of data necessary to conduct the studies are not available. Up to now, it is only possible to draw conclusions at the aggregate level, which show that local governments present evidence of the flypaper effect with asymmetric behavior. This suggests that there is an asymmetry of information between the government and individual members of the community, allowing for the municipalities to have bureaucratic behavior, thus generating problems of fiscal illusion. These results highlight the importance of evaluating the effectiveness of public spending at the local level in future research.

Future research should also analyze the flypaper effect by the type of spending. Once again, the correction of these problems is subject to the availability of data at the local level so that another type of variable, one

that would capture the impact in a more precise manner, could be constructed.

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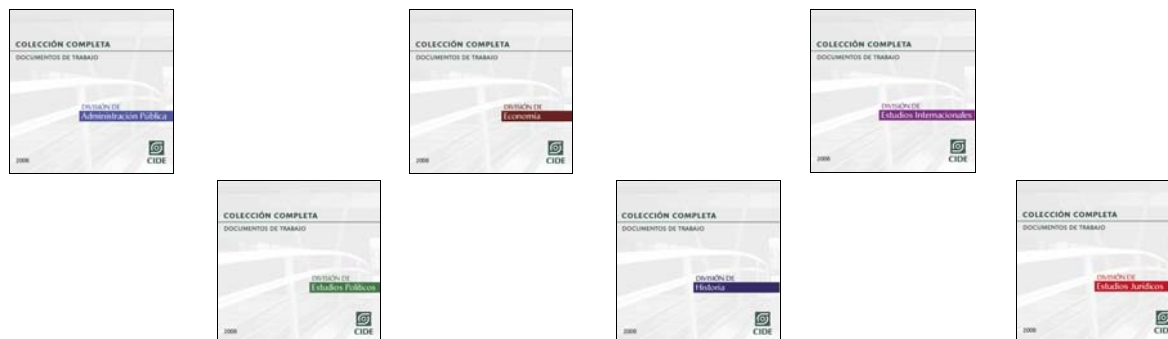
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