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HOW STICKY ARE LOCAL EXPENDITURES IN ITALY? ASSESSING THE RELEVANCE OF THE "FLYPAPER EFFECT" THROUGH MUNICIPAL DATA

by Elena Gennari* and Giovanna Messina**

Abstract

An extensive literature analyses the impact of upper-tier transfers on the spending behaviour of lower level governments. According to the median voter framework, a transfer from the centre should act as a lump sum grant to residents and thus be spent by jurisdictions in the same proportion as residents are willing to spend their own money on public goods and services. But the actual local expenditure response to central government transfers is stronger than predicted by the theory, giving rise to the "flypaper effect". Using the database on municipal accounts, and various other information sources, this work aims at assessing the size of the effect for Italian municipalities and the symmetry in the local expenditure response to central government transfers. Our dataset enables us also to investigate the role of some political factors. We find a sizeable effect and a remarkable asymmetric response of municipal expenditures to central government transfers as well as a significant role for political variables.

JEL Classification: D72, H30, H72, H77.
Keywords: flypaper effect, intergovernmental transfers, fiscal federalism.

Contents

1. Introduction 5
2. Theory of intergovernmental transfers and the *flypaper* effect 6
3. State transfers in the Italian institutional framework 10
4. Testing the *flypaper* effect 12
   4.1 Our model 12
   4.2 The dataset 14
   4.3 Some econometric issues 18
   4.4 Estimation results 19
   4.5 Robustness checks 21
5. Concluding remarks 24
References 26
Figures 29

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1 Introduction[1]

The *flypaper* effect denotes an overreaction of local expenditures to varying transfers from upper-tier governments and it is one of the most explored subjects in the fiscal federalism literature.

According to the theory, unconditional grants crowd out local revenues as only a fraction sticks to the public sector and is spent by the grantee to buy local public goods, while an equivalent share is expected to flow into private sector through a reduction in tax rates. This prediction rests upon the fundamental assumptions that government spending decisions reflect voter preferences, on one hand, and that individuals perceive grant income and private income to be fungible, on the other. But in the real world grant revenues have proved to be much more sticky in public budgets than the theory predicts. This boosted a huge empirical literature, which has also showed that spending is often more sensitive to increases than to cuts in transfers.

We are persuaded that testing the relevance of the *flypaper* effect is not just a fancy empirical exercise. The overreaction of expenditures to transfers may be due to politicians aiming at maximising local budgets, with a greater propensity to spend on public goods than their voters. An asymmetric response would reveal that grant cuts may not help in curbing expenditures. This is a potentially relevant matter of concern in Italy, where fiscal adjustments are implemented through significant cuts on transfers to local authorities.

Despite the increasing role of local decision-making bodies in Italy, only few attempts have been made so far to understand thoroughly their budgetary behaviour and in particular the way in which it is influenced by State transfers. Our work seeks to supplement this dearth of evidence by focusing on the responsiveness of expenditures of Italian municipalities to State grants in the most recent years (1999-06).

There are two distinguishing features of our analysis as compared to other studies. First, our cross section is much larger (we use data on almost 8.000 municipal balance sheets per year) so that our results are corroborated by a huge variability in the data. Second, following some recent works in the political economy literature, we build a broad empirical model which takes into account not only traditional socio-demographic determinants of local

[1]We are grateful to the participants of the XXI SIEP Conference in Pavia and of the 50^{th} SIE Conference in Rome, for useful comments on earlier drafts and to two anonymous referees. The opinions expressed in this paper do not necessarily reflect those of the Bank of Italy.

expenditures but also political factors (such as electoral cycles, party fragmentation, political orientation of local bodies) that may shape the budget behaviour of municipalities.

The rest of the paper is structured as follows. The second section describes the *flypaper* effect as a puzzle to the traditional theory on intergovernmental transfers. The third section gives some information about the Italian setting, describing the changes in the revenue structure of subnational governments in the last two decades along the path towards decentralisation. The fourth section is devoted to empirical testing: it opens with an outline of our empirical strategy, then it describes our dataset, and finally it discusses our results. The fifth section concludes.

2 Theory of intergovernmental transfers and the *flypaper* effect

According to the median voter framework, which has represented the benchmark for this type of analysis, grants induce income and price effects which shift local demand for public goods. More specifically, unconditional grants act as lump sum transfers and are thus associated with a pure income effect. Matching grants have instead a greater stimulatory power as they couple income and substitution effects, the latter stemming from a reduction in public goods relative prices (see Gramlich, 1977 for an overview). An active area of research has dealt with the so called *flypaper* effect, which points to the occurrence of an overreaction of local expenditures to unconditional transfers from upper tiers.

Consider a stylised model with a representative citizen (median voter) and a policymaker. The median voter's gross private income y, exogenously given, is allocated to private consumption c and to the payment of local taxes t. We assume that the fiscal burden reflects individual fiscal capacity, expressed by the share $h_i = y_i/\overline{y}$, where $\overline{y}$ is the average gross income. Hence (gross) private income can be written as:

$$y_i = c_i + t_i = c_i + h_i\bar{t} \tag{1}$$

where c_i and t_i are individual consumption and taxes, $\bar{t}$ is the average tax burden. Policymaker chooses the aggregate level of public services provision, which is financed either by local taxes or by upper-tier lump transfers Z^*, which are determined exogenously; for simplicity, we assume that sub-

national governments cannot issue debt[2]. The aggregate budget constraint faced by the local officer can hence be written as:

$$G = T + Z^* = \sum_i h_i \bar{t} + Z^* \tag{2}$$

Assuming that upper-tier transfers are distributed among individuals according to their contribution to aggregate tax revenue, we can rewrite (2) as:

$$\sum_i g_i = \sum_i h_i \bar{t} + \sum_i h_i \bar{z} \tag{3}$$

where $\bar{z}$ is per capita transfer. The policy maker chooses G (and T) in order to maximize the median voter's utility function, which is positively affected by consumption and individual share of public goods g_i:

$$maxW = U(c_i, g_i) \tag{4}$$

The individual budget constraint is given by the median voter's full income (I) which, taking into account (1) and (3), can be written as:

$$I = (y_i + h_i \bar{z}) = c_i + g_i \tag{5}$$

In this set up a unit rise in private income would produce a rise in the consumption of public good equal to $\Delta g_Y = (\delta g / \delta I)$ while a unit rise in transfers would result in a public good consumption increase of $\Delta g_z = (\delta g / \delta I) h_i$ (see Inman, 2008).

The impact of lump sum transfers is the one depicted in figure 1a. The horizontal axis measures public spending G in both money and real terms (i.e. price is set equal to one), while the vertical axis represents total post-tax income Y. Local community preferences are exemplified by the indifference curves of the median voter. The constraint faced by the local decision-maker in allocating goods between public and private sectors is given by the budget line AB, whose slope is equal to the individual's local tax share h (i.e. the relative price of one additional unit of public good out of private income). An unconditional grant of Z shifts the equilibrium from e_1 to e_2 (along the

[2]This assumption is not too restrictive in the Italian framework, where the issue of local debt is subject to the following limitations: borrowing is allowed only to finance investment expenditures (golden rule) and is subject to quantitative ceilings in terms of the ratio of interest expenditures to current revenues (for Provinces and Municipalities) or to the ratio of amortization instalments to tax revenues (for Regions). Overall, subnational governments account for a share of roughly 6 per cent of total general government debt.

EP dotted path), where the community indifference curve is tangent to the new budget line CD. The change in local expenditures is expected to be less than the size of the transfer: in the new equilibrium, Y increases along with G since the lump sum transfer substitutes for local taxes. Thus the standard prediction of the theory is the 'equivalence theorem': from the point of view of local spending, a unit increase in transfers paid by central government produces the same effect as an h unit increase in private income (from the graph, if Y increased by W=hZ units the budget line would in the same manner shift to CD).

The a priori theoretical equivalence between the stimulative impact of unconditional transfers and that of private income has been widely disproved by empirical literature. Since the median voter tax base is generally less than the average tax base (i.e $h < 1$), then the ratio $\Delta g_z/\Delta g_Y$ should be less than one. However, the empirical research has shown that this is not the case. The estimates of Δg_z are more than ten times larger than those of Δg_Y, as will be shown in section four. This evidence was labelled by Arthur Okun the *flypaper* effect since "money sticks where it hits" (Courant *et al.*, 1979), meaning that the reallocation of resources between public and private sector is very rigid and that money is mainly spent by the sector which receives it first. Graphically, this implies that - for any possible increase of Z - the new equilibrium lies along a path as EP', which is located to the right of the e_1e_2 line in Figure 1b (where the marginal rate of substitution of G out of Y is greater than the slope h).

The *flypaper* effect refers to a strong empirical asymmetry between the magnitude of the reaction to increases in private income as compared to lump-sum transfers. A second type of asymmetry which has been found in the literature is related to the sign of the variation in transfers (cuts versus increases). Losses in transfers may be partly compensated by local governments willing to preserve expenditures by raising additional taxes: this is the "fiscal replacement" effect observed by Gramlich (1987)[3]. Alternatively, local governments may magnify the spending response to cuts in grants by lowering own revenues as well: this gives rise to the "fiscal restraint" type of asymmetry also called *super-flypaper* effect by Gamkhar and Oates (1996). In the "fiscal replacement" case spending is less sensitive to cuts than to increases in central transfers, while the opposite occurs in the "fiscal restraint"case. For the sake of graphical representation, starting from e_2, if

[3]The fiscal replacement type of asymmetry as been dubbed as "money sticks where it hits, but it comes unstuck without leaving a gaping hole" (Gamkhar and Oates, 1996, p. 502).

the budget line moves from CD to AB the equilibrium path would be like EP'' in the fiscal replacement case (where the marginal rate of substitution of G out of Y is lower than h, Figure 1c), and like EP''' in the fiscal restraint case (where the marginal rate of substitution of G out of Y is greater than h, Figure 1d).

But what are the theoretical explanations of the *flypaper* effect? Bailey and Connolly (1998) assume that standard theory still holds, but under ideal conditions whose violation gives rise to the *flypaper* effect. On the supply side, the crucial assumption of a harmony of interests between the decision-making body and the community has been questioned by models showing that agents in the budgeting process (politicians and bureaucrats) may pursue their own objective functions rather than that of their principal. On one hand, politicians may use expenditures as a way to feed their clienteles and perpetuate their tenure (McGuire, 1975). Similarly, bureaucrats may aim at maximising their income and other non monetary rewards (such as perks, status, power, privileges of the office) which increase monotonically with the size of the budget (Niskanen, 1968). On the demand side, the *flypaper* effect can arise as a consequence of voters' fiscal illusion (Oates, 1979 and Courant *et al.* 1979). When spending is financed by lump sum transfers, the tax price of services provided by local governments is reduced on average: when setting their desired level of local public goods, voters confuse the marginal price of the goods (unaffected by the transfer) with their lower average price and this generates a substitution effect.

Another line of analysis explains the *flypaper* effect from a totally different point of view. According to Hines and Thaler (1995) the overreaction of local spending may arise as a consequence of behavioural phenomena, as loss aversion and lack of fungibility between different types of funds. If taxpayers are more sensitive to decreases than to increases in their welfare and if they do not treat similarly changes in current and in future income, then it becomes likely that subnational governments are more prone to expand their budgets with grants than with taxes.

Finally, some authors have interpreted the overreaction of spending to transfers merely as an econometric artefact, resulting from some kind of model misspecification. According to Becker (1996) the magnitude of the *flypaper* effect could be amplified by the choice of an inappropriate functional form as well as by the possible endogeneity of grants in spending decisions[4]. The empirical results may also be biased by some specification error arising

[4]Endogeneity problems, for instance, create an upward bias by a factor of almost ten (Becker, 1996).

from the nature of the government granting process: grants perceived as unconditional by the researcher may implicitly include some matching elements and thus produce a greater stimulatory impact than pure lump sum transfers.

3 State transfers in the Italian institutional framework

In the Italian institutional framework the subnational sector comprises three levels of government: Regions, Provinces and Municipalities. Regions are involved primarily in the provision of health services, Provinces perform some functions in the areas of road maintenance and natural environment, while Municipalities are responsible for public illumination, waste disposal, urban road maintenance, local transports, social aid, childcare and primary schooling.[5]

Intergovernmental grants have historically played a significant role in the financing of subnational governments in Italy. Up to the early nineties transfers resulted from yearly negotiations with central government; funds were mostly earmarked and allocated in such a way to compensate for individual differences between past expenditures and own revenues.[6] The recursive link between State transfers and past expenditures weakened local administrators' budget constraints and generated overspending, contributing to the deterioration of the overall fiscal framework.

With the start of the monetary unification process the need for Italy to engage in budget consolidation became imperative. Decentralisation gained momentum as an important instrument to achieve fiscal discipline by the mid nineties. The financing system of low-tiers governments was substantially changed: own taxes boosted while the share of expenditures covered by intergovernmental transfers gradually declined (Figure 2).[7]

From the point of view of timing, Municipalities leaded the transformation of Italian subnational finance. Their revenue structure was reformed in

[5]The share of subnational expenditures accounted for by each level of government is roughly two thirds for Regions, and less than thirty per cent for Municipalites.

[6]This was a consequence of the fiscal reform of the early seventies, which centralized most of taxing and collecting powers to the State while suppressing some municipal taxes (such as the family tax, the consumption tax and the tax upon the value increases of building areas).

[7]The work by Darby *et al.* (2004) shows that attempts for consolidation have brought substantial changes in lower tiers financing system in many OECD countries. For a more detailed description of fiscal decentralisation in Italy see Franco *et al.* (2004).

1992, with the assignment of a property tax along with the rationalisation of transfers from State, which became largely unconditional.[8] The criteria for grant allocation were renewed in order to reflect structural parameters (i.e. demographic, socio-economic and fiscal indicators) rather than past expenditures. Further changes occurred in 1997, when some minor revisions of the allocation criteria were put in place, and in 2001.[9]

The evolution of municipal tax revenues, primary expenditures and transfers from public governments is depicted in figure 3. The figure is based on national accounts data, expressed in real terms on a per capita basis. We can observe a sharp fall of transfers in 1992-1993, which is a composition effect due to the introduction of the municipal property tax. The trend for transfers kept on downwards up to 1995, and was then followed by periods of alternating dynamics: a slight increase from 1996 to 1998, a decline from 1999 up to 2005, which was temporarily interrupted in 2001 (when Municipalities were granted a financial compensation for the abolition of some minor local taxes) and in 2004, and a strained growth in the last two years. The evolution of expenditures was similar and apparently sensible to that of transfers, particularly in the years from 1995 to 2001. A change seems to have occurred by 2002: expenditures kept on growing, although transfers were not, and were partly financed by increases in tax revenues. The trend inverted in 2004, when expenditures resumed to follow the path of decreasing transfers; it has to be noticed that from 2003 to 2006 municipalities were prevented to use some of their fiscal powers as a way to curb local expenditures.[10]

Overall, the aggregate data seem to show anecdotic evidence of a strong reaction of local expenditures to State transfers up to 2001, and of a somewhat fiscal replacement behaviour in the two subsequent years. But this analysis can be misleading and has to be supplemented by an investigation at the micro level, which is the object of the following section.

[8] See Decree law n. 504/1992.

[9] Decree law n. 544/1997 introduced new parameters concerning the extent of service provision, the presence of military bases and indicators of socio-economic decay and of fiscal effort. In application of the financial law 448/2001, starting with 2002 the annual amount of transfers to be allocated among municipalities has been set as a proportion of the receipts from national personal income tax.

[10] In particular, municipalities were not allowed to increase rates for the local surcharge on personal income tax (which accounts for a share of roughly 6 per cent of municipal total tax revenues). It has to be noticed that, for this kind of tax, revenue effects of varying rates are observed with a one year lag.

4 Testing the *flypaper* effect

The evidence of the *flypaper* effect is widespread (Table 1). The literature has been particularly prolific for the US, favoured by the richness of available data as well as by a wide use of grants. For that economy the measured rate of change of expenditures relative to intergovernmental grants Δg_z ranges from 0.25 (found by Gramlich and Galper, 1973) to more than 1.00 (Case, Hines, and Rosen, 1993); the corresponding rate of change in individual income Δg_y is 4 to 6 times smaller. Additional asymmetries in the reaction to increasing as opposed to decreasing grants seem to be not statistically relevant according to Gamkhar and Oates (1996).

European economies display even more sensitiveness to variations in transfers. The *flypaper* is appreciable for English and Welsh counties (Gemmell *et al.*, 2002), while it becomes huge for Norwegian (Tovmo and Falch, 2002) and Flemish municipalities (Heyndels, 2001); in the latter case, asymmetries with respect to the sign of variations in transfers appear to be significant. As for Italy, only a couple of attempts to measure the stimulative impact of State grants have been made so far. In particular, Levaggi and Zanola (2003) found evidence of *flypaper* in regional health expenditures in the years from 1989 to 1993, with a remarkable asymmetrical effect. More recently the results by Legrenzi (2009) show a downward inflexibility of both municipal spending and tax revenues in the period 1955-2003, which could be attributable to some form of budget maximising behaviour of local bodies.

4.1 Our model

Our empirical strategy is aimed at evaluating the sensitiveness of municipal budgets to transfers by measuring two types of asymmetries: the first concerns the magnitude of the reaction to increases in private income as compared to increases in lump-sum transfers (the standard *flypaper* effect); the second type of asymmetry is related to the sign of the variation in transfers (cuts versus increases).

We assume that decision-makers are subject to a revenue constraint and discretionary set the level of expenditures (and own revenue) in order to appeal a utility maximising median voter. For the sake of comparison we follow previous work in the literature, and estimate a reduced form equation on the expenditure side which can be derived from the analytical framework outlined in Section 2. In the estimating equation spending is a function of intergovernmental grants, private income and a vector of several socio-

Table 1: Some evidence of the *flypaper* effect

Author	**Data**	**Sample**	Δg_z	Δg_y	**Asym.**
Gramlich and Galper (1973)	10 US urban governments	1962-1970	0.25	0.05	-
Gramlich and Galper (1973)	aggregate US state and local government data (quarterly)	1954-1972	0.43	0.10	-
Case, Hines and Rosen (1993)	48 US states	1970-1985	0.65-1.02	0.11-0.17	-
Gamkhar and Oates (1996)	aggregate US state and local government data (annual)	1953-1991	0.62-0.73	0.11-0.28	not sign.
Heyndels (2001)	308 Flemish municipalities	1989-1996	1.03-1.13	0.04-0.05	sign.
Gemmell, Morrissey and Pinar (2002)	54 English and Welsh counties	1991-1992 1993-1994	0.70-0.75	0.10-0.22	-
Tovmo and Falch (2002)	605 Norwegian rural municipalities	1934-1935	1.31-2.09	0.07-0.10	-
Levaggi and Zanola (2003)	18 Italian regions	1989-1993	0.56-0.84	0.01-0.02	sign.

economic and institutional determinants of spending. Furthermore, our set of controls includes, as in Tovmo and Falch (2002) and in Borge *et al.* (2008), some political factors that may be relevant in shaping local budgeting decisions.

The basic estimating equation for municipal expenditures is therefore:

$$G_{it} = \alpha_0 + \alpha_1 Z_{it} + \alpha_2 A_{it} + \alpha_3 Y_{it} + \beta X_{it} + u_{it}$$

where G_{it} is the level of total spending, Z_{it} is the level of transfers from the central government, Y_{it} is the private income, X_{it} is the vector of controls and u_{it} is the disturbance term. The variable A_{it} is introduced to capture a possible asymmetrical response to transfers, namely:

$$A_{it} = D_t(Z_t - Z_{t-1})$$

where D_t is a dummy equal to 1 when transfers are decreasing and 0 otherwise. A rejection of the null hypothesis of symmetry (i.e. $H_0 : \alpha_2 = 0$) implies that α_1 is the expenditure response to increasing grants, while $\alpha_1+\alpha_2$ is the coefficient on declining grants; in this case, $\alpha_2 < 0$ means that we are in presence of a fiscal replacement type of asymmetry while $\alpha_2 > 0$ reveals a *super flypaper* effect.

4.2 The dataset

In order to test for the *flypaper* effect we use a panel data of Italian municipalities in 18 regions covering 8 years (from 1999 to 2006). To cope with the presence of several outliers in balance-sheet data (some of which are due to specific events, such as earthquakes or floods, that exceptionally boost State grants) we trim the first and the last percentile of capital expenditures[11]. Overall, our data set consists of 55-60 thousands of observations. Table 2 reports labels, descriptions, summary statistics and data sources for the dependent and explanatory variables used in the model.

Dependent variables

We estimate the model considering two different dependent variables: G_{it}, which is the level of per capita total expenditures in each municipality[12] and $Gcap_{it}$ which is the level of per capita capital expenditures.[13] Our data

[11] In Section 4.5 we check the robustness of results to the trimming.

[12] Total expenditures include current and capital outlays but exclude financial operations. They include interest expenditures whose incidence is, however, quite low.

[13] We did not take into consideration sub-items of municipal expenditures as the corresponding data are not completely reliable. As a matter of fact, the classification of local expenditures into sub-categories is not homogeneous among municipalities.

source is the Italian Home Office, which collects final budget sheets from all Italian municipalities (and provinces as well) on a yearly basis.

Explanatory variables

Our main regressors in both equations are State transfers and gross income per capita (tax base). State transfers (Z_{it}) are taken from the Home Office balance sheet data set mentioned above and include only current transfers[14]. This kind of transfers are totally non-earmarked and are hence unconditional. Due to the dearth of data at municipal level, we use as a proxy of the median voter's gross income (Y_{it}) the average personal income tax base stated in the database on income tax returns of the Revenue Agency.[15]

Demographic, socio-economic and institutional controls

Following the literature we add to the main regressors a set of conventional demographic, socio-economic and institutional controls. More precisely, our demographic controls are composed by the municipality's population size (POP_{it}, the number of residents) and the ratio of population less than 10 and more than 65 years old (DEP_{it}). We then add also the municipal surface (SUR, in hectares). Population size and surface could influence expenditures since the cost of providing public goods may be subject to economies of scale; population age may be relevant for public spending, as services targeted to elderly and to children are expected to cost more. Following Wickoff (1991), we include as a proxy of socio-economic status the educational level of the community (EDU_{it}), given by the share of residents with high school education. This should control for the fact that the socio-economic condition of residents could influence the possibility of attaining a given standard in the provision of public services with a lower level of expenditures as argued by Hamilton (1983) and Oates (1977, 1981). The data source for socio-demographic variables is the National Statistical Office.

In our first set of conventional controls we include three more variables in order to account for some peculiarities in the public goods production function or in the budgeting process: the degree of altimetry (ALT_{it}, expressed as the altitude with respect to the sea level), a dummy variable indicating if the municipality is also the administrative centre of the province ($TYPE_{it}$), and a dummy for municipalities falling into 'special status' regions ($STAT_{it}$). These are regions which enjoy a greater degree of decentralisation from the

[14]Current transfers include proper State current transfers and the proportion of national personal income tax assigned to municipalities by financial law 448/2001.

[15]Another variable to be considered would be debt, although the simplified model presented in Section 2 does not account for debt financing. Unfortunately data for local debt at the micro-level are not currently available.

point of view of the function performed, and hence their budgets are oversized with respect to 'ordinary' regions; municipalities belonging to these regions somewhat share this peculiarity and exhibit higher than average level of expenditures.

Political controls

A second set of controls is a distinguishing feature of our data set. Public finance has become deeply entrenched with political economy, once it has been widely acknowledged that the budgeting process arises from a principal-agent relationship. A number of studies has dealt with how observed spending and taxation choices are influenced by politics (see Besley and Case, 1995, for a notable example). We thus add some controls for the political factors that may shape local budgets, namely: a variable representing the position of each municipality along the political cycle ($CYCLE_{it}$ computed at each time t as the time span to the following council election), a dummy representing the possibility for the mayor to be re-elected in the following election ($TERM_{it}$, equal to 1 if the mayor is at the second term and thus cannot be re-elected), an index of compactness of the governing coalition ($COMP_{it}$, which is an Herfindal index of the share of each party sitting in local councils), and a dummy for the political orientation of local bodies (POL_{it}, taking a value of 1 for centre-right governments) for the common wisdom that right wing governments tend to spend less than left wing ones. We also introduce the interaction factor CYCLE*TERM. All other things being equal, if politicians tend to maximise their probability of being re-elected, CYCLE is expected to have a negative effect on spending like the variable TERM, but the magnitude of the negative relationship between time distance to the elections and spending could be damped by a binding term limit. The degree of homogeneity in the political structure may also matter: Tovmo and Falch (2002) and Borge *et al.* (2008) argue that the strength of political leadership is negatively related to the size of local budgets, since a weak government would be more prone to bargaining and more reluctant to cut spending, as it would find it difficult to resist to pressures from local interest groups; if their argument is right COMP should have a negative sign in our regressions. All our political variables have been computed from the database on local and general elections of the Home Office.

Table 2: Summary statistics

Variable	Definition	Mean	Std. Dev.	Min.	Max.	N	Data source
G	Total Expenditures - per capita	1247.409	884.192	42.2	24943.551	64982	Home office
Gcap	Capital Expenditures - per capita	535.377	646.92	25.973	5102.738	64991	Home office
Z	Current State transfers	234.833	140.019	0	6137.488	64750	Home office
Y	Personal income	8505.745	2928.273	1301.612	51255.594	57259	Revenue Agency
ALT	Altimetry - meters	340.982	285.024	0	2035	64991	Nat. Stat. office
TYPE	Administrative centre	0.015	0.12	0	1	64991	Home office
POP	Population size - thousands	7.274	40.529	0.031	2705.603	64991	Nat. Stat. office
SUR	Municipal surface- thousands meters	3.632	4.961	0.01	128.53	64594	Home office
DEP	Share of population < 10 and > 65 years	22.095	6.721	5.444	67.089	64991	Nat. Stat. office
EDU	Share of population w/high school educ.	27.591	6.337	5.263	72.107	63709	Home office
CYCLE	Days before next election	1221.573	501.776	73	2336	63756	Home office
COMP	Index of coalition compactness	69.066	26.845	6.560	100	58431	Home office
POL	Political orientation	0.155	0.362	0	1	64991	Home office
TERM	Eligibility of the mayor	0.413	0.492	0	1	54644	Home office
STAT	Special status region	0.156	0.363	0	1	64991	Nat. Stat. office

4.3 Some econometric issues

The estimation of the model is potentially affected by some relevant econometric problems. A first issue is the possible endogeneity of the variable representing transfers from central government. Transfers to municipalities could be set simultaneously with local expenditures, and this would cause an endogeneity problem which should be treated properly in order to get consistent parameter estimates. But, as pointed out in Section 3, this seems not to be the case. Since 1992 new allocative criteria for State transfers were introduced, hence, if at all, their distribution follows the setting of local expenditures at that date; furthermore, from 2002 the amount of State transfers is set as a proportion of the receipt from national personal income tax. Hence we can reasonably assume that reverse causation from expenditures to transfers is not at work.

A second estimation issue, as pointed out by some authors (Bailey and Connolly, 1998; Becker, 1996), is represented by the possible presence of omitted variables which, if correlated with regressors, lead to inconsistent estimates. To help solving this problem the inclusion of a large set of controls may sometimes be the right choice but in many cases it is not sufficient. To test whether this issue is relevant in our case we performed an Hausman test comparing random-effect estimates of the model, which are consistent only if there are not omitted variables correlated with regressors, and fixed-effect estimates, which are consistent in both cases, under the assumption that non-modeled heterogeneity can be considered time invariant. Results are reported in table 3. The model for per capita total expenditures was estimated with fixed and random effects using the whole set of controls and with panel-robust standard errors. Since the RE estimation is likely to be non-fully efficient, we could not adopt the standard version of the Hausman test. We thus boostrapped the coefficient difference and tested its overall significance (see Cameron and Trivedi, 2005 and 2009). The evidence led us to accept the null hypothesis. Individual effects can then be considered uncorrelated with regressors and RE estimator can be used. We can thus obtain the estimation of all coefficients, including those of time invariant variables, exploiting both cross sectional and time variation. As a matter of fact the use of FE estimation wipes out a relevant piece of information, which is given by the variability across municipalities, to exploit only the variability along the time dimension. In what follows, for completeness, we will present fixed effect estimates as well.

Table 3: Hausman test

Replications = 400				
Variable	**Coeff. diff.**	**Bootst. S.E.**	**z**	$P > \|z\|$
Z	0.084	0.087	0.96	0.336
ASYMMETRY	-0.078	0.045	-1.74	0.082
Y	-0.003	0.005	-0.55	0.580
POP	4.317	5.203	0.83	0.407
DEP	-4.742	3.807	-1.25	0.213
CYCLE	-0.001	0.001	-0.54	0.592
COMP	0.153	0.066	2.32	0.021
POL	1.666	2.683	0.62	0.535
TERM	-2.633	3.448	-0.76	0.445
TERM*CYCLE	0.002	0.002	0.83	0.408
$\chi^2(10)$:	17.28			
P-value:	0.0684			

4.4 Estimation results

We estimated a model for per capita total expenditures with different specifications (table 4). In column 1 and 2 we present results for both fixed and random effect (RE) estimation with all control variables described in the previous section. In column 3 we added time dummies to RE estimates[16] while in columns 4 and 5 we present results splitting the sample according to the population size of municipalities (over and under 5000 citizens). In column 6 the model is estimated with RE and with time and spatial dummies, represented by provinces.

Results show that the sensitivity of total municipal spending to variations in personal income ranges from 0.04 to 0.06 in the full sample, similar to the GDP response of Flemish municipalities in Heyndels (2001). The range is amplified if we consider local size: the coefficient is 0.07 for municipalities with less than 5000 inhabitants and 0.03 for larger ones. If we add spatial dummies the magnitude decreases to 0.02. The stimulative impact of transfers, around 1.3/1.4, is instead higher than the one obtained by Heyndels and more comparable with what is obtained by Tovmo and Falch (2002) for Norwegian municipalities. The effect is more pronounced for smaller municipalities although the pure *flypaper* effect, i.e. the asymmetry between

[16]Time dummies can be useful to capture possible changes in expenditures due, for instance, to different regimes with respect to the possibility of modifying local tax rates.

the coefficient on transfers and that on income, seems less. The coefficient on asymmetry is significant and has a negative sign, thus revealing a fiscal replacement type of asymmetry i.e. municipalities react to declining transfers by increasing own revenues. As to demographic controls, there are signs of economies of scale with respect to population only for small municipalities; in this case, there is also a positive association between surface and per capita expenditures. Local spending is in all specifications positively influenced by the age structure of population as municipalities deal with the provision of many social services to children and to old-age people (whose costs are higher). The socio-economic status of the community, proxied by the educational level, is significant with a positive sign. This could be explained by the fact that education may boost the demand for local cultural services, such as exhibitions, museums, theatres and libraries[17], while the cost reducing effect described by Hamilton (1983, see Section 4.2) is probably negligible. As to the other conventional controls, altitude is, as expected, a factor which increases spending as a consequence of higher costs of provision for local public goods; the institutional dummy on regions is also relevant, since expenditure level for municipalities falling in special status regions is higher, reflecting the peculiarities of the functions they perform. Municipalities which act as administrative centres do not show, instead, significant higher costs.

Results for political variables give interesting insights. First, we note that local spending is undoubtedly subject to electoral cycles, since expenditures soar as administrative elections approach and if the mayor is at the first term. The sign of the interaction term between CYCLE and TERM indicates that the negative effect of the political cycle is, however, mitigated when the mayor cannot be re-elected. The political compactness of local bodies is also relevant, but the sign is unexpectedly positive. Here the argument seems reversed to the one made by Tovmo and Falch (2002): the more cohesive majorities are, the easier they spend, while political fragmentation hinders spending decisions. Actually, political fragmentation can be the expression of some sort of heterogeneity in municipal community and this can make spending decisions more difficult: this is the justification given for example by Heyndels (2001) for introducing a measure of income dispersion in an analogous model of local expenditures. Finally, there isn't any clear and unique evidence of a difference in the spending behaviour of centre-right governments with respect to left wing ones. Time dummies, where

[17] See Dalle Nogare and Galizzi, 2009, for an analysis of cultural expenditures of Italian municipalities.

introduced, are significant for all years apart for 2000 and have a similar coefficient for two groups: 2001-02 and 2006 on one side and 2003-05 on the other side.

We also looked at the behaviour of per capita municipal capital expenditures. In table 5 we present the model estimated with both random and fixed effects (column 1 and 2), with RE and time dummies (column 3) and with RE, time dummies and space dummies (column 4). The evidence suggests that the reaction to current transfers as well as to per capita income is about one-third of the one shown by total expenditures; the sensitivity to personal income is between 10 and 30 per cent. Municipal surface is significant and negative, which could be explained by economies of scale. The dependency ratio still has a positive impact as well as the educational level of the community. Political variables COMP and CYCLE have the same sign, size and significancy of the models for total expenditures while political orientation does not play any role. The impossibility for the mayor to be re-elected lowers per capita capital expenditures and mitigates the adverse effect of the electoral cycle as in the model for total expenditures.

Overall, the evidence shows the presence for Italian municipalities of strong *flypaper* and fiscal replacement effects. These effects are present even controlling for a wide range of factors, from demography to socioeconomic conditions as well as political features. The magnitude of the *flypaper* is indeed not altered by the introduction of political factors. The coefficient estimates (not reported here for space limits) of the model with only socio-demographic controls are equal to 1.49 for transfers and 0.07 for income. Therefore, on the basis of this evidence, the *flypaper* effect seems not to be fully ascribed to a misalignment between local policy makers and population and thus the explanation is probably due also to other phenomena, like fiscal illusion or loss aversion and lack of fungibility, as outlined in Section 2.

4.5 Robustness checks

In order to test the robustness of our results we performed two other types of estimation. In the first one we pooled all observations together and we estimated with OLS using the same set of observations of the RE model. In the second estimation we applied the least absolute deviations (LAD) estimator in the original dataset without trimming the first and the last percentile.[18]

[18] As in the RE-ii, we added a set of time dummies to account for a trend whose coefficients are not reported.

Table 4: Estimation results: total expenditures

Variable	**RE-i**	**FE-i**	**RE-ii**	**RE-i** < 5000	**RE-i** > 5000	**RE-iii**
Z	1.429***	1.346***	1.318***	1.435***	1.074***	1.602***
	(7.96)	(6.02)	(7.52)	(7.29)	(6.79)	(7.38)
ASYMMETRY	-0.349**	-0.270**	-0.290**	-0.327**	-0.306*	-0.358**
	(-2.36)	(-2.08)	(-2.19)	(-2.20)	(-1.85)	(-2.22)
Y	0.061***	0.064***	0.041***	0.070***	0.029***	0.022**
	(14.82)	(11.71)	(7.84)	(12.59)	(7.94)	(2.51)
STAT	786.756***		758.426***	900.874***	251.248***	1041.763***
	(21.99)		(20.91)	(20.70)	(7.20)	(10.27)
ALT	1.049***		1.067***	1.044***	0.025	0.957***
	(17.51)		(17.67)	(15.50)	(0.19)	(12.88)
TYPE	-84.640		-51.713		-54.970	-55.731
	(-1.29)		(-0.82)		(-0.90)	(-0.75)
POP	0.488	-3.830	0.509	-94.781***	0.380	0.589
	(1.13)	(-1.61)	(1.24)	(-9.62)	(0.77)	(1.40)
SUR	1.213		-1.067	18.661***	4.674**	-1.970
	(0.56)		(-0.48)	(3.68)	(1.98)	(-0.83)
DEP	21.091***	25.833***	19.957***	14.385***	24.64***	22.333***
	(10.12)	(5.83)	(9.81)	(6.08)	(7.85)	(7.88)
EDU	6.233***		9.054***	8.394***	8.379***	10.527***
	(3.36)		(5.13)	(3.39)	(5.52)	(5.89)
CYCLE	-0.115***	-0.115***	-0.102***	-0.148***	-0.043***	-0.105***
	(-15.50)	(-15.47)	(-13.41)	(-14.24)	(-7.16)	(-13.72)
COMP	1.503***	1.350***	0.659***	1.561***	0.451***	0.504***
	(9.00)	(7.39)	(3.95)	(7.20)	(2.63)	(3.01)
POL	-18.867**	-20.533**	-1.862	-30.869**	2.595	3.179
	(-2.09)	(-2.11)	(-0.20)	(-2.16)	(0.33)	(0.34)
TERM	-28.514*	-25.881	-39.125**	-48.317**	2.795	-44.620***
	(-1.75)	(-1.58)	(-2.39)	(-2.15)	(0.21)	(-2.73)
TERM*CYCLE	0.023*	0.021*	0.047***	0.035**	-0.002	0.047***
	(1.94)	(1.80)	(3.98)	(2.23)	(-0.25)	(4.01)
Intercept	-648.920***	-103.788	-547.108***	-459.553***	-237.411***	-636.878***
	(-7.97)	(-1.05)	(6.46)	(-3.96)	(-3.52)	(-5.27)
Number of obs.	45581					

Table 5: Estimation results: capital expenditures

Variable	**RE-i**	**FE-i**	**RE-ii**	**RE-iii**
Z	0.529***	0.463***	0.432***	0.731***
	(4.85)	(2.92)	(4.28)	(4.89)
ASYMMETRY	-0.256***	-0.185**	-0.218***	-0.281**
	(-2.78)	(-2.29)	(-2.58)	(-2.51)
Y	0.013***	0.0213***	0.005**	0.003
	(5.06)	(4.93)	(1.90)	(0.72)
STAT	382.269***		368.787***	495.644***
	(17.07)		(16.61)	(9.14)
ALT	0.604***		0.614***	0.499***
	(21.98)		(22.24)	(14.07)
TYPE	-43.834		-31.647	-60.749
	(-1.11)		(-0.83)	(-1.38)
POP	0.458	0.233	0.481	0.445
	(1.28)	(0.26)	(1.37)	(1.24)
SUR	-3.721**		-4.928***	-3.689**
	(-2.41)		(-3.15)	(-2.17)
DEP	13.357***	16.089***	14.015***	16.021***
	(10.05)	(3.91)	(11.02)	(8.12)
EDU	2.126**		2.801***	2.451**
	(2.13)		(2.77)	(2.14)
CYCLE	-0.109***	-0.110***	-0.097***	-0.100***
	(-15.65)	(-15.69)	(-13.69)	(-14.12)
COMP	1.296***	0.902***	0.699***	0.458***
	(9.17)	(5.41)	(4.79)	(3.18)
POL	-6.228	-9.302	-2.984	-1.916
	(-0.76)	(-1.00)	(-0.35)	(-0.23)
TERM	-12.314	-10.809	-32.067**	-39.727***
	(-0.82)	(-0.72)	(-2.12)	(-2.63)
TERM*CYCLE	0.017	0.014	0.042***	0.043***
	(1.56)	(1.35)	(3.86)	(3.99)
Intercept	-243.700***	-41.825	-215.867***	-321.012***
	(-5.64)	(-0.48)	(-5.01)	(-6.00)
Number of obs.	45584			

Results (table 6) are mostly in line with those obtained with the panel data RE model. The magnitude of the asymmetric term is definitely higher but the estimated coefficients of transfers and income have all the same sign, significance and magnitude of the ones in table 4 and 5. As to controls and political variables, results are mostly in line with panel data estimates apart from the coefficient of surface variable and those of political compactness and orientation.

5 Concluding remarks

The *flypaper* effect is one of the most popular and documented subjects in the fiscal federalism literature. Despite a widespread success overseas, in Italy little empirical research has been done on this matter. Our work has started to fill this gap, by investigating the extent to which spending decisions by municipal governments are influenced by changes in their revenue structure. Results have highlighted a remarkable standard *flypaper* effect and strong evidence of an asymmetrical response with respect to the sign of variations in transfers. Conventional demographic, social and institutional controls have mostly the expected sign. Altitude is a factor which increases expenditures associated with a given level of output while municipal expenditures grow as population becomes older, reflecting the need for more expensive services.

Politics is confirmed to play a crucial role in local budgeting processes: data unambiguously show that local spending is subject to electoral cycles and that compact majorities are more prodigal. But the presence of the *flypaper* effect is not fully explained by political variables, also demand side factors - like fiscal illusion - or behavioural phenomena are likely to play a role.

Table 6: Robustness check

Estimator	**OLS**	**LAD**	**OLS**	**LAD**
Variable	G_{it}	G_{it}	$Gcap_{it}$	$Gcap_{it}$
Z	1.467***	1.204***	0.545***	0.453***
	(11.92)	(15.21)	(6.65)	(9.51)
ASIMMETRY	-0.868***	-1.117***	-0.406**	-0.211
	(-2.64)	(-4.39)	(-2.35)	(-1.55)
Y	0.043***	0.028***	0.004	0.006***
	(11.05)	(12.22)	(1.57)	(5.10)
STAT	742.378***	539.071***	363.569***	257.213***
	(24.50)	(22.04)	(17.86)	(16.58)
ALT	0.895***	0.514***	0.542***	0.313***
	(17.76)	(16.82)	(21.62)	(17.90)
TYPE	-67.678	5.819	-34.730	-15.364
	(-1.31)	(0.12)	(-1.09)	(-0.66)
POP	0.324	0.226	0.331	0.061
	(1.09)	(0.54)	(1.36)	(0.30)
SUR	1.703	4.116***	-3.297**	0.624
	(0.86)	(3.78)	(-2.41)	(0.88)
DEP	18.974***	13.821***	12.339***	5.970***
	(11.27)	(14.33)	(11.21)	(10.75)
EDU	8.489***	6.351***	3.823***	2.256***
	(6.02)	(7.24)	(4.08)	(4.38)
CYCLE	-0.097***	-0.077***	-0.091***	-0.067***
	(-10.13)	(-14.24)	(-11.78	(-16.46)
COMP	1.304***	0.242	1.297***	0.569***
	(5.68)	(1.48)	(7.87)	(6.34)
POL	3.897	-12.777	5.762	2.150
	(0.29)	(-1.63)	(0.58)	(0.43)
TERM	-35.630	-27.396**	-30.835*	-19.228**
	(-1.59)	(-2.14)	(-1.77)	(-2.09)
TERM*CYCLE	0.059***	0.042***	0.052***	0.028***
	(3.87)	(4.98)	(4.28)	(4.43)
Intercept	-616.787	-199.687***	-278.156***	-111.279***
	(-9.90)	(-5.87)	(-7.09)	(-5.31)

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Lump-sum transfers and local expenditure

Fig. 1a: traditional theory

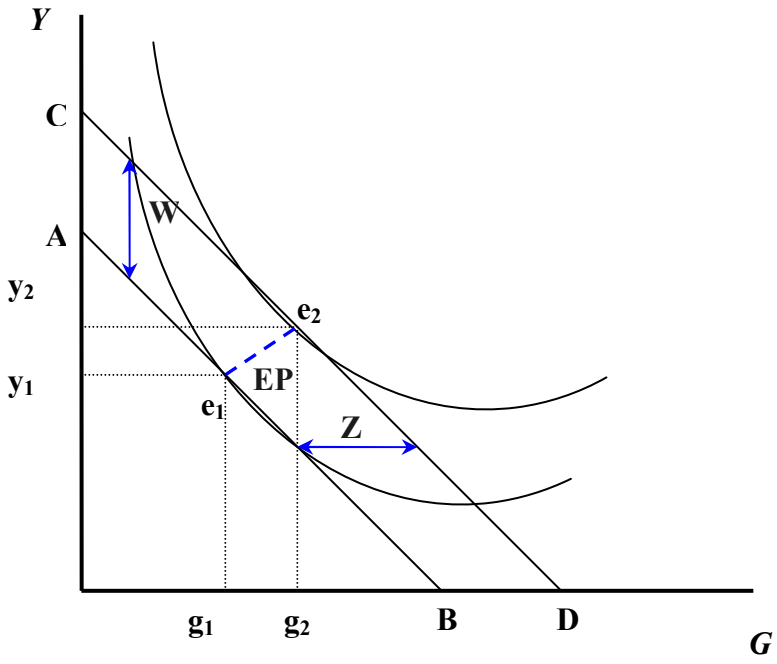


Fig 1b: standard *flypaper*

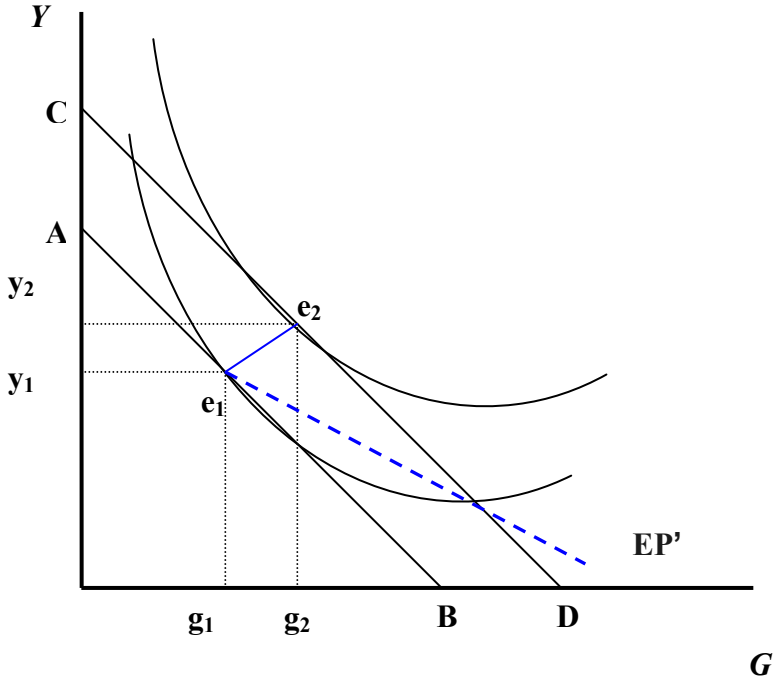


Fig 1c: *fiscal replacement*

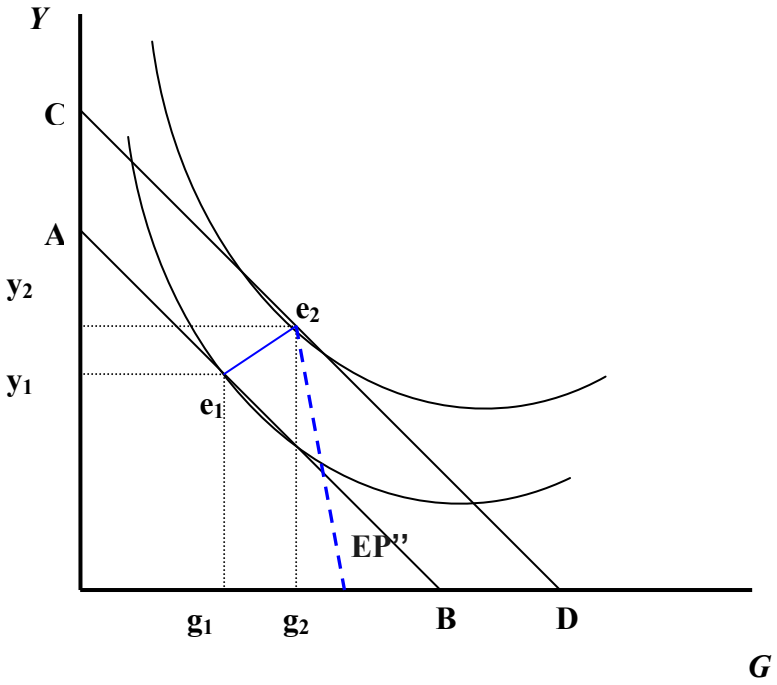


Fig 1d: *super flypaper effect*

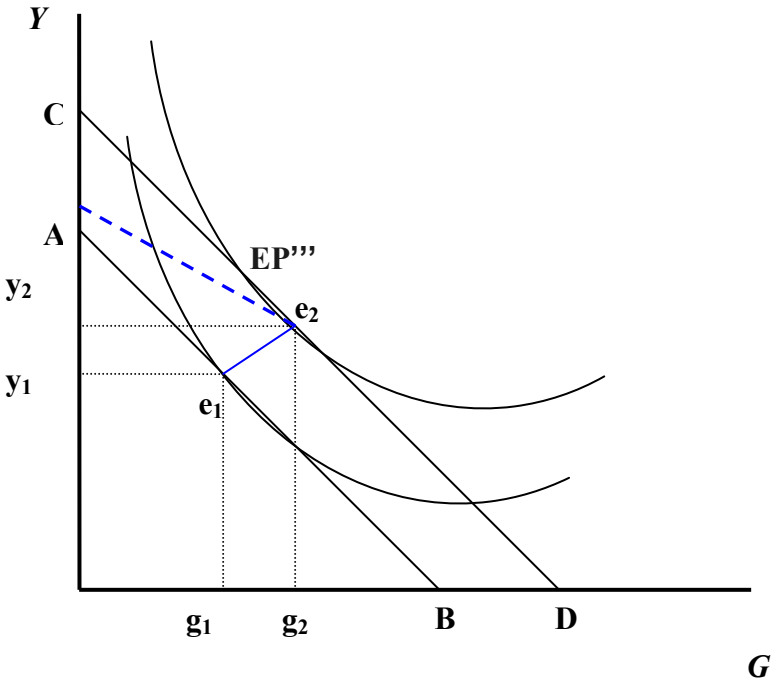
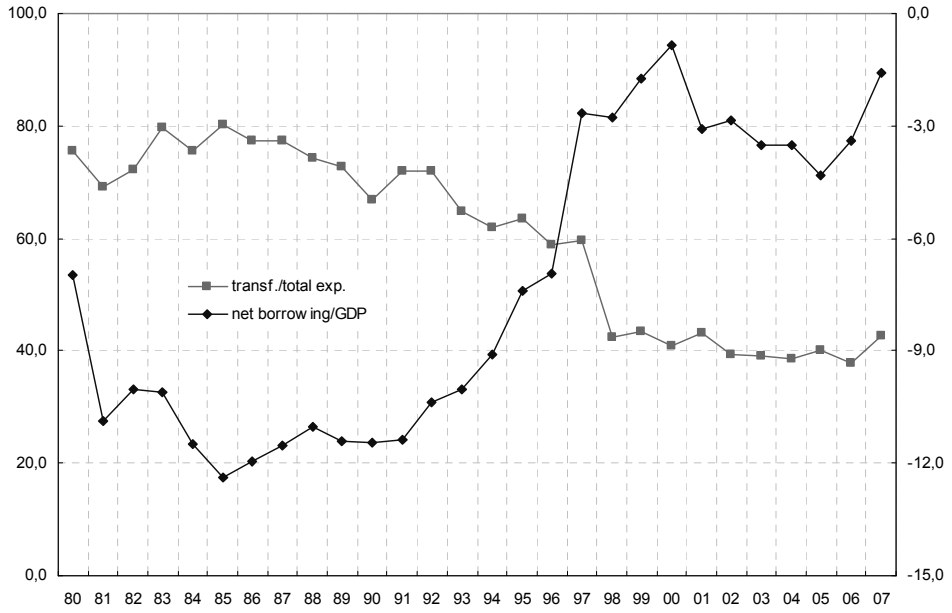


Fig. 2

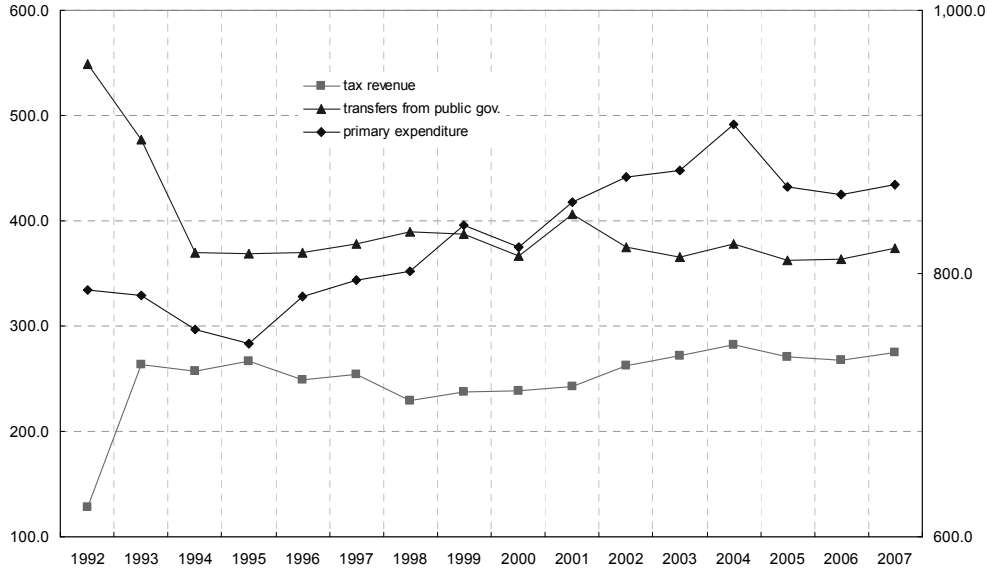
Transfers to subnational governments and net borrowing from 1980 to 2007
(as a percentage of local expenditures and of GDP respectively)



Source: Istat, *Local Government Accounts* (for transfers and local expenditures; scale on the left) and *General Government Accounts* (for net borrowing; scale on the right).

Fig. 3

Municipalities: per capita revenues, expenditures and transfers
(in real terms, base year=2000)



Source: Istat, *Local Government Accounts.*

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