

Fiscal imbalance and fiscal performance of local governments: empirical evidence from Italian municipalities

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Abstract

Recent empirical research (Eyraud and Lusinyan 2013) based on national data suggests that the combination of vertical and horizontal imbalances is particularly damaging to fiscal outcomes. In particular fiscal discipline is strengthened as the sub-national governments' reliance on transfers diminishes.

This paper provides a theoretical framework to describe the interaction between the vertical and the horizontal fiscal imbalances in determining fiscal behaviour of local jurisdictions.

Furthermore, we test whether the financing structure of sub-national governments affects fiscal performance using different indices of vertical and horizontal fiscal imbalance. The empirical analysis is conducted using a panel data on a large sample of Italian municipalities between years 2002-2010.

Our results suggest that the horizontal fiscal imbalance has a positive direct effect on tax and fees burden, that is, "poorest" jurisdictions (in terms of fiscal capacity) exert a greater fiscal effort. On the other hand, the horizontal fiscal imbalance also presents an indirect effect, that is, it magnifies the negative effect of the vertical fiscal imbalance on the fiscal effort of local governments.

Keywords: Fiscal imbalance; decentralization; municipal equalization.

JEL Classification: D72 H77

1. Introduction

The focus of this paper is on the two main forms of fiscal imbalances discussed in the literature on fiscal federalism. Vertical Fiscal Imbalance (VFI), i.e. the difference between sub-national governments' expenditures and sub-national governments' own fiscal revenues, and Horizontal Fiscal Imbalances (HFI), i.e. the difference between sub-national revenue-raising capacity.

VFI is due to fact that usually a portion of local government's expenditure is financed by intergovernmental grants rather than through local taxes. HFI are due to the fact that richest jurisdictions are characterized by a larger amount of local tax bases than others, hence, exerting the same fiscal effort, they have the possibility to spend more than poor jurisdictions (Martinez-Vazquez et al. 2006).

Large VFI may relax fiscal discipline. Although some degree of mismatch between sub-national own revenue and expenditure is inevitable and may even be desirable, large gaps present

risks. A common view in the normative literature is that a high reliance on intergovernmental transfers or borrowing “softens” the budget constraint of sub-national governments, reducing fiscal effort.

HFI result in differences in net fiscal benefits, for this reason equalization matters not merely of horizontal equity but it also indirectly influences the allocative efficiency. In fact differences in net fiscal benefits between jurisdictions could theoretically lead to an inefficient allocation of productive resources (Boadway and Flatters 1982, Boadway 2004, Smart 2007).

The combined effect of HFI and VFI has not been deeply investigated in literature. Recently, the combined effect of HFI and VFI on fiscal behaviour has been tested by Eyraud and Lusinyan (2013), without providing a theoretical model on the interaction between HFI and VFI. They provide evidence regarding the fact that the negative impact on fiscal performance of the vertical imbalances and the horizontal fiscal imbalance strengthen each other. In particular, Eyraud and Lusinyan (2013) show that VFI is more detrimental to general governments’ deficits in countries with high HFI (measured as income disparity).

However, even if the cross-country approach provides a valuable comparative perspective on the VFI, it has also some limitations. In fact working with national data we need the implicit assumption that the effect the VFI is identical across sub-national governments in each country. Eyraud and Lusinyan (2013) admit the need of more accurate estimates working on sub-national level data. Furthermore, they suggest to test different VFI indicators and to split own revenues into taxes and fees.

This paper provides a theoretical framework to describe the interaction of VFI and HFI in determining the fiscal effort of local jurisdictions. Furthermore, we test empirically the combined effect of vertical and horizontal fiscal imbalance on the local tax burden and the local fees burden, using a panel data on a large sample of Italian municipalities over a nine years period between 2002 and 2010.

We believe that our research is important for many reasons. First of all, as far as we could verify, almost all the empirical literature on fiscal federalism investigates the role played by the vertical fiscal imbalances (Martinez-Vazquez et al. 2006) and only few papers have studied the role played by horizontal imbalances for both practical and theoretical reasons (Eyraud and Lusinyan 2013).

Finally, while the literature on fiscal decentralisation provides many empirical and theoretical analysis on the relationship between the degree of VFI and the behaviour of sub-national governments (Shankar and Shah 2003, Villaverde 2006), very little is known, from the theoretical point of view, on the impact that HFI may exert on the behaviour of sub-national governments.

The rest of the paper is organised as follows: section 2 and section 3 report, respectively, a detailed literature review on vertical fiscal imbalances and horizontal fiscal imbalances; section 4 provides the theoretical framework which help to understand the interaction between HFI and VFI; section 5 shows the results of the empirical analysis. Finally, section 6 concludes.

2. Vertical Fiscal imbalance

In a federation, or in a decentralized administrative system, the devolution of spending responsibilities has not been always followed by the devolution of tax revenues, resulting in vertical fiscal imbalances (VFI). That is, sub-national authorities can have access to transfers, and to a lesser extent, on borrowing by the central government in order to finance their expenditure (Gosh and Gosh 2008).

The main reason that justifies the presence of VFI in many countries is that the national government is seen as the only level of government capable of addressing national goals of redistribution (Persson and Tabellini 1996, Boadway 2005), correcting equity and efficiency distor-

tions (Boadway, 2004), insuring regions against shocks (Lockwood 1999) and facilitating equal treatment in the public sector (Boadway 1998).

The systematic presence of VFI and grants in a federal system has stimulated the academic interest in investigations about economic performance of countries suffering from VFI and the literature about VFI is increased over time.

Among others, Jin and Zou (2002), Borge and Rattsø(2003) and Boetti et al. (2012) (for the Italian case) provide theoretical foundations and empirical evidence about the importance of VFI in determining the performance of local and national governments.

Apart from the redistributive reasons, the presence of a large VFI: undermines the autonomy and vitality of decentralized decision-making (Oates 1993); adversely impacts the sub-national government accountability (Bird 2000, 2003) and common pool problems (Weingast et al. 1981); induces the flypaper effect (Gramlich 1977, Fisher 1982); generates “fiscal illusion”, a phenomenon which arises when the link between taxes and benefits is distorted and voters are less likely to sanction overspending politicians (Rodden et al. 2003).

Furthermore, the VFI affects fiscal performance because it leads to the problem of the soft budget constraint. In fact, sub-national governments with high VFI do not have sufficient tax and borrowing authority to cope with idiosyncratic shocks (Von Hagen and Eichengreen 1996) and they may enter into a fiscal crisis (be unable to pay wages or default on loans) when faced with adverse shocks. As they may claim that they are not responsible, the pressures from voters, civil servants, and creditors will likely be directed at the central government, which will have no choice but to bail them out. Anticipating this, sub-national governments have an incentive to engage in riskier fiscal policies (Eyraud and Lusinyan 2013). As a result, since transfer-dependent local governments face weak incentives to be fiscally responsible, the VFI affects negatively the fiscal performance (Rodden et al. 2003).

Empirical literature provides many tests on the negative relation between vertical imbalances and fiscal performance, i.e. the existence of the soft budget constraint problem. Rodden (2002) provides evidence that higher reliance on intergovernmental transfers worsens the general government’s overall balance. Rodden et al. (2003) show that transfer dependency is associated to larger fiscal deficits, the negative impact being larger at high levels of decentralization. Jin and Zou (2002) find that transfers increase the size of the government at the sub-national, national, and general government levels. Finally, according to De Mello (2007), large VFI could lead to higher deficits.

Table 1 shows some of the most common measures of VFI (Sharma 2012) that can be applied to the local level (to the i^{th} local jurisdiction instead of the national aggregate). The following empirical analysis will be based on the measures of VFI listed in table 1.

Table 1: Common measures of VFI at local level Sharma (2012)

Measuring VFI
$VFI1 = \frac{\text{Total grants received}}{\text{Total expenditure}}$
$VFI2 = 1 - \frac{\text{Total own source revenues}}{\text{Total expenditure}}$
$VFI3 = \frac{\text{Grants} + \text{Tax Sharing}}{\text{Own revenues}}$

3. Horizontal Fiscal imbalance

In general, within each sub-national level of government there are always some jurisdictions that are richer than others. The resulting difference in the fiscal capacities (FC) of governments at the same level is called horizontal fiscal imbalance (HFI). If resources are not equalized, the poorest jurisdictions should exert an higher fiscal effort (higher tax rates) in order to reach a level of expenditures comparable to the richest jurisdictions.

Measuring HFI is not straightforward since it is based on the concept of “fiscal capacity” and the best way to measure it. There is a general agreement between scholars and politicians that the data series used for measuring capacity should have the following characteristics (Dafflon 2012):

- precise and stable over a range of several years;
- not susceptible to manipulation by decision-makers;
- easily verifiable by all government units and parties involved in the equalization process.

It follows that there are two common ways of measuring the fiscal capacity of government units. One is based on macroeconomic indicators, such as the GDP, calculated per government unit and per capita or average incomes in jurisdictions if GDP measures are not available.¹ The other is to use the representative tax system (RTS) for an approximation of taxable capacity (Aronson and Hilley 1986).

The RTS may be defined as a hypothetical tax system that is representative or typical of all the taxes actually levied by sub-national governments of a country. By other words it consists in the calculations of the per capita tax amounts that jurisdictions could raise if each jurisdiction imposed taxes at the standard tax rate, that is, in the absence of fiscal effort.

The macro indicators present a theoretical limit. They involve some macro indicators related to incomes or local GDP as proxies for the fiscal capacity but in many cases this could lead to a biased measure of real revenue-raising capacity. For example, if a region is a significant tourist attraction place, that region could collect significant amounts of revenues from tourists (sales taxes, hotel taxes etc.). This revenues are not captured by indicators like the average jurisdictional income.

On the other hand, the macro measures would be simpler or more transparent to apply in econometric estimations. The statistic procedure to calculate macro measures is simpler compared to the RTS approach since it needs less data. Furthermore, in many cases there is a strong correlation between the macro measures and the fiscal capacity computed by means of the RTS (Shankar and Shah 2003).

Different purposes leads to different measures fiscal capacity (RTS, GDP, income etc.). Once obtained the fiscal capacity’s measure it is possible to evaluate the HFI using common inequality indices.

The most frequent *global* measures, i.e. relative to the entire country, of the degree of HFI used in literature are the usual inequality or variability indices (between local jurisdictions) of the variable chose as proxy of the fiscal capacity (Shankar and Shah 2003).

4. Interaction between HFI and VFI in determining jurisdictional tax effort

In general there is a lack of empirical tests on the combined impact of the HFI and the VFI on sub-national governments’ fiscal performance.

¹See, for example, Eyraud and Lusinyan (2013).

To the best of our knowledge, the most complete empirical study about the combined impact of VFI and HFI on fiscal performance is provided by Eyraud and Lusinyan (2013). They adopt a cross-country approach using panel data, using aggregate data, in contrast to the prolific case-study literature on VFI. They use several macro indicators of fiscal capacity, such as income level, income per capita and population associated to different measures of HFI (variance, coefficient of variation, min-max ratio, max-average ratio).

The results of the empirical analysis of Eyraud and Lusinyan (2013) suggest that VFIs and HFIs may interact with each other, and their combination could be particularly damaging to fiscal performance, measured by the primary balance of the general government as a share of GDP.

However, Eyraud and Lusinyan (2013) do not conduct empirical analyses on the effect of HFI on the fiscal effort (local tax burden) even if the positive effect of equalizing transfers on local tax rates (Buettner 2006, Snoddon 2004) provides indirect evidence about the negative effect of fiscal disparities on tax effort if not completely equalized. Furthermore, irrespective of whether explicitly labelled “fiscal equalization” or embedded in a system of revenue sharing, the common characteristic is that transfers are inversely related to the tax base or some corresponding measure of “fiscal capacity”. As a consequence, those schemes will tend to compensate jurisdictions for the adverse impact of higher taxing efforts on the tax base (Buettner 2006).

Standard theoretical models of tax competition argue that in a decentralized setting the mobility of the tax base will tend to increase the marginal cost of raising public funds. Redistributive transfers aim to decrease the marginal cost of raising public funds (Bucovetsky and Smart 2006).

Some empirical studies provide ambiguous evidence about the incentive effect in raising revenues due to fiscal equalization. Snoddon (2004) finds support for incentive effects of fiscal equalization. Dahlby and Warren (2003) find some limited support for an incentive effect on taxing decisions. Buettner (2006) finds evidence about the fact that the marginal contribution rate of equalizing transfers exerts a significantly positive impact on the local tax rate.

Switching the focus from equalization to fiscal capacities’ disparities, we expect that fiscal disparities, net of the equalizing transfers, exert a negative effect on local tax burden. Castels et al. (2004) confirm this theory. They find that negative shocks in fiscal capacities of some municipalities (increased inequality without increasing equalization) are internalized through an increase in tax effort.

On the other hand, equalizing transfers, which aim to reduce the HFI enforce the negative effect due to the VFI since they increase the total amount of grants in the poorest jurisdictions, increasing the transfer dependence of local jurisdictions which leads to the problem of the soft budget constraint.

Consequently, we expect that HFI enforces the negative impact of the VFI on fiscal effort since it increases the transfer dependence. Furthermore HFI has a negative effect on fiscal effort, this negative effect should be mitigated by transfers.

To better understand the problem we will present a simple theoretical model which explains the interaction between the HFI and the VFI in determining the tax effort.

4.0.1. HFI and fiscal effort: a theoretical model

The negative impact of fiscal disparities on fiscal effort could be described by means of a simple theoretical model.

Consider a decentralized economy divided into two districts or jurisdictions: one denoted by R , and the other denoted by P . Each district has a continuum of individuals and the population size is the same for both districts and normalized to one $N_P = N_R = 1$.

For simplicity, we assume that income is the proxy of the tax base present in the local system (macro measure of fiscal capacity). The two jurisdictions are characterized by uniform

distribution of incomes and y_i , with $i \in (P, R)$, indicates the average (and median) income. That is, each voter in jurisdiction R has income y_R and each voter in jurisdiction P has income y_P . We assume that $y_R > y > y_P$, where $y_R = y + \frac{\Delta}{2}$ and $y_P = y - \frac{\Delta}{2}$, y is the average income in the society. That is, we are assuming the presence of horizontal fiscal imbalance due to different tax bases in the two jurisdictions. Note that the value assumed by Δ doesn't influence the total amount of income in the national territory.

We also assume the presence of vertical fiscal imbalance and the existence of a vertical system of intergovernmental transfers.

In particular we assume the presence of equalizing transfers $T^e = h\bar{\tau}\Delta$, that aim to reduce the existence of disparities in fiscal capacity $\Delta \in [0, y]$. The parameter $\bar{\tau}$ is the standard tax rate, while h is the degree of equalization decided exogenously by the CG. When $h = 1$ there is full equalization.

We also assume the presence of generic transfers T^v related to other purposes, such as, filling the VFI, financing specific local investments or other special purposes local expenditures. The transfers' amount and the tax rate t that finance grants are set by the central government (CG). For simplicity we assume that transfers must be used exclusively to finance the local public good.

Each jurisdiction provides a certain amount of the local public goods g_i , with $i \in \{P, R\}$. The amount of the public good is given by the sum of transfers and the autonomous component of revenues. That is, the product between the local tax base y_i and the local tax rate τ_i (for simplicity we are assuming that local public goods are not financed by fees). Furthermore, we assume that the tax autonomy of local jurisdiction is limited, i.e. $0 \leq \tau_i \leq \tau^{max}$.

We suppose that the cost of the local public goods are the same in both jurisdictions and that the cost is normalized to one.

For simplicity we assume that individuals in both jurisdictions are characterized by quasi-linear utility functions. That is, representable by utility functions that are linear in private goods and strictly concave in the public good.

Quasi-linearity has strong implications. It implies a zero income elasticity of demand for public goods, that is, the income distribution doesn't affect the aggregate demand of the local public goods. By other words, we are separating the allocation problem from the income distribution (Bergstrom and Cornes 1983).

The utility function of jurisdiction R is:

$$U_R = \sqrt{g_R} + y_R - \tau_R y_R - t y_R, \quad (1)$$

that is,

$$U_R = \sqrt{g_R} + \left(y + \frac{\Delta}{2}\right) (1 - \tau_R - t). \quad (2)$$

The budget constraint of jurisdiction R is:

$$g_R = \tau_R \left(y + \frac{\Delta}{2}\right) + T^v, \quad (3)$$

Substituting equation (3) into equation (2) we obtain:

$$U_R = \sqrt{\tau_R \left(y + \frac{\Delta}{2}\right) + T^v} + \left(y + \frac{\Delta}{2}\right) (1 - \tau_R - t). \quad (4)$$

The fiscal effort, given by the tax rate τ_R^* , exerted by jurisdiction R will be:

$$\tau_R^* = \arg \max_{\tau_R} \left(\sqrt{\tau_R \left(y + \frac{\Delta}{2}\right) + T^v} + \left(y + \frac{\Delta}{2}\right) (1 - \tau_R - t) \right) \quad (5)$$

That is:

$$\tau_R^* = \frac{1 - 4T^v}{4\left(y + \frac{\Delta}{2}\right)}. \quad (6)$$

It is apparent from equation (6) that τ_R^* is greater than zero only if T^v is smaller than a threshold value $\tilde{T} = \frac{1}{4}$. If $T^v > \tilde{T}$, then jurisdiction R will finance the local public good without own source revenues. Furthermore, the local tax rate τ_R^* , i.e. the fiscal effort of jurisdiction R , is decreasing in transfers T^v .

The utility function of jurisdiction P is:

$$U_P = \sqrt{g_P} + y_P(1 - \tau_P - t), \quad (7)$$

that is,

$$U_P = \sqrt{g_P} + \left(y - \frac{\Delta}{2}\right)(1 - \tau_P - t), \quad (8)$$

The budget constraint of jurisdiction P is:

$$g_P = \tau_P \left(y - \frac{\Delta}{2}\right) + T^v + h\bar{\tau}\Delta, \quad (9)$$

where $T^e = h\bar{\tau}\Delta$ is the amount of the equalizing transfer.

Substituting equation (9) into equation (8) we obtain:

$$U_P = \sqrt{\tau_P \left(y - \frac{\Delta}{2}\right) + T^v + h\bar{\tau}\Delta} + \left(y - \frac{\Delta}{2}\right)(1 - \tau_P - t). \quad (10)$$

The fiscal effort τ_P^* exerted by jurisdiction P is

$$\tau_P^* = \arg \max_{\tau_P} \sqrt{\tau_P \left(y - \frac{\Delta}{2}\right) + T^v + h\bar{\tau}\Delta} + \left(y - \frac{\Delta}{2}\right)(1 - \tau_P - t). \quad (11)$$

That is:

$$\tau_P^* = \frac{1 - 4T^v - 4h\bar{\tau}\Delta}{4\left(y - \frac{\Delta}{2}\right)}. \quad (12)$$

Note that τ_P^* is positive only if T^v is smaller than a threshold value $\bar{T} = \frac{1}{4} - h\bar{\tau}\Delta$. If $T^v > \bar{T}$, then jurisdiction P will finance the local public good without own source revenues.

Equations (6) and (12) lead to the following proposition.

Proposition 1. *In the absence of equalization, the jurisdiction with the lowest fiscal capacity exerts a greater fiscal effort, compared to the jurisdiction with the highest fiscal capacity. That is, $\tau_P^* > \tau_R^*$.*

Proof. From equations (6) and (12), we know that, in the absence ($h = 0$) of fiscal equalization, $\tau_P^* > \tau_R^*$ when

$$\frac{1 - 4T^v}{4\left(y - \frac{\Delta}{2}\right)} > \frac{1 - 4T^v}{4\left(y + \frac{\Delta}{2}\right)}, \quad (13)$$

that is satisfied for any positive value of Δ . \square

Proposition 1 shows that disadvantaged administrators (in terms of tax bases availability) must exert a greater tax effort in order to maximize voters' utility. As a consequence, administrators of jurisdictions with small tax bases face greatest political costs (Kenny and Winer 2006), in terms of electoral support, of taxation.

It follows that equalization is not just a matter of equity between jurisdictions, equalization transfers also improve the yardstick competition between local administrators, eliminating disparities on available resources (Borge 2011).

In the presence of equalization transfers, the effect of fiscal disparities Δ on the fiscal effort τ_P^* of the poorest jurisdiction is ambiguous. In fact, the *indirect effect* of fiscal disparity Δ is given by a relative decrease of the tax base in poorest jurisdictions; the *indirect effect* is given by an increase in horizontal transfers $h\Delta$ that, in turn, leads to an increase in the VFI. The total effect will depend on the degree of equalization h . In particular, equation (12) leads to the following proposition.

Proposition 2. *Fiscal disparities decrease the fiscal effort of poorer jurisdictions in the presence of high equalization transfers. The amount of resources necessary to decrease the fiscal effort in jurisdictions with lower fiscal capacity decreases with the average national tax base and the amount of general purpose transfers.*

Proof. From equation (12), we know that $\tau_P^* = \tau_R^*$ when

$$\frac{\partial \tau_P^*}{\partial \Delta} = \frac{1 - 4T^v - 8h\bar{\tau}y}{2(2y - \Delta)^2}. \quad (14)$$

From equation (14) it follows that:

$$\frac{\partial \tau_P^*}{\partial \Delta} > 0 \Leftrightarrow h < \frac{1 - 4T^v}{8\bar{\tau}y} \quad (15)$$

From equation 15 it is apparent that, when h is lower than a threshold value $\bar{h} = \frac{1-4T^v}{8\bar{\tau}y}$, then fiscal disparities lead to higher fiscal effort. \square

It follows that equalization could help in reducing the gap between tax rates in different jurisdictions. The degree of equalization necessary to reduce fiscal effort in poorer jurisdictions decrease on the average national tax base and on the vertical fiscal imbalance. The intuition is that in richest countries, characterized by a large local tax base, also poorest local jurisdictions have more expenditure autonomy and are less dependent on equalization transfers. That is, local jurisdiction are likely to satisfy their expenditure needs independently on the inequality within the national territory.

The same hold when the system is characterized by high vertical fiscal imbalance, due to the presence of high generic grants. In this case the large presence of generic grants provide enough resources to poorest jurisdictions too and, in a certain sense, it compensate the lack of tax base in poorest jurisdiction. In cases like these, there is less need of high equalization transfers.

Given that the effect of fiscal disparities on the fiscal performance of local government depends on the equalization degree, it is interesting to examine when local jurisdictions exert the same fiscal effort, choosing the same tax rate. In particular the following proposition can be stated.

Proposition 3. *The degree of equalization h^* that ensures the same fiscal effort for both jurisdictions doesn't necessary correspond to full equalization ($h^* = 1$) and it is function of the VFI (T^v) and HFI (Δ). In particular, h^* decreases when T^v and Δ increase.*

Proof. From equations (6) and (12), we know that $\tau_P^* = \tau_R^*$ when

$$\frac{1 - 4T^v - 4h\bar{\tau}\Delta}{4\left(y - \frac{\Delta}{2}\right)} = \frac{1 - 4T^v}{4\left(y + \frac{\Delta}{2}\right)}, \quad (16)$$

that is, when

$$h^* = \frac{1 - 4T^v}{2\bar{\tau}(2y + \Delta)}. \quad (17)$$

From equation 17 it comes straightforwardly that $\frac{\partial h^*}{\partial T^v} < 0$ and $\frac{\partial h^*}{\partial \Delta} < 0$. \square

From equation (17), it is apparent that the degree of equalization that ensures an uniform fiscal effort between jurisdictions is decreasing in the standard tax rate and the average income. The intuition is that, the higher the standard tax rate decided by the central government, the lower will be the general fiscal effort of local jurisdictions. Furthermore, the higher the average national income, the higher will be the probability that local jurisdictions will satisfy their spending needs without exerting fiscal effort and equalization. As a consequence, equalization will be less important in determining the local fiscal behaviour

In the following section we will test empirically the joint impact of VFI and HFI on the fiscal effort of local jurisdictions in the Italian context. Differently from Eyraud and Lusinyan (2013) we don't use local deficits as explanatory variable. Instead, we use the tax/fees burden as proxies of the fiscal effort of local jurisdictions. In fact, in the Italian municipal context the tax burden better indicates the fiscal behaviour of local administrators, since the local budgets are constrained by the *Internal Stability Pact* and Italian municipalities must achieve a balanced budget.

We expect to observe a positive estimated point coefficient associated to the HFI measure (direct effect of the HFI) and a negative coefficient associated to the VFI measure. In addition we expect to observe a negative coefficient associated to the interaction between HFI and VFI (indirect effect of the HFI).

5. Empirical analysis

There is a lack of analyses on the combined effect of VFI and HFI using sub-national data. We choose to focus our analysis on the Italian municipal framework since Italy is a country which is implementing a series of reforms concerning the decentralization of expenditure and decisional competencies and the debate on the new mechanism of financing local expenditures is still open.

5.1. Description of data

We have assembled a dataset that is, at the moment, the most complete “unofficial” dataset on local public finance for Italy. We collected data on all Italian municipalities, excluding municipalities of special status regions² over the period 2002-2010.

Table 5 in appendix shows the variables included in the econometric model (after the elimination of outliers and incoherent data) and a list of summary statistics.

Data are grouped in seven categories. Category Y contain data on municipal revenues and borrowing. Categories B and G include other indicators of municipal finance (expenditure composition, transfers etc.). These data have been collected from the final budget accounts provided by the Italian Ministry of Interior.

²Municipalities of Trentino-Alto Adige, Valle d'Aosta, Friuli-Venezia Giulia, Sicily and Sardinia are characterized by different rules on intergovernmental transfers, compared to ordinary regions' municipalities.

Category C reports data on average municipal incomes from official tax returns, provided by the Ministry of Economy and Finance. Category D includes variables about the cadastral income and the market values of the estate market, provided by the Agency of Territory at the Ministry of Economy and Finance.

Category E includes a set of demographic and geographic control variables provided by ISTAT (Italian National Institute of Statistics) and category F data about electoral preferences in regional elections provided by the Ministry of Interior. We have used regional elections, instead of municipal ones, because in latter case it is often not possible to assign a political colour to all local political movements or citizens associations. We have included both demographic and geographic controls together with electoral variables, in order to capture local preferences on taxation.

Other variables that provide useful informations are included in table 5 under the category “other”.

5.2. The empirical model

For estimations, we use an econometric model to test the combined impact of VFI and HFI on local governments’ tax and fees burden (computed as the percentage of local fees and taxes on average income).

The baseline econometric models relates the local tax burden and fees burden of Italian municipalities to a long series of explanatory variables, which include data on tax bases of different revenues and a wide set of control variables.

The econometric specification is:

$$d_{it} = \beta' B_{it} + \gamma' C_{it} + \delta' D_{it} + \eta' E_{it} + \zeta' F_{it} + \nu VFI_{it} + \xi VFI_{it} * HFIIloc_{it} + \nu HFIIloc_{it} + u_i + e_{it}, \quad (18)$$

where variable d is the local tax/fees burden. The matrices B, C, D, E and F represent the correspondent categories of variables described in table 5. The variables VFI and HFI are, in turn, indices of vertical and horizontal fiscal imbalance included in the various estimates.

Table 2 lists the measures of VFI and HFI included in the various model specifications.

Table 2: Measures of VFI and HFI

VFI measures	Local HFI measures
$VFI1 = \frac{\text{Total grants received}}{\text{Total expenditure}}$	$HFIIloc1 = \text{Max average income} - \text{average income}$
$VFI2 = \frac{\text{Total grants received} + \text{tax sharing}}{\text{Total expenditure}}$	$HFIIloc2 = \text{Mean of average income} - \text{average income}$
$VFI3 = \frac{\text{Total grants received}}{\text{Total revenue}}$	$HFIIloc3 = \text{Median of average income} - \text{average income}$
$VFI4 = \frac{\text{Total grants received} + \text{tax sharing}}{\text{Total revenue}}$	

Panel analyses³ have been conducted through Generalised Methods of Moments (GMM) estimation for panel data.

³For a detailed analysis of panel modelling used see, among others: Baltagi (2005), Wooldridge (2002), and Roodman (2009).

The use of the dynamic estimations by GMM estimator is necessary because, when working with data on tax revenues and tax bases, problems of endogeneity and autocorrelation are likely to arise.

The presence of the lagged dependent variables in our regressions may give rise to autocorrelation. Furthermore, the fiscal imbalance variables can be endogenous, because causality with the dependent variables may run in both directions. Finally, time-invariant country characteristics (fixed effects), such as geography and demographics, may be correlated with the explanatory variables.

When such econometric problems exist, the traditional panel data estimators (Pooled OLS, Fixed Effects or Least Squares Dummy Variables (LSDV) and Random Effects) do not yield consistent estimates.

To cope with this eventual problems we use the Arellano - Bond Dynamic Panel GMM estimator with robust standard errors (Roodman 2009).⁴ In fact, the GMM dynamic panel data methods can simultaneously deal with the problem of persistence and endogeneity. In particular, as GMM-style instruments (endogenous covariates) we use the differences of the fees/tax burden and of the variables related to decentralization (VFI, HFI and their interaction terms).

5.3. Results

Tables 3 and 4 show the coefficient point estimates relative to equation (18) using the tax burden and the fees burden as dependent variable, respectively.

The full estimates, including the complete set of regressors are reported in appendix by tables 6 and 7. Tables 6 and 7 also report the value of the Hansen J statistics used to test the exogeneity of the included instruments.⁵

As we can see from table 3, all VFI measures included in the models show negative and significant estimated coefficients. That is, our results confirm the negative *direct* impact of the VFI on the local tax burden.

The interaction terms between VFI and HFI shows negative and significant estimated coefficients with all the measures adopted and all the possible combinations. These results suggest the existence of a negative *indirect* effect on the fiscal effort due to the interaction between the VFI and the HFI. That is, we find empirical evidence that the negative impact of the VFI is greater in municipalities characterized by a greater HFI.

These results are robust to all different measures of HFI and VFI used for the estimates.

Furthermore, the estimated coefficients associated to the HFI measures are positive and significant only for the measure HFI1. That is, the existence of a positive *direct* effect (disadvantaged jurisdiction should increase the tax burden in order to offer a local services' quality comparable to the advantaged ones) of the HFI on the tax burden is not robust to all specifications.

Looking at table 4, we can see that all VFI measures included in the models show no significant estimated coefficients. That is, our results suggest that the VFI doesn't affect the fees burden *directly*.

The interaction terms between VFI and HFI shows negative and significant estimated coefficients with all the measures adopted in all the possible combinations. It follows that the combination of high HFI and high VFI disincentive the effort in raising fees.

these results are robust to all different measures of HFI and VFI used for the estimates.

⁴The estimates based on the GMM system by Blundel and Bond (1998) produce results that are qualitatively in line with our baseline model, however we prefer to base our analysis on the GMM-DIFF estimates given the small time span of the dataset. To save space we provide these results on request.

⁵For robust GMM, the Sargan test statistic is inconsistent.

Table 3: Coefficients point estimates. Dependent variable: tax burden. Arellano - Bond Dynamic Panel GMM Estimator.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LAG1 Local tax burden	0.395830*** (0.067)	0.273916*** (0.061)	0.278325*** (0.061)	0.417388*** (0.064)	0.300390*** (0.076)	0.304772*** (0.075)	0.366406*** (0.069)	0.198869*** (0.055)	0.203271*** (0.054)	0.393545*** (0.068)	0.255303*** (0.064)	0.257147*** (0.064)
VFI1 - Grants/Total Expenditure %	-0.0108372** (0.005)	-0.028380*** (0.005)	-0.027830*** (0.005)	-0.016423** (0.008)	-0.022800*** (0.008)	-0.022219*** (0.008)	-0.009460* (0.005)	-0.039294*** (0.005)	-0.038896*** (0.005)	-0.018290** (0.008)	-0.043209*** (0.008)	-0.043759*** (0.008)
VFI2 - (Grants + Tax Sharing)/Total Expenditure %												
VFI3 - Grants/Own Revenues %												
VFI4 - (Grants + Tax Sharing)/Own Revenues %												
VFI1xHF1loc1	-0.000000*** (0.000)											
VFI1xHF1loc2		-0.0000004*** (0.000)										
VFI1xHF1loc3			-0.000004*** (0.000)									
VFI2xHF1loc1				-0.000000* (0.000)								
VFI2xHF1loc2												
VFI2xHF1loc3					-0.000003** (0.000)							
VFI3xHF1loc1							-0.000000*** (0.000)					
VFI3xHF1loc2								-0.000006*** (0.000)				
VFI3xHF1loc3									-0.000006*** (0.000)			
VFI4xHF1loc1										-0.000000*** (0.000)		
VFI4xHF1loc2											-0.000006*** (0.000)	
VFI4xHF1loc3												-0.000006*** (0.000)
HF1loc1 - Max average income - average income	0.000014*** (0.000)			0.000013** (0.000)	0.000365 (0.001)	0.001393 (0.004)	0.000017*** (0.000)	0.000200 (0.001)	-0.000105 (0.004)	0.000015*** (0.000)	0.000425 (0.001)	0.001169 (0.004)
HF1loc2 - Mean average income - average income		-0.000022 (0.001)										
HF1loc3 - Median average income - average income			-0.000943 (0.004)									
Observations	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116
Municipalities	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744
AR(1) test statistic	-7.506	-10.27	-10.28	-8.386	-10.12	-10.08	-7.167	-9.632	-9.580	-7.349	-9.723	-9.605
p-value of AR(1) statistic	0	0	0	0	0	0	0	0	0	0	0	0
AR(2) test statistic	0.699	-0.234	-0.228	0.357	-0.866	-0.857	1.223	-1.177	-1.141	0.627	-0.729	-0.710
p-value of AR(2) statistic	0.484	0.815	0.819	0.721	0.386	0.391	0.221	0.239	0.254	0.531	0.466	0.478
Hansen J statistic	63.84	84.70	84.26	66.98	92.27	91.75	67.17	78.99	77.60	65.63	88.79	86.85
Degrees of freedom for Hansen statistic	73	73	73	73	73	73	73	73	73	73	73	73
p-value of Hansen J statistic	0.769	0.165	0.173	0.676	0.0634	0.0682	0.670	0.295	0.334	0.718	0.101	0.128

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Coefficients point estimates. Dependent variable: fees burden. Arellano - Bond Dynamic Panel GMM Estimator.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LAG1 Local fees burden	0.208170*** (0.074)	0.220444*** (0.077)	0.220721*** (0.077)	0.200950*** (0.072)	0.199821*** (0.072)	0.200281*** (0.072)	0.214606*** (0.076)	0.225462*** (0.077)	0.225884*** (0.077)	0.206891*** (0.074)	0.213706*** (0.073)	0.214118*** (0.073)
VFI1 - Grants/Total Expenditure %	0.002288 (0.004)	-0.003115 (0.005)	-0.002838 (0.005)									
VFI2 - (Grants + Tax Sharing)/Total Expenditure %				-0.002081 (0.007)	-0.006362 (0.008)	-0.006052 (0.008)						
VFI3 - Grants/Own Revenues %							0.003340 (0.004)	-0.000051 (0.006)	0.000247 (0.006)			
VFI4 - (Grants + Tax Sharing)/Own Revenues %										0.000961 (0.007)	-0.001440 (0.008)	-0.001035 (0.008)
VFI1xHF1loc1	-0.000000 (0.000)											
VFI1xHF1loc2		-0.000002* (0.000)										
VFI1xHF1loc3			-0.000002* (0.000)									
VFI2xHF1loc1				-0.000000 (0.000)								
VFI2xHF1loc2					-0.000002 (0.000)							
VFI2xHF1loc3						-0.000002 (0.000)						
VFI3xHF1loc1							-0.000000 (0.000)					
VFI3xHF1loc2								-0.000001 (0.000)	-0.000001 (0.000)			
VFI3xHF1loc3												
VFI4xHF1loc1												
VFI4xHF1loc2										-0.000000 (0.000)		
VFI4xHF1loc3												
HF1loc1 - Max average income - average income	0.000006 (0.000)											
HF1loc2 - Mean average income - average income		0.001597** (0.001)										
HF1loc3 - Median average income - average income			0.009098* (0.005)									
Observations	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116
Municipalities	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744
AR(1) test statistic	-5.765	-6.080	-6.089	-5.986	-6.324	-6.320	-5.749	-5.841	-5.888	-5.888	-5.613	-5.625
p-value of AR(1) statistic	8.14e-09	1.20e-09	1.14e-09	2.15e-09	2.55e-10	2.61e-10	8.95e-09	5.18e-09	4.63e-09	3.91e-09	1.99e-08	1.86e-08
AR(2) test statistic	1.205	1.298	1.266	0.494	0.973	0.943	1.669	1.129	1.121	0.967	0.442	0.423
p-value of AR(2) statistic	0.228	0.194	0.205	0.621	0.331	0.346	0.0952	0.259	0.262	0.334	0.658	0.672
Hansen J statistic	64.38	62.05	61.92	61.72	60.64	60.84	67.60	59.15	58.64	64.99	57.59	57.22
Degrees of freedom for Hansen statistic	73	73	73	73	73	73	73	73	73	73	73	73
p-value of Hansen J statistic	0.754	0.816	0.819	0.824	0.849	0.844	0.657	0.879	0.889	0.737	0.907	0.913

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Furthermore, the estimated coefficients associated to the HFI measures are positive and significant in almost all specification. This result suggests the existence of a positive *direct* effect of the HFI on the fees burden. It follows that high HFI leads to an increase in fees instead of local taxes.

As a robustness check, we also estimate a Fixed Effect (FE) model by feasible generalized least squares (FGLS) estimator with robust standard errors. It follows that u_i in equation (18) is the unobserved time-invariant individual effect and e_{it} is the error term. Common interpretations for time-invariant effects u_i are innate ability for individuals or historical and institutional factors for countries.

Unlike the Random effects (RE) model where the unobserved u_i is independent of the other regressors, the FE model allows u_i to be correlated with the regressor matrix. Strict exogeneity, however, is still required.

Tables 8 and 9 in appendix show the coefficient point estimates of the same models, obtained using the Fixed effect FGLS estimator. In this way we can also observe estimated coefficients associated to time invariant control variables. The results remain qualitatively comparable in each specification.

6. Final remarks

This paper contributes to the existing literature about the effect of the horizontal fiscal imbalance on fiscal performance of the local government.

We provide a theoretical framework to describe the interaction of VFI and HFI in determining the fiscal effort of local jurisdictions.

In particular, we show that the direct effect of fiscal disparities between sub-national governments on the local fiscal effort is positive. That is, fiscal disadvantaged jurisdiction should exert an higher fiscal effort in order to provide local services comparable to the fiscal advantaged jurisdictions.

On the other hand, the interaction between VFI and HFI leads to a negative indirect effect in presence of fiscal equalization. In fact, since the horizontal transfers due to the horizontal fiscal imbalance increase the total amount of transfers, they increase the VFI in some jurisdictions and negative effect of grants is accentuated.

We also show that the amount of equalization necessary to ensure the neutrality in the local tax effort, i.e. to induce the local governments to exert the same fiscal effort, doesn't necessary coincide to the full equalization. On the contrary, it is function of the HFI and the amount of not-equalizing transfers.

Furthermore, we provide empirical evidence on the negative impact of the HFI on fiscal performance of local government, using a panel data on a large sample of Italian municipalities over a nine years period between 2002 and 2010.

In particular, we estimates the combined effect of HFI and VFI on the municipal local tax and fees burden and our results suggests that the horizontal fiscal imbalance magnify the negative effect of the vertical fiscal imbalance on the fiscal effort of local jurisdictions.

Our results, obtained by means of panel data estimates on a large sample of Italian municipalities, are in line to previous results obtained on country-based data (Eyraud and Lusinyan 2013).

In order to test the generality of our results, in the further empirical studies on local data of other developed countries are necessary. In particular, since Italian equalization grants are not formula-based, we need further analyses on municipalities characterized by a stable equalization formula.

In fact, in this way econometric estimates could also account for the role of expectation on future equalization grants.

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Appendix: Tables and figures

Table 5: List of variable included in the econometric model - Years 2002-2010

Category	Variable	N	Mean	SD	Min	Max
Y	Local fees burden (no waste) % of income	41463	1.68	1.31	0	21.89
Y	Local tax burden % of income	41463	3.44	1.26	0.33	20.64
Y	Borrowing/income %	41463	1.27	2.31	0	29.8
B	Administrative expenditure/total exp %	41463	40.42	9.96	0	95.74
B	Culture expenditure/total exp %	41463	1.98	2.02	0	33.52
B	Sport expenditure/total exp %	41463	1.54	1.45	0	28.16
B	Tourism expenditure/total exp %	41463	0.62	1.31	0	32.34
B	Education expenditure/total exp %	41463	10.18	4.61	0	34.76
B	Local police expenditure/total exp %	41463	4.6	2.98	0	42.12
B	Traffic man. expenditure/total exp %	41463	9.36	4.43	0	43.41
B	Landing expenditure/total exp %	41463	20.01	7.07	0	67.92
B	Social expenditure/total exp %	41463	9.76	7.31	0	68.51
B	Ec. planning expenditure/total exp %	41462	1.4	4.04	0	62.87
B	Inhabitant with main residence %	41457	82.06	5.12	40.28	96.77
C	Unitary estate income - Euro PC	41463	1260.93	543.51	217.56	12000.96
C	Unitary total income - Euro PC	41463	15359.11	3358.63	5605.7	61590.84
D	Commercial estate value - Euro/msq	35987	1264.41	568.91	187.66	16493.15
D	Residential estate value - Euro/msq	40112	1128.42	514.09	257.3	12347.88
E	Population 31 Dec	41463	7668.02	45913.76	59	2761477
E	Population 0-14 %	41461	13.55	3.11	1.32	29.39
E	Population over 65 %	41461	20.87	6.26	4.1	63.33
E	Foreingner population %	41236	4.88	3.76	0	29.41
E	Cancelled/Population %	41463	2.91	1.26	0	55.56
E	New registered/Population %	41463	3.75	1.81	0	20.35
E	Cohousing/population*1000	36802	0.5	2.34	0	416.39
F	CL % votes - regional government ballots	41460	45.06	14.65	5.14	94.39
F	Others % votes - regional government ballots	41460	3.72	3.75	0	55.33
G	TOTAL grants current exp - Euro PC	41463	254.66	158.75	1.83	1975.98
G	TOTAL grants cap exp - Euro PC	41463	340.26	424.81	0	5202.06
Other	Capital expenditure - Euro PC	41463	453.01	476.51	0	5755.57
Other	Current expenditure - Euro PC	41463	755.13	231	426.25	2738.44
Other	Revenues Total taxes - Euro PC	41463	375.65	151.58	19.59	1299.98
Other	Revenues Total non taxes - Euro PC	41463	178.73	135.77	0	2410.58
Other	Total grants - Euro PC	41463	594.92	500.71	14.86	5565.59
Other	Income tax sharing with CG - Euro PC	41463	52.95	52.65	0	615.72
Other	Revenues Total taxes - Euro PC	41463	375.65	151.58	19.59	1299.98
Other	Revenues Total non taxes - Euro PC	41463	178.73	135.77	0	2410.58

Table 6: Coefficients point estimates. Dependent variable: tax burden. Arellano - Bond Dynamic Panel GMM Estimator. Full model.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LAG1 Local tax burden	0.395830*** (0.067)	0.273916*** (0.061)	0.278325*** (0.061)	0.417388*** (0.064)	0.300390*** (0.076)	0.304772*** (0.075)	0.366406*** (0.069)	0.198869*** (0.055)	0.203271*** (0.054)	0.393545*** (0.068)	0.255303*** (0.064)	0.257147*** (0.064)
VFI1 - Grants/Total Expenditure %	-0.010372*** (0.005)	-0.028380*** (0.005)	-0.027930*** (0.005)	-0.016423*** (0.008)	-0.022800*** (0.008)	-0.022249*** (0.008)	-0.009460* (0.005)	-0.039294*** (0.005)	-0.038896*** (0.005)	-0.018290** (0.008)	-0.043420*** (0.008)	-0.043759*** (0.008)
VFI2 - (Grants + Tax Sharing)/Total Expenditure %												
VFI3 - Grants/Own Revenues %												
VFI4 - (Grants + Tax Sharing)/Own Revenues %												
VFI1xHFIloc1	-0.000000*** (0.000)											
VFI1xHFIloc2		-0.000004*** (0.000)										
VFI1xHFIloc3			-0.000004*** (0.000)									
VFI2xHFIloc1				-0.000000* (0.000)								
VFI2xHFIloc2					-0.000003** (0.000)							
VFI2xHFIloc3												
VFI3xHFIloc1												
VFI3xHFIloc2												
VFI3xHFIloc3												
VFI4xHFIloc1												
VFI4xHFIloc2												
VFI4xHFIloc3												
HFIloc1 - Max average income - average income	0.000014*** (0.000)			0.000013** (0.000)			0.000017*** (0.000)	0.000200 (0.001)		0.000015*** (0.000)	0.000425 (0.001)	
HFIloc2 - Mean average income - average income		-0.000022 (0.001)			0.000365 (0.001)							
HFIloc3 - Median average income - average income			-0.000943 (0.004)			0.001393 (0.004)			-0.000105 (0.004)			0.001169 (0.004)
Administrative expenditure/total exp %	0.086629 (0.098)	-0.032476 (0.050)	-0.035071 (0.050)	0.084893 (0.097)	0.007660 (0.065)	0.006392 (0.064)	0.071795 (0.081)	-0.005061 (0.044)	-0.007924 (0.045)	0.044261 (0.063)	-0.008070 (0.048)	-0.006576 (0.049)
Culture expenditure/total exp %	0.106823 (0.127)	0.001051 (0.098)	0.000794 (0.097)	0.094484 (0.129)	0.016080 (0.112)	0.016437 (0.112)	0.056877 (0.108)	0.063122 (0.085)	0.062233 (0.085)	0.057365 (0.099)	0.094003 (0.109)	0.106338 (0.109)
Sport expenditure/total exp %	0.110455 (0.167)	-0.006997 (0.129)	-0.012045 (0.128)	0.117502 (0.168)	-0.023768 (0.151)	-0.028835 (0.150)	0.117785 (0.159)	-0.162465 (0.113)	-0.159754 (0.113)	0.115200 (0.124)	-0.144345 (0.125)	-0.147267 (0.126)
Tourism expenditure/total exp %	-0.103594 (0.147)	-0.020746 (0.121)	-0.024779 (0.121)	-0.043866 (0.147)	0.061195 (0.134)	0.059315 (0.133)	-0.175815 (0.135)	-0.000362 (0.114)	-0.000890 (0.114)	-0.188845 (0.124)	0.006523 (0.119)	0.015569 (0.120)
Education expenditure/total exp %	0.179442 (0.114)	0.034899 (0.070)	0.034411 (0.070)	0.181023 (0.113)	0.049788 (0.087)	0.048764 (0.087)	0.134494 (0.099)	0.028077 (0.061)	0.026821 (0.061)	0.109746 (0.081)	0.019066 (0.068)	0.017293 (0.069)
Local police expenditure/total exp %	-0.068839 (0.113)	-0.187322*** (0.072)	-0.191370*** (0.072)	-0.086866 (0.113)	-0.227690*** (0.085)	-0.230126*** (0.084)	-0.062075 (0.102)	-0.136577** (0.067)	-0.139794** (0.068)	-0.103893 (0.088)	-0.189343*** (0.071)	-0.187375*** (0.072)
Traffic man. expenditure/total exp %	0.115238 (0.103)	0.006236 (0.066)	0.006087 (0.066)	0.101108 (0.105)	0.031986 (0.079)	0.032294 (0.079)	0.125393 (0.091)	0.013514 (0.059)	0.012582 (0.059)	0.057903 (0.073)	-0.028726 (0.064)	-0.028129 (0.064)
Landing expenditure/total exp %	0.103519 (0.099)	0.069137 (0.048)	0.063354 (0.048)	0.102527 (0.098)	0.109295* (0.065)	0.106932* (0.062)	0.074999 (0.084)	0.063960 (0.041)	0.059783 (0.041)	0.033127 (0.065)	0.051061 (0.045)	0.050242 (0.046)
Social expenditure/total exp %	0.050658 (0.102)	0.042022 (0.055)	0.038941 (0.055)	0.051016 (0.102)	0.107792 (0.072)	0.105854 (0.072)	0.027629 (0.085)	0.027389 (0.049)	0.025530 (0.049)	-0.001598 (0.068)	0.053010 (0.053)	0.054320 (0.054)
Ec. planning expenditure/total exp %	0.216075* (0.118)	0.230945** (0.097)	0.226853** (0.097)	0.193565** (0.113)	0.273527** (0.112)	0.269785** (0.111)	0.180292* (0.103)	0.193960** (0.088)	0.193459** (0.088)	0.119779 (0.097)	0.209693** (0.097)	0.211579** (0.097)
Unitary estate income - Euro PC	-0.001921** (0.001)	-0.000509 (0.001)	-0.000586 (0.001)	-0.001871** (0.001)	-0.000904 (0.001)	-0.000929 (0.001)	-0.001370 (0.001)	-0.000580 (0.001)	-0.000667 (0.001)	-0.001000 (0.001)	-0.000734 (0.001)	-0.000757 (0.001)
Unitary total income - Euro PC	0.000013 (0.000)	-0.000263 (0.001)	-0.000187 (0.004)	-0.000072 (0.000)	0.000218 (0.001)	0.001242 (0.005)	0.000093 (0.000)	-0.000196 (0.001)	-0.000506 (0.004)	0.000028 (0.000)	0.000130 (0.001)	0.000860 (0.004)

Commercial estate value - Euro/msq	-0.001082*	-0.000257	-0.000244	-0.000993*	-0.000070	-0.000046	-0.0000238	-0.000225	-0.000898*	-0.000087	-0.000085
Residential estate value - Euro/msq	0.000572	-0.000184	-0.000168	0.000557	-0.000298	-0.000299	-0.000027	-0.000011	0.000046	-0.000409	-0.0000416
Population 31 Dec	-0.000164	-0.000030	-0.000031	-0.000153	-0.000041	-0.000040	-0.000021	-0.000024	-0.000021	-0.000010	-0.000012
Population 0-14 %	0.032536	-0.006290	-0.007899	0.031859	-0.003179	-0.003515	0.019019	0.016672	0.024746	0.022128	0.020221
Population over 65 %	-0.055027*	-0.008454	-0.009260	-0.058438*	-0.002975	-0.003953	-0.015738	-0.017294	-0.068666**	-0.017451	-0.020503
Foreigner population %	-0.074070	0.001460	0.001658	-0.093126*	-0.008278	-0.007361	0.005971	0.006115	-0.074692	-0.015685	-0.016138
Cancelled/Population %	-0.130371	-0.042968	-0.043512	-0.114391	-0.075868	-0.077060	-0.021045	-0.021527	-0.078889	-0.028251	-0.025894
New registered/Population %	0.029150	-0.085792	-0.080093	0.012519	-0.101054	-0.095625	0.006101	-0.043291	-0.031845	-0.103814*	-0.098832*
Borrowing - Euro PC	-0.000164	-0.000601	-0.000602	-0.000456	-0.000455	-0.000461	0.000584	0.000234	0.000575	0.000055	0.000039
Current grants/Total grants %	-0.014337***	-0.017707***	-0.017828***	-0.017615***	-0.016131***	-0.014547***	-0.021101***	-0.021303***	-0.016908***	-0.020799***	-0.021220***
CL % votes - regional government ballots	0.013277**	0.005453	0.005948	0.014911**	0.010393	0.010728	0.022203	0.002861	0.011515	0.004442	0.004852
Others % votes - regional government ballots	0.015538	-0.002561	-0.001990	0.018307	-0.003694	-0.003214	-0.009243	-0.008221	0.017021	-0.008520	-0.008640
RMI	1.461266***	0.603536	0.591773	1.607816***	0.752183*	0.736738*	1.340353***	0.284801	1.480155***	0.556465	0.501539
Dummy_inc1	1.244668	1.731718***	1.730391***	1.207485	1.550131**	1.569244**	1.640399**	1.954796***	1.606057**	1.751296***	1.756923***
Dummy_inc2	0.671964	0.964571**	0.974768***	0.594809	1.172467**	1.183283**	0.884775	0.684071**	0.857742	1.087966***	1.077540***
Dummy_inc3	0.614716	0.470854	0.486357	0.751462*	0.4666	0.4666	0.394940	0.420324	0.839161**	0.444858	0.448460
Cohousing/population*1000	0.022788	0.000096	-0.000857	0.008751	0.007611	0.004967	-0.004785	-0.005832	0.003604	-0.014281	-0.016833
Year 2003	-0.016514	0.158920	-0.684146	-0.049334	0.661640	1.579786	0.076703	-0.167866	0.024978	0.465445	1.108016
Year 2004	-0.084789	0.126779	-0.641922	-0.113871	0.629090	1.464286	-0.035008	-0.220012	-0.094199	0.346293	0.26794
Year 2005	-0.110857	0.120583	-0.574832	-0.156385	0.546309	1.302391	-0.069387	0.025708	-0.126671	0.277660	0.800722
Year 2006	-0.025888	0.246252**	0.064562	-0.029865	0.422497***	0.609913	0.002616	0.010835	-0.049761	0.160834	0.275864
Year 2007	-0.108893	0.191380	0.249505	-0.156070	0.080711	-0.008222	-0.033162	0.108347	-0.083603	-0.024393	-0.107096
Year 2008	-0.337534***	-0.035723	-0.136915	-0.388775***	-0.054925	0.040832	-0.279992**	-0.089129	-0.320845***	-0.136424	-0.081680
Observations	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116
Municipalities	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744
AR(1) test statistic	0	0	0	0	0	0	0	0	0	0	0
p-value of AR(1) statistic	-7.506	-10.27	-10.28	-8.386	-10.12	-10.08	-7.167	-9.632	-7.349	-9.723	-9.605
AR(2) test statistic	0.699	-0.234	-0.228	0.357	-0.866	-0.857	1.223	-1.141	0.627	-0.729	-0.710
p-value of AR(2) statistic	0.484	0.815	0.819	0.721	0.386	0.391	0.239	0.254	0.531	0.466	0.478
Hansen J statistic	63.84	84.70	84.26	66.98	92.27	91.75	67.17	77.60	65.63	88.79	86.85
Degrees of freedom for Hansen J statistic	73	73	73	73	73	73	73	73	73	73	73
p-value of Hansen J statistic	0.769	0.165	0.173	0.676	0.0634	0.0682	0.670	0.334	0.718	0.101	0.128

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Coefficients point estimates. Dependent variable: fees burden. Arellano - Bond Dynamic Panel GMM Estimator. Full model.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
LAG1 Local fees burden	0.208170*** (0.074)	0.220444*** (0.077)	0.220721*** (0.077)	0.200950*** (0.072)	0.199821*** (0.072)	0.200281*** (0.072)	0.214666*** (0.076)	0.225462*** (0.077)	0.225884*** (0.077)	0.206891*** (0.074)	0.213706*** (0.073)	0.214118*** (0.073)
VFI1 - Grants/Total Expenditure %	0.002288 (0.004)	-0.003115 (0.005)	-0.002638 (0.006)	-0.002081 (0.007)	-0.006362 (0.008)	-0.006052 (0.008)	0.003340 (0.004)	-0.000051 (0.006)	0.000247 (0.006)	0.000061 (0.007)	-0.001440 (0.008)	-0.001035 (0.008)
VFI2 - (Grants + Tax Sharing)/Total Expenditure %												
VFI3 - Grants/Own Revenues %												
VFI4 - (Grants + Tax Sharing)/Own Revenues %												
VFI1xHF1loc1	-0.000000 (0.000)											
VFI1xHF1loc2		-0.000002* (0.000)										
VFI1xHF1loc3			-0.000002* (0.000)									
VFI2xHF1loc1				-0.000000 (0.000)								
VFI2xHF1loc2					-0.000002 (0.000)							
VFI2xHF1loc3							-0.000000 (0.000)					
VFI3xHF1loc1								-0.000001 (0.000)				
VFI3xHF1loc2												
VFI3xHF1loc3									-0.000001 (0.000)			
VFI4xHF1loc1										-0.000000 (0.000)		
VFI4xHF1loc2											-0.000001 (0.000)	
VFI4xHF1loc3												-0.000001 (0.000)
HF1loc1 - Max average income - average income	0.000006 (0.000)			0.000005 (0.000)			0.000008 (0.000)			0.000007 (0.000)		
HF1loc2 - Mean average income - average income		0.001597** (0.001)			0.001441* (0.001)			0.001666** (0.001)			0.001442* (0.001)	
HF1loc3 - Median average income - average income			0.009098* (0.005)			0.008080* (0.005)			0.009683** (0.005)			0.008305* (0.005)
Administrative expenditure/total exp %	-0.029398 (0.079)	-0.033803 (0.061)	-0.034405 (0.061)	-0.030144 (0.073)	-0.044818 (0.068)	-0.043742 (0.068)	-0.000890 (0.074)	-0.026057 (0.055)	-0.026597 (0.056)	0.000423 (0.070)	-0.042137 (0.060)	-0.042310 (0.060)
Culture expenditure/total exp %	-0.232426* (0.123)	-0.187492* (0.111)	-0.188993* (0.112)	-0.234496** (0.119)	-0.222889** (0.110)	-0.222938** (0.110)	-0.167631 (0.121)	-0.162955 (0.113)	-0.164308 (0.113)	-0.164115 (0.124)	-0.206524* (0.117)	-0.208175* (0.117)
Sport expenditure/total exp %	-0.164309 (0.138)	-0.102054 (0.164)	-0.099535 (0.164)	-0.201324 (0.172)	-0.062255 (0.169)	-0.061664 (0.168)	-0.087422 (0.153)	0.005848 (0.172)	0.009310 (0.172)	-0.142763 (0.158)	-0.002420 (0.175)	0.002692 (0.175)
Tourism expenditure/total exp %	-0.148934 (0.144)	-0.089498 (0.140)	-0.088295 (0.140)	-0.164779 (0.146)	-0.090213 (0.139)	-0.086767 (0.139)	-0.092773 (0.141)	-0.039992 (0.143)	-0.039440 (0.143)	-0.0999380 (0.145)	-0.057767 (0.146)	-0.056633 (0.146)
Education expenditure/total exp %	-0.064595 (0.091)	-0.023548 (0.088)	-0.023441 (0.088)	-0.069523 (0.089)	-0.077540 (0.085)	-0.075532 (0.085)	-0.018532 (0.083)	0.018793 (0.091)	0.019806 (0.092)	-0.033409 (0.078)	-0.027716 (0.084)	-0.027078 (0.085)
Local police expenditure/total exp %	0.147443 (0.092)	0.110397 (0.087)	0.110352 (0.087)	0.173437** (0.087)	0.117242 (0.087)	0.119213 (0.087)	0.185554** (0.087)	0.134337 (0.088)	0.133833 (0.088)	0.196894** (0.082)	0.131061 (0.086)	0.131781 (0.086)
Traffic man. expenditure/total exp %	0.003029 (0.087)	0.042728 (0.078)	0.042940 (0.078)	-0.008441 (0.080)	0.019397 (0.081)	0.020762 (0.081)	0.003001 (0.081)	0.047796 (0.072)	0.048762 (0.072)	-0.008500 (0.075)	0.026845 (0.075)	0.028206 (0.076)
Landing expenditure/total exp %	0.023182 (0.077)	0.019041 (0.059)	0.017469 (0.060)	0.026567 (0.070)	0.002041 (0.064)	0.001868 (0.064)	0.056922 (0.072)	0.032536 (0.051)	0.031857 (0.051)	0.057415 (0.069)	0.009701 (0.057)	0.009123 (0.057)
Social expenditure/total exp %	-0.002379 (0.083)	0.006042 (0.074)	0.005357 (0.074)	0.002370 (0.079)	0.001129 (0.078)	0.002145 (0.078)	0.024008 (0.076)	0.004230 (0.068)	0.004400 (0.068)	0.030212 (0.072)	-0.020045 (0.071)	-0.019664 (0.071)
Ec. planning expenditure/total exp %	0.085766 (0.077)	0.073262 (0.066)	0.073122 (0.066)	0.086494 (0.072)	0.062740 (0.069)	0.064213 (0.068)	0.106911 (0.068)	0.084289 (0.063)	0.084103 (0.063)	0.110402* (0.062)	0.068934 (0.063)	0.069177 (0.063)
Unitary estate income - Euro PC	-0.001045 (0.001)	-0.000898 (0.001)	-0.000952 (0.001)	-0.001334 (0.001)	-0.000838 (0.001)	-0.000916 (0.001)	-0.001409 (0.001)	-0.001810 (0.001)	-0.001858 (0.001)	-0.001634 (0.001)	-0.001665 (0.001)	-0.001706 (0.001)
Unitary total income - Euro PC	-0.000016 (0.000)	0.001499* (0.001)	0.000904* (0.005)	-0.000009 (0.000)	0.001345 (0.001)	0.007989* (0.005)	0.000047 (0.000)	0.001608** (0.001)	0.000628** (0.005)	0.000039 (0.000)	0.001367* (0.001)	0.008236* (0.005)

Commercial estate value - Euro/msq	0.000567	0.000680	0.000680	0.000780*	0.000600	0.000774	0.000771	0.000341	0.000874*	0.000850*
Residential estate value - Euro/msq	-0.000299	-0.000618	-0.000601	-0.000960**	-0.000188	-0.000393	-0.000388	-0.000171	-0.000555	-0.000543
Population 31 Dec	-0.000069	-0.000075	-0.000076	-0.000032	-0.000102	-0.000100	-0.000104	-0.000038	-0.000020	-0.000022
Population 0-14 %	0.013138	0.038481	0.037731	0.026958	0.021552	0.057005*	0.056559*	0.019075	0.048534	0.047748
Population over 65 %	-0.012744	-0.006016	-0.005711	-0.010995	-0.010555	-0.016714	-0.016508	-0.028231	-0.019811	-0.019107
Foreigner population %	0.039239	-0.019146	-0.018536	0.038199	-0.015088	0.027134	-0.009964	0.030748	-0.003316	0.028
Cancelled/Population %	-0.096568	-0.091618	-0.093690	-0.138217	-0.085682	-0.083486	-0.124277	-0.119295	-0.112427	-0.115051
New registered/Population %	0.027596	0.055456	0.057169	0.021705	0.024292	0.034109	0.086968	0.036066	0.068061	0.070105
Borrowing - Euro PC	0.000161	0.000258	0.000268	0.000325	0.000334	-0.000115	0.000342	0.000105	0.000453	0.000454
Current grants/Total grants %	0.000899	-0.002269	-0.002143	-0.000569	-0.000355	0.000747	-0.001455	0.000956	-0.000673	-0.000495
CL % votes - regional government ballots	0.011404	0.013456*	0.013804*	0.011759	0.012066	0.014599*	0.017718**	0.011386	0.015940*	0.016253**
Others % votes - regional government ballots	-0.009011	-0.019744	-0.019801	-0.010783	-0.020554	-0.019881	-0.014866	-0.009253	-0.013138	-0.012600
RAMI	0.067607	-0.002496	-0.011446	0.073952	-0.229271	-0.235947	0.447876	0.067689	0.302641	-0.096874
Dummy_inc1	-1.210730	-0.798052	-0.834611	-1.048027	-0.692968	-0.721785	-0.943139	-0.558153	-1.006813	-1.031709
Dummy_inc2	-0.856787	-0.175456	-0.178254	-0.739623	-0.104667	-0.015064	-0.378644	-0.478918	-0.145199	-0.147003
Dummy_inc3	-0.422775	-0.485807	-0.492009	-0.402939	-0.344517	-0.344234	-0.211608	-0.545138	-0.431	-0.433
Cohousing/population*1000	-0.024420	-0.013572	-0.013752	-0.031059	-0.019775	-0.019613	-0.034180	-0.033174	-0.007651	-0.007711
Year 2003	0.360747	1.261241**	8.037866*	0.273164	1.173944*	7.176824*	0.295627	1.285873**	8.525267**	7.345463*
Year 2004	0.309183	1.261489**	7.433174**	0.257096	1.152370*	6.619726*	0.262948	1.307876**	7.902404**	6.792372*
Year 2005	0.177008	0.949115**	6.529049*	0.146439	0.884602*	5.828705*	0.103320	0.982677**	6.945333**	5.970323*
Year 2006	0.115515	0.039162	1.444317*	0.074783	0.055296	1.302825*	0.088510	0.049076	0.021198	1.309959*
Year 2007	0.049587	-0.437626*	-1.029673*	0.040412	-0.382520	-0.904088*	0.032697	-1.156234**	-0.448091*	-0.987902*
Year 2008	0.084243	-0.057596	0.079509**	0.077036	-0.053831	0.601904*	0.030334	0.029286	-0.088410	0.587535*
Observations	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116	19,116
Municipalities	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744	4,744
AR(1) test statistic	-5.765	-6.080	-6.089	-5.986	-6.320	-6.320	-5.841	-5.888	-5.613	-5.625
p-value of AR(1) statistic	8.14e-09	1.20e-09	1.14e-09	2.56e-10	2.61e-10	8.95e-09	5.18e-09	3.91e-09	1.96e-08	1.86e-08
AR(2) test statistic	1.205	1.298	1.266	0.494	0.973	0.943	1.129	0.967	0.442	0.423
p-value of AR(2) statistic	0.194	0.205	0.231	0.346	0.346	0.0952	0.259	0.262	0.658	0.672
Hansen J statistic	64.38	62.05	61.92	61.72	60.64	60.84	58.64	64.99	57.59	57.22
Degrees of freedom for Hansen statistic	73	73	73	73	73	73	73	73	73	73
p-value of Hansen J statistic	0.754	0.816	0.819	0.824	0.849	0.844	0.879	0.737	0.907	0.913

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Coefficients point estimates. Dependent variable: tax burden. Fixed effect FGLS estimator. Full model.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VF11 - Grants/Total Expenditure %	-0.014763*** (0.001)	-0.014927*** (0.001)	-0.014918*** (0.001)									
VF12 - (Grants + Tax Sharing)/Total Expenditure %				-0.010286*** (0.001)	-0.010789*** (0.001)	-0.010779*** (0.001)	-0.021774*** (0.001)	-0.026848*** (0.001)	-0.026442*** (0.001)	-0.026755*** (0.001)	-0.026900*** (0.001)	-0.029046*** (0.001)
VF13 - Grants/Own Revenues %												
VF14 - (Grants + Tax Sharing)/Own Revenues %												
VF11xHFLloc1	-0.000000 (0.000)											
VF11xHFLloc2		-0.000000 (0.000)										
VF11xHFLloc3			-0.000000 (0.000)									
VF12xHFLloc1				-0.000000 (0.000)								
VF12xHFLloc2					-0.000000*** (0.000)							
VF12xHFLloc3						-0.000000*** (0.000)						
VF13xHFLloc1							-0.000000*** (0.000)					
VF13xHFLloc2								-0.000002*** (0.000)				
VF13xHFLloc3									-0.000002*** (0.000)			
VF14xHFLloc1										-0.000018*** (0.000)		
VF14xHFLloc2											-0.000001*** (0.000)	
VF14xHFLloc3												-0.000001*** (0.000)
HFLloc1 - Max average income - average income	-0.000022*** (0.000)											
HFLloc2 - Mean average income - average income		-0.000671*** (0.000)		-0.000023*** (0.000)								
HFLloc3 - Median average income - average income			-0.000652*** (0.000)			-0.000721*** (0.000)						
RMI	-0.107726** (0.027)	-0.105156** (0.026)	-0.106433** (0.026)	-0.080945 (0.025)	-0.080374 (0.027)	-0.080536 (0.027)	-0.161816*** (0.025)	-0.119250*** (0.025)	-0.120424*** (0.024)	-0.117791** (0.026)	-0.103389** (0.025)	-0.104419** (0.025)
LAG tax burden %	0.277178*** (0.002)	0.277269*** (0.002)	0.277213*** (0.002)	0.310398*** (0.002)	0.309711*** (0.002)	0.309753*** (0.002)	0.294375*** (0.002)	0.228097*** (0.002)	0.228359*** (0.002)	0.237060*** (0.002)	0.232772** (0.025)	0.233060*** (0.025)
Administrative expenditure/total exp %	-0.001309 (0.004)	-0.001322 (0.004)	-0.001321 (0.004)	-0.001321 (0.004)	-0.001366 (0.004)	-0.001365 (0.004)	-0.001702 (0.004)	-0.002032 (0.004)	-0.002032 (0.004)	-0.001277 (0.004)	-0.001658 (0.004)	-0.001637 (0.004)
Culture expenditure/total exp %	0.001020 (0.006)	0.001008 (0.006)	0.001011 (0.006)	0.000516 (0.006)	0.000469 (0.006)	0.000475 (0.006)	0.004716 (0.006)	0.004519 (0.006)	0.004519 (0.006)	0.005655 (0.006)	0.005324 (0.006)	0.005351 (0.006)
Sport expenditure/total exp %	0.008743 (0.006)	0.008675 (0.006)	0.008679 (0.006)	0.008842 (0.006)	0.008591 (0.006)	0.008594 (0.006)	0.006598 (0.006)	0.005321 (0.006)	0.005321 (0.006)	0.007412 (0.006)	0.006408 (0.006)	0.006416 (0.006)
Tourism expenditure/total exp %	-0.004088 (0.006)	-0.004027 (0.006)	-0.004033 (0.006)	-0.004060 (0.006)	-0.004374 (0.006)	-0.004379 (0.006)	0.001048 (0.006)	0.002393 (0.006)	0.002393 (0.006)	0.000836 (0.006)	0.001801 (0.006)	0.001795 (0.006)
Education expenditure/total exp %	-0.010039*** (0.003)	-0.010015*** (0.003)	-0.010018*** (0.003)	-0.010251*** (0.003)	-0.010240*** (0.003)	-0.010242*** (0.003)	-0.010910*** (0.003)	-0.010610*** (0.003)	-0.010621*** (0.003)	-0.009500*** (0.003)	-0.009488*** (0.003)	-0.009497*** (0.003)
Local police expenditure/total exp %	-0.017516*** (0.003)	-0.017536*** (0.003)	-0.017536*** (0.003)	-0.016942*** (0.003)	-0.016990*** (0.003)	-0.016993*** (0.003)	-0.020518*** (0.003)	-0.021025*** (0.003)	-0.021051*** (0.003)	-0.021531*** (0.003)	-0.022262*** (0.003)	-0.022112*** (0.003)
Traffic man. expenditure/total exp %	-0.000051 (0.004)	-0.000031 (0.004)	-0.000033 (0.004)	-0.000670 (0.004)	-0.000651 (0.004)	-0.000653 (0.004)	-0.000431 (0.004)	-0.000829 (0.004)	-0.000826 (0.004)	0.000059 (0.004)	-0.000370 (0.004)	-0.000365 (0.004)
Landing expenditure/total exp %	0.015141*** (0.002)	0.015170*** (0.002)	0.015168*** (0.002)	0.016170*** (0.002)	0.016223*** (0.002)	0.016221*** (0.002)	0.012311*** (0.002)	0.012356*** (0.002)	0.012356*** (0.002)	0.012880*** (0.002)	0.012827*** (0.002)	0.012824*** (0.002)
Social expenditure/total exp %	0.002714 (0.002)	0.002776 (0.002)	0.002771 (0.002)	0.001398 (0.003)	0.001483 (0.002)	0.001481 (0.002)	0.004399** (0.002)	0.005008** (0.002)	0.005017** (0.002)	0.005423** (0.003)	0.005743** (0.003)	0.005748** (0.003)

Ec. planning expenditure/total exp %	-0.001033 (0.003)	-0.000437 (0.003)	-0.004429 (0.003)	-0.004212 (0.003)	-0.004893 (0.004)	-0.005363 (0.003)	-0.005342 (0.003)
Property tax - ordinary taxrate %	0.910996*** (0.080)	0.864800*** (0.083)	0.868690*** (0.083)	0.868696*** (0.083)	0.812231*** (0.076)	0.806326*** (0.076)	0.806093*** (0.076)
Property tax - taxrate main residence %	0.227532*** (0.082)	0.246674*** (0.083)	0.246845*** (0.083)	0.162824** (0.080)	0.204172** (0.082)	0.189576** (0.081)	0.190167** (0.081)
Dummy_inc1	0.091170** (0.037)	0.076629** (0.038)	0.076483** (0.038)	0.115474*** (0.034)	0.113343*** (0.036)	0.120584*** (0.034)	0.120450*** (0.034)
Dummy_inc2	0.084912*** (0.025)	0.092915*** (0.026)	0.093651*** (0.026)	0.071566*** (0.023)	0.090774*** (0.025)	0.085688*** (0.023)	0.085901*** (0.023)
Dummy_inc3	0.065820*** (0.016)	0.081854*** (0.016)	0.081681*** (0.016)	0.039053*** (0.015)	0.061256*** (0.015)	0.057137*** (0.015)	0.057272*** (0.015)
Unitary estate income - Euro PC	-0.000149*** (0.000)	-0.000121** (0.000)	-0.000122** (0.000)	-0.000175*** (0.000)	-0.000156*** (0.000)	-0.000155*** (0.000)	-0.000155*** (0.000)
Unitary total income - Euro PC	-0.000777*** (0.000)	-0.000860*** (0.000)	-0.000837*** (0.000)	-0.000729*** (0.000)	-0.000711*** (0.000)	-0.000866*** (0.000)	-0.000843*** (0.000)
Commercial estate value - Euro/msq	0.000091** (0.000)	0.000101*** (0.000)	0.000101*** (0.000)	0.000087** (0.000)	0.000089** (0.000)	0.000089** (0.000)	0.000089** (0.000)
Residential estate value - Euro/msq	-0.000092** (0.000)	-0.000083** (0.000)	-0.000083** (0.000)	-0.000127*** (0.000)	-0.000131*** (0.000)	-0.000112** (0.000)	-0.000116*** (0.000)
Population 31 Dec	-0.000004*** (0.000)	-0.000005*** (0.000)	-0.000005*** (0.000)	-0.000003*** (0.000)	-0.000004*** (0.000)	-0.000004*** (0.000)	-0.000004*** (0.000)
Population 0-14 %	-0.001125 (0.002)	-0.001228 (0.002)	-0.001223 (0.002)	0.005248*** (0.002)	0.005248*** (0.002)	0.005248*** (0.002)	0.005248*** (0.002)
Population over 65 %	-0.000109 (0.002)	-0.000215 (0.002)	-0.000207 (0.002)	0.001163 (0.002)	0.001166 (0.002)	0.000552 (0.002)	0.000259 (0.002)
Foreigner population %	0.000094 (0.002)	0.000136 (0.002)	0.000132 (0.002)	0.000018 (0.001)	0.000039 (0.001)	0.000387 (0.001)	0.000371 (0.001)
Cancelled/Population %	0.007212* (0.004)	0.007230* (0.004)	0.007571** (0.004)	0.007062*** (0.003)	0.007375** (0.003)	0.006994** (0.004)	0.007008** (0.004)
New registered/Population %	-0.008001*** (0.003)	-0.007908*** (0.003)	-0.007908*** (0.003)	-0.009192*** (0.003)	-0.008073*** (0.003)	-0.008878*** (0.003)	-0.008321*** (0.003)
Cohousing/population*1000	0.000404** (0.000)	0.000407** (0.000)	0.000431** (0.000)	0.000429** (0.000)	0.000945*** (0.000)	0.000929*** (0.000)	0.000929*** (0.000)
LAG1 Borrowing - Euro PC	0.000077*** (0.000)	0.000077*** (0.000)	0.000066*** (0.000)	0.000066*** (0.000)	0.000026 (0.000)	0.000018 (0.000)	0.000018 (0.000)
Current grants/Total grants %	-0.007684*** (0.000)	-0.007700*** (0.000)	-0.006281*** (0.000)	-0.011520*** (0.001)	-0.012623*** (0.001)	-0.013644*** (0.001)	-0.013653*** (0.001)
CL % votes - regional government ballots	-0.001987*** (0.001)	-0.001999*** (0.001)	-0.002377*** (0.001)	-0.001359** (0.001)	-0.001364** (0.001)	-0.001767*** (0.001)	-0.001770*** (0.001)
Others % votes - regional government ballots	0.006658*** (0.001)	0.006654*** (0.001)	0.007605*** (0.001)	0.004375*** (0.001)	0.004381*** (0.001)	0.005273*** (0.001)	0.005275*** (0.001)
Year 2004	0.034066** (0.017)	-0.223636*** (0.012)	-0.186672*** (0.012)	-0.179235*** (0.014)	-0.251501*** (0.011)	-0.266420*** (0.011)	-0.224569*** (0.011)
Year 2005	0.090274*** (0.015)	-0.141505*** (0.012)	-0.114557*** (0.011)	-0.092602 (0.013)	-0.177339*** (0.011)	-0.201330*** (0.012)	-0.170744*** (0.011)
Year 2006	-0.312938*** (0.019)	0.105950*** (0.009)	0.124046*** (0.009)	-0.282131*** (0.019)	-0.407454*** (0.018)	0.075628*** (0.009)	0.096090*** (0.009)
Year 2007	-0.590672*** (0.023)	-0.278769*** (0.016)	-0.257714*** (0.016)	-0.665329*** (0.023)	-0.574933*** (0.021)	-0.686280*** (0.022)	-0.218482*** (0.013)
Year 2008	-0.476310*** (0.013)	-0.170900*** (0.025)	-0.072933*** (0.025)	-0.438190*** (0.020)	-0.437558*** (0.012)	-0.496322*** (0.012)	-0.024463 (0.022)
Year 2009	-0.396701*** (0.019)	-0.119202*** (0.027)	-0.073055*** (0.027)	-0.122968*** (0.028)	-0.371150*** (0.016)	-0.417417*** (0.018)	-0.021461 (0.023)
Year 2010							
Constant	5.130354*** (0.391)	14.517003*** (0.361)	4.979291*** (0.411)	15.541250*** (0.395)	15.197568*** (0.390)	14.640548*** (0.327)	17.296528*** (0.402)
Observations	25,938	25,938	25,938	25,938	25,938	25,938	25,938
R-squared	0.693	0.674	0.674	0.730	0.734	0.721	0.721
Municipalities	5,375	5,375	5,375	5,375	5,375	5,375	5,375

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Coefficients point estimates. Dependent variable: fees burden. Fixed effect FGLS estimator. Full model.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VF11 - Grants/Total Expenditure %	-0.005115*** (0.001)	-0.008433*** (0.001)	-0.008408*** (0.001)	-0.008947*** (0.001)	-0.010998*** (0.001)	-0.010971*** (0.001)	-0.007661*** (0.001)	-0.014510*** (0.001)	-0.014503*** (0.001)	-0.018740*** (0.002)	-0.024358*** (0.002)	-0.024322*** (0.002)
VF12 - (Grants + Tax Sharing)/Total Expenditure %												
VF13 - Grants/Own Revenues %												
VF14 - (Grants + Tax Sharing)/Own Revenues %												
VF11xHFIloc1	-0.000000*** (0.000)											
VF11xHFIloc2												
VF11xHFIloc3												
VF12xHFIloc1												
VF12xHFIloc2												
VF12xHFIloc3												
VF13xHFIloc1												
VF13xHFIloc2												
VF13xHFIloc3												
VF14xHFIloc1												
VF14xHFIloc2												
VF14xHFIloc3												
HFIloc1 - Max average income - average income	0.000004*** (0.000)											
HFIloc2 - Mean average income - average income												
HFIloc3 - Median average income - average income												
RMI	-0.132211*** (0.039)	-0.105407*** (0.040)	-0.105327*** (0.040)	-0.108008*** (0.040)	-0.104402*** (0.040)	-0.104875*** (0.040)	-0.170430*** (0.039)	-0.112766*** (0.037)	-0.113690*** (0.037)	-0.159763*** (0.039)	-0.137330*** (0.036)	-0.138516*** (0.036)
LAG fees burden %	0.206232*** (0.032)	0.205046*** (0.032)	0.205034*** (0.032)	0.203373*** (0.032)	0.202745*** (0.032)	0.202735*** (0.032)	0.203933*** (0.031)	0.200634*** (0.031)	0.200638*** (0.031)	0.192876*** (0.031)	0.192881*** (0.031)	0.192881*** (0.031)
Administrative expenditure/total exp %	-0.006772** (0.003)	-0.006851** (0.003)	-0.006855** (0.003)	-0.006387** (0.003)	-0.006476** (0.003)	-0.006480** (0.003)	-0.006996** (0.003)	-0.007410** (0.003)	-0.007417** (0.003)	-0.006308** (0.003)	-0.006870** (0.003)	-0.006878** (0.003)
Culture expenditure/total exp %	0.006485 (0.005)	0.006421 (0.005)	0.006432 (0.005)	0.006766 (0.005)	0.006684 (0.005)	0.006691 (0.005)	0.008312* (0.005)	0.008198* (0.005)	0.008237* (0.005)	0.010835** (0.005)	0.010306** (0.005)	0.010339** (0.005)
Sport expenditure/total exp %	-0.001789 (0.008)	-0.002661 (0.008)	-0.002668 (0.008)	-0.000425 (0.008)	-0.001152 (0.008)	-0.001163 (0.008)	-0.002741 (0.008)	-0.004640 (0.008)	-0.004636 (0.008)	-0.001994 (0.008)	-0.003714 (0.008)	-0.003713 (0.008)
Tourism expenditure/total exp %	0.016187* (0.009)	0.016573* (0.009)	0.016572* (0.009)	0.015638* (0.009)	0.015830* (0.009)	0.015829* (0.009)	0.019220** (0.009)	0.021016** (0.008)	0.021094** (0.008)	0.020746** (0.008)	0.022028** (0.008)	0.022049** (0.008)
Education expenditure/total exp %	-0.018800*** (0.003)	-0.018363*** (0.003)	-0.018376*** (0.003)	-0.017771*** (0.003)	-0.017612*** (0.003)	-0.017624*** (0.003)	-0.019107*** (0.003)	-0.018394*** (0.003)	-0.018612*** (0.003)	-0.017376*** (0.003)	-0.017201*** (0.003)	-0.017222*** (0.003)
Local police expenditure/total exp %	0.046236*** (0.006)	0.046281*** (0.006)	0.046238*** (0.006)	0.045807*** (0.006)	0.045807*** (0.006)	0.045789*** (0.006)	0.045047*** (0.006)	0.044601*** (0.006)	0.044548*** (0.006)	0.043028*** (0.006)	0.042515*** (0.006)	0.042461*** (0.006)
Traffic man. expenditure/total exp %	-0.014450*** (0.004)	-0.014324*** (0.004)	-0.014328*** (0.004)	-0.013806*** (0.004)	-0.013759*** (0.004)	-0.013762*** (0.004)	-0.014451*** (0.004)	-0.014985*** (0.004)	-0.014987*** (0.004)	-0.013287*** (0.004)	-0.013907*** (0.004)	-0.013910*** (0.004)
Landing expenditure/total exp %	-0.006598 (0.002)	-0.000282 (0.002)	-0.000281 (0.002)	-0.000283 (0.002)	-0.000141 (0.002)	-0.000142 (0.002)	-0.002215 (0.002)	-0.002171 (0.002)	-0.002178 (0.002)	-0.003228* (0.002)	-0.003295* (0.002)	-0.003302* (0.002)
Social expenditure/total exp %	0.018935*** (0.007)	0.019400*** (0.007)	0.019409*** (0.007)	0.019976*** (0.007)	0.020191*** (0.007)	0.020194*** (0.007)	0.019705*** (0.007)	0.020520*** (0.007)	0.020547*** (0.007)	0.022381*** (0.007)	0.023016*** (0.006)	0.023035*** (0.006)

Ec. planning expenditure/total exp %	0.058984***	0.059065***	0.059076***	0.058535***	0.058591***	0.058602***	0.058009***	0.057484***	0.057499***	0.056137***	0.055631***	0.055650***
Property tax - ordinary taxrate %	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Property tax - taxrate main residence %	-0.141367	-0.146235	-0.146447	-0.153097	-0.152328	-0.152445	-0.172724*	-0.197266**	-0.197676**	-0.229530**	-0.242949**	-0.243250**
Dummy_inc1	(0.096)	(0.096)	(0.096)	(0.096)	(0.096)	(0.096)	(0.097)	(0.097)	(0.097)	(0.095)	(0.095)	(0.095)
Dummy_inc2	-0.025417	-0.032237	-0.031804	-0.010746	-0.019659	-0.019402	-0.056869	-0.076142	-0.075435	-0.058439	-0.082786	-0.082142
Dummy_inc3	(0.098)	(0.098)	(0.098)	(0.098)	(0.097)	(0.097)	(0.096)	(0.096)	(0.096)	(0.094)	(0.094)	(0.094)
Unitary estate income - Euro PC	0.060274	0.063851	0.063717	0.061665	0.071650	0.072838	0.072838	0.067134	0.066847	0.089667**	0.100732**	0.100689**
Unitary total income - Euro PC	(0.045)	(0.046)	(0.046)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)	(0.044)	(0.044)
Commercial estate value - Euro/msq	0.038908	0.037842	0.037899	0.049094	0.051285	0.051357	0.030651	0.015782	0.015811	0.044183	0.037981	0.038106
Residential estate value - Euro/msq	-0.003276	-0.002286	-0.002222	0.007194	0.007254	0.007279	-0.017841	-0.023021	-0.022969	-0.011981	-0.016931	-0.016892
Population 31 Dec	-0.000101*	-0.000097*	-0.000099*	-0.000099*	-0.000099*	-0.000099*	-0.000107*	-0.000095*	-0.000096*	-0.000111**	-0.000105**	-0.000105**
Population 0-14 %	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Foreigner population %	-0.000044***	-0.000109***	-0.000107***	-0.000050***	-0.000154***	-0.000035***	-0.000035***	-0.000091***	-0.000089***	-0.000037***	-0.000034***	-0.000034***
Cancelled/Population %	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
New registered/Population %	-0.000081**	-0.000084***	-0.000083***	-0.000085***	-0.000086***	-0.000086***	-0.000086***	-0.000089***	-0.000089***	-0.000095***	-0.000097***	-0.000097***
Cohousing/population*1000	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LAG1 Borrowing - Euro PC	-0.000017	-0.000018	-0.000018	-0.000006	-0.000008	-0.000008	-0.000008	-0.000037	-0.000037	-0.000031	-0.000035	-0.000036
Current grants/Total grants %	0.000004***	0.000003***	0.000003***	0.000004***	0.000004***	0.000004***	0.000004***	0.000004***	0.000004***	0.000005***	0.000005***	0.000005***
CL % votes - regional government ballots	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Others % votes - regional government ballots	0.004342	0.004469	0.004380	0.003626	0.004025	0.003957	0.007487**	0.008781**	0.008630**	0.009443***	0.011165***	0.011006***
Year 2004	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Year 2005	0.001813	0.001240	0.001209	0.001274	0.001251	0.002841	0.002841	0.001908	0.001894	0.001128	0.001817	0.001800
Year 2006	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Year 2007	0.001096	0.001622	0.001614	0.001212	0.001497	0.001490	0.000945	0.001908	0.001894	0.001128	0.001817	0.001800
Year 2008	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year 2009	0.004428	0.004590	0.004601	0.004127	0.004084	0.004093	0.004424	0.004891	0.004907	0.003974	0.004023	0.004039
Year 2010	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
Constant	-0.003627	-0.003097	-0.003066	-0.004359	-0.004266	-0.004243	-0.004270	-0.002967	-0.002902	-0.006525*	-0.005988*	-0.005926*
Observations	-0.000935***	-0.000996***	-0.000995***	-0.001010***	-0.001049***	-0.001048***	-0.000612***	-0.000658***	-0.000655***	-0.000570	-0.000618***	-0.000613***
R-squared	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Municipalities	0.000103***	0.000106***	0.000106***	0.000113***	0.000114***	0.000114***	0.000075***	0.000075***	0.000075***	0.000067***	0.000062**	0.000062**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	-0.003784***	-0.004203***	-0.004220***	-0.004775***	-0.004872***	-0.004880***	-0.005584***	-0.006932***	-0.006980***	-0.009362***	-0.010082***	-0.010119***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	0.002191**	0.002217**	0.002211**	0.002015*	0.002072*	0.002068*	0.002495**	0.002654**	0.002645**	0.002508**	0.002718***	0.002711***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	0.001682	0.001909	0.001910	0.002168	0.002242	0.002240	0.000470	0.000473	0.000473	0.000159	0.000034	0.000030
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	0.022085	0.012399	0.015392	0.037885**	0.007145	0.012894	-0.022258	-0.009810	-0.008289	-0.035104**	-0.039790***	-0.033461***
	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
	-0.037428**	-0.043396***	-0.041145***	-0.022434	-0.046844***	-0.042594***	-0.094229***	-0.079627***	-0.078482***	-0.121013***	-0.115210***	-0.110513***
	(0.015)	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)
	-0.103407***	-0.054988***	-0.053474***	-0.103908***	-0.031367***	-0.028567***	-0.153323***	-0.117304***	-0.116721***	-0.206527***	-0.119685***	-0.116709***
	(0.022)	(0.012)	(0.012)	(0.022)	(0.011)	(0.010)	(0.023)	(0.015)	(0.015)	(0.025)	(0.013)	(0.013)
	-0.071316***	(0.024)	(0.024)	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
	0.018315	0.044715***	0.046651***	-0.001703	0.040052***	0.043378***	0.038875***	0.078883***	0.080491***	0.017695	0.097173***	0.101141***
	(0.015)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
	-0.005890	0.021651	0.030832**	-0.018900	0.024522*	0.040022***	0.014245	0.055796***	0.062899***	0.011011	0.089630***	0.107712***
	(0.017)	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)	(0.017)	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)
	(0.017)	-0.004708	-0.000376	-0.000502	0.006825	0.030878*	0.034349**	0.030878*	0.034349**	0.070204***	0.078876***	0.078876***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
	2.720521***	3.842452***	3.819438***	3.069997***	4.695796***	4.647103***	2.834092***	4.121028***	4.111958***	3.681655***	5.949920***	5.898161***
	(0.287)	(0.387)	(0.379)	(0.301)	(0.423)	(0.414)	(0.281)	(0.387)	(0.380)	(0.305)	(0.450)	(0.442)
Observations	25,938	25,938	25,938	25,938	25,938	25,938	25,938	25,938	25,938	25,938	25,938	25,938
R-squared	0.209	0.212	0.212	0.218	0.219	0.223	0.233	0.233	0.233	0.256	0.264	0.264
Municipalities	5,375	5,375	5,375	5,375	5,375	5,375	5,375	5,375	5,375	5,375	5,375	5,375

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses