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Decentralization, competition and the local tax mix: Evidence from Flanders

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Decentralization, competition and the local tax mix: Evidence from Flanders

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Abstract

While numerous studies analyse the determinants of the level and composition of local public spending, little attention has been given to what shapes the choice of tax instruments used by decentralised governments. This paper bridges this gap by investigating the economic and political determinants of the local tax mix in the Flemish region of Belgium, where local governments enjoy extensive fiscal autonomy and have a wide variety of tax instruments available. Specifically, using panel data of 289 Flemish municipalities over the period 1995-2002, we estimate a system of five reduced-form tax revenue-share equations (income, property, business, user fees and other own revenues). The analysis highlights a number of important economic determinants of the observed tax mix (especially the tax base and revenue requirement), while political variables turn out to play a relatively minor role. Finally, the analysis uncovers virtually no evidence of inter-municipal dependence in the determination of the local tax mix.

Keywords: Tax mix; Local government; Flemish municipalities; Decentralisation.

JEL classification: C33; D72; H71.

1. Introduction

Starting with the seminal contributions of Borcherding and Deacon (1972) and Bergstrom and Goodman (1973), the public economics literature saw a proliferation of empirical research on the determinants of the level of public spending by decentralized authorities. One prominent strand of that literature analyses the effect of various types of grants from higher levels of government on the decision process at the local level, thereby focusing on the (large) impact of grants on local public spending and their (small) impact on local taxes (the well-known "flypaper effect"; see Hines and Thaler, 1995, for a review). Similarly, the impact of fiscal decentralization on the level of taxation and on the overall size of the public sector has been an area of extensive debate and scholarly research (see, e.g., Wilson, 1999, for a review).

In contrast, an aspect of local public finance that has received relatively limited empirical attention concerns the choice of tax instruments by decentralized authorities.[1] Nonetheless, local governments generally have more than one revenue instrument available – ranging from the choice between, say, tax revenues and user fees to the decision to generate tax revenues from different tax bases (e.g., property vs. income). Understanding what factors cause local authorities to rely more heavily on one instrument versus alternative ones – i.e. the role of economic and political forces in determining the observed tax mix – is of interest for two reasons. First, it can tell us whether local authorities are using the available tax instruments optimally. Second, it can help in the design of an optimal allocation of revenues in the processes of decentralization that are underway in several developed and developing countries.

This paper focuses on the economic and political determinants of the local tax mix in Flanders. The municipal level of government in the Flemish region of Belgium represents an interesting – or even unique – example of local tax autonomy. In fact, Flemish municipalities have a very large number of available tax instruments, ranging from surcharges on federal personal income and regional property tax revenues, to own taxes on business activities as well as fees and user charges. In fact, over 120 different local taxes currently exist (see section 3 below). In addition, Flemish local governments are virtually free to set tax rates and fee levels, as well as to define tax bases, for all purely local taxes (see also Goeminne *et al*., 2008).[2] As a result, there is a vast variation in the choice of tax instruments across the Flemish municipalities, as well as in the extent to which a given set of tax instruments is used. The municipal level of government in Flanders – consisting of about 300 jurisdictions – therefore lends itself perfectly to an empirical analysis of the determinants of the observed tax mix.

Following the empirical approach employed by Kenny and Winer (2006) when analysing the tax structure in a large sample of countries, we estimate a system of reduced-form equations, where the revenue shares of the main local tax instruments are used as dependent variables. The available municipal tax instruments are thereby

[1] While some evidence exists on the determinants of local governments' decisions to adopt a 'new' tax (e.g., Ashworth *et al*., 2006) or whether to adopt a local property tax (Fiva and Rattso, 2007), analyses addressing the choice of the entire local tax mix are, to the best of our knowledge, unavailable to date. Explorations of the tax mix at the national level are likewise scant (exceptions include Winer and Hettich, 1991; Volkerink and De Haan, 1999; Kenny and Winer, 2006).

[2] For the limited number of surcharge taxes, local governments only set the tax rate. As described in section 3 below, the tax base is defined by the higher-level government setting the tax upon which the surcharge is levied.

grouped into five areas: taxes on income (the municipal surcharge on the federal personal income tax), taxes on property (including the surcharge on the regional property tax and municipal second-property taxation), taxes on business (including taxes on employment of personnel, commercial signs or use of motorised equipment), user charges (including waste disposal and fees for public facilities) and other own revenues (such as administrative duties). We employ a vector of (the same) explanatory variables in each equation, reflecting the idea that the tax mix in each jurisdiction – i.e., the relative revenue share of each of the fiscal instruments – is the joint outcome of the simultaneous working of economic and political characteristics of the jurisdiction.

Moreover, given that local governments might use their available tax instruments strategically and compete with each other either to attract tax base (cf. tax competition literature; see Wilson, 1999; Fuest *et al*., 2005) or to safeguard their popularity in front of immobile, yet rational and informed taxpayers (cf. yardstick competition literature; Salmon 1987; Besley and Case 1995), we also test for inter-municipal dependence in the choice of the tax mix. In the presence of such strategic behaviour, municipalities' tax choices would not be independent of each other (Brueckner, 2003; Revelli, 2005).

The empirical analysis – based on a panel dataset on 289 (out of 308) Flemish municipalities observed along an eight-year time period (1995-2002) – identifies a number of important determinants of the observed tax mix. For one, we find that the size of the main tax bases – per capita income, assessed property values and an index of business activity – and the overall size of the budget requirement play a major role in determining the choice and relative weight of local tax instruments. Second, and somewhat surprisingly, political factors – such as government fragmentation and ideological complexion – turn out to play a negligible role. Finally, the analysis uncovers virtually no evidence of inter-municipal dependence in the determination of the local tax mix. Overall, therefore, it appears that, conditional on the size of the local budget, the local tax mix is mainly driven by economic factors rather than political ones.

The rest of the paper is organized as follows. Section 2 discusses the theoretical framework underlying our empirical analysis. We build on the tax choice model developed by Hettich and Winer (1984, 1988, 1999). Section 3 offers a presentation of the institutional structure of local government in Flanders, while sections 4 and 5 illustrate the empirical approach employed and the results of estimation of the system of reduced-form equations respectively. In section 6, we test for inter-jurisdictional dependence. Finally, section 7 concludes.

2. Theoretical background and hypotheses

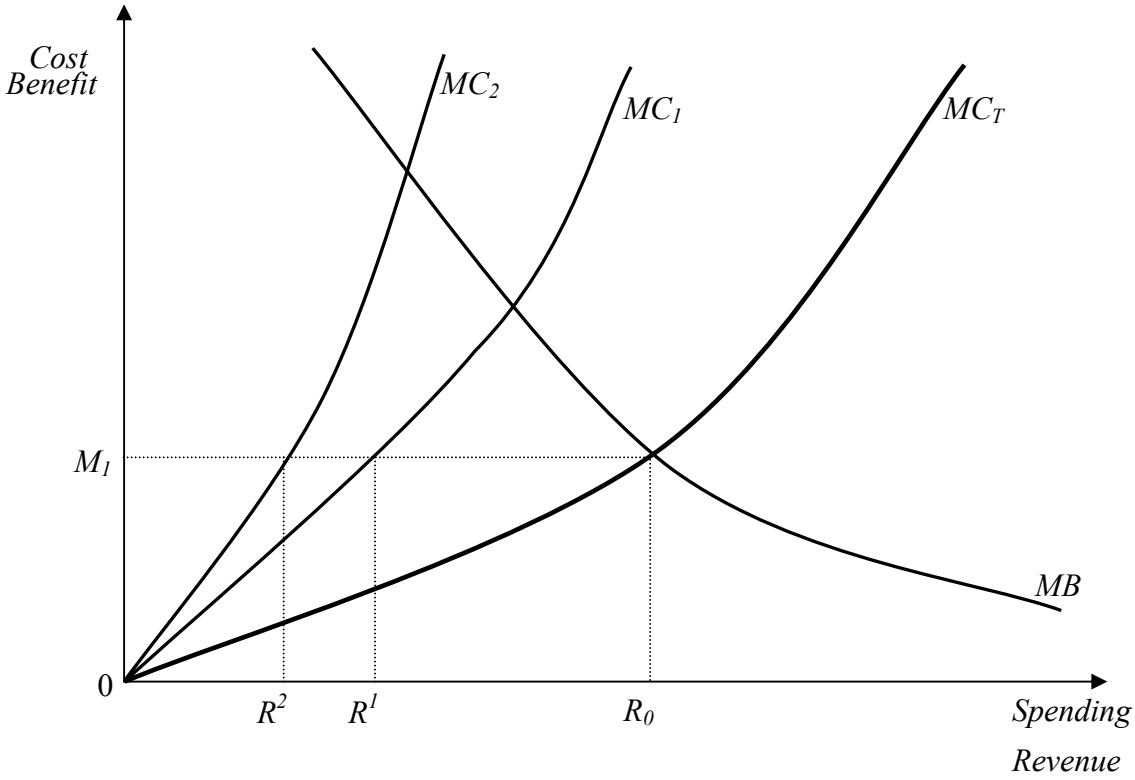
Following Kenny and Winer (2006) and Ashworth *et al*. (2006), our theoretical framework to study local taxation choices and the resulting equilibrium tax mix builds on the theory of revenue structures developed by Hettich and Winer (1984, 1988, 1999).

Hettich and Winer model taxation as part of a broader political equilibrium in which political parties are assumed to maximise their expected votes and have re-election as their sole objective. Basically, political parties compete for the support of a heterogeneous group of voters by choosing a tax structure that minimizes the political costs (in terms of electoral support) associated with the different tax sources

exploited. The political costs of taxation derive both from the individual's loss in disposable income due to taxation as well as the welfare loss resulting from the costs incurred in attempting at avoiding or evading taxation (Hettich and Winer, 1999; Kenny and Winer, 2006; Ashworth *et al*., 2006).

The basic set-up concerning the determination of the tax mix in a competitive political equilibrium is represented in Figure 1, where we consider a very stylized situation in which two tax instruments (Tax 1 and Tax 2) are available.

Figure 2: Optimal taxation with two tax instruments



The marginal cost curves for each tax (MC_1 and MC_2) reflect the government's (expected) vote loss relative to a given level of tax revenues derived from levying this tax.[3] Horizontally summing these marginal cost curves leads to the marginal political cost of both taxes (MC), or, in other words, the marginal cost of raising a given level of revenue. As usual, the MC curves are upward-sloping, reflecting the idea that taxation becomes increasingly electorally costly when the amount of revenue raised increases. Each tax is also associated with a marginal political benefit function, the vertical summation of which is given by MB (for reasons of clarity, the tax-specific MB functions are not drawn). The marginal benefit is downward sloping to indicate that increasing amounts of government spending become progressively less desirable to the electorate.[4]

[3] The depiction in Figure 1 assumes that marginal political costs are independent across revenue sources (see Hettich and Winer, 1984, 70).

[4] Each tax also has an underlying tax rate-revenue relationship (represented by the Laffer curve), which, for ease of exposition, is not drawn in Figure 1.

In equilibrium, the government's optimal budget size corresponds to the expenditure (and tax) level R_0. At this level, the marginal political benefits and costs of taxation (taking into account costs of administration, monitoring, enforcement and tax compliance) are equalized. The implications for the tax structure result from "a classic optimisation problem in which the government, for any level of expenditures, will adjust the tax rates until the marginal political costs are equalised over the different tax instruments" (Ashworth *et al*., 2006, 227). The result is a tax mix where the "marginal costs per dollar of revenue be equalized across tax bases" (Kenny and Winer, 2006, 185).

This model, and its graphical representation in Figure 1, can be employed to assess how exogenous changes in the economic and political environment affect the level and distribution of revenues across the available tax instruments. In particular, the model provides empirical predictions of a twofold nature.

The first concerns the "absolute" reliance on each of the available tax instruments as circumstances change, and is known as the "scale" effect (Kenny and Winer, 2006). In particular, the model suggests that all available tax instruments should generate higher revenues as total budget size increases.

The second set of empirical predictions regards how the "relative" reliance on available tax instruments (i.e., the share of tax instruments in total tax revenues) varies as circumstances change. Following Kenny and Winer (2006), three "effects" can here be distinguished: a) tax base, b) political and c) administration cost effects. Indeed, by affecting the position and slope of the marginal cost functions depicted in Figure 1, these factors influence the degree to which revenues from each tax instrument contribute in equilibrium to the funding of local public expenditures. In particular, a larger tax base lowers the marginal cost of raising revenues from that tax instrument (shifting the MC function in Figure 1 down and to the right), implying more intense reliance on that tax instrument at the expense of the other tax instruments. A similar movement of the marginal cost function follows from lower political and administration costs related to a given tax instrument, implying increased reliance on that instrument.

3. Local government and taxation in Flanders

The local level of government in Flanders (and Belgium more generally) is organised in much the same way as governments at the regional or federal level in Belgium. That is, local governments are designed according to a parliamentary system consisting of two main political bodies: the local council (the legislative body or 'parliament') and the College of Mayor and Alderman (the executive body or 'government'). The number of representatives in each of these two bodies is a direct function of the population size of the municipality and varies between 2 to 10 members for the College and 7 to 55 members for the council. Council members are elected directly once every 6 years (and they can be indefinitely re-elected) using a system of proportional representation. Following the election, the party (or parties in case a coalition needs to be formed) obtaining a majority position in the council chooses its council-members that are to be appointed as alderman and mayor.[5] As

[5] A multi-party College thus generally indicates that no party obtained a clear majority in the council (although, in some cases, a party obtaining a majority nonetheless opts for a coalition government). This is different from, for example, the Norwegian system where the composition of the College is a reflection of the composition of the council (cf. Tovmo, 2007). It implies, moreover, that, with the

such, all members of the College are also members of the council and the College can be seen as that sub-section of the council that is concerned with the day-to-day running of the municipality (and is, like the council, headed by the mayor). Since all policy decisions, with few exceptions, are taken by majority vote in the council, it is clear that political power at the local level in Flanders lies (nearly) completely with those parties forming the majority government (note that minority governments hardly ever occur).

Flemish local governments finance most of their spending via two main revenue sources. First, intergovernmental grants constitute on average about 40% of local revenues. They are a complicated, though objective function of population size, fiscal capacity, indicators of 'need' (i.e. share of elderly people), size of green areas and whether or not the municipality is considered a 'pole of attraction' (for labour and education). While some conditional grants are also employed, the majority of grant revenue is unconditional. Second, tax revenues constitute approximately 40% of revenues on average. These revenues mostly derive from surcharge taxes on the regional tax on immovable property (i.e. the local property tax) and on the federal tax on labour income (i.e. the local income tax), though numerous purely local taxes are also employed (for more details, see below). The remaining 20% of revenues comes from a variety of revenue sources such as dividends from municipal cooperations (e.g., in the distribution of gas and electricity) and returns on financial investments.

Important for our analysis, Flemish municipalities nowadays have an extensive degree of autonomy with respect to their tax policy (see also Ashworth *et al*., 2006; Goeminne *et al*., 2008). This, however, was not always the case. In fact, Flemish municipalities only obtained the right to generate own fiscal revenue in the mid-1960s (when the Law of 31 July 1963 allowed them to set a surcharge on federal income tax revenues). However, they could not introduce a surcharge of more than 5% of federal income tax revenues (increased to 6% in the law of 7 April 1967). Still, in an effort to curb the consequences of the municipal budgetary crisis of the early 1980s, the law of 11 April 1983 removed this limitation. The same law also extended the possibilities for local governments to introduce own local taxes. While both elements were aimed at increasing the sense of financial responsibility in municipal officials and induce inhabitants to more closely monitor municipal policies, they obviously also extended the fiscal autonomy of the local level of government a great deal (for more details on these legislative changes, see Van Audenhove, 1990).

One immediate consequence of the extensive fiscal autonomy given to local governments since 1983 is that they obtained a considerable liberty to introduce new taxes. In a sense, local governments are now only stopped by their own imagination – and interventions by higher-level governments – regarding the nature of taxes they introduce. For example, while a tax on the placement of mobile phone transmission masts within the municipal boundaries is currently contested, taxes on private swimming pools, balconies, transportation of drunken persons, distribution of telephone books, dogs, boats, horses and so on are levied by at least one Flemish municipality (while a tax on wearing masks has recently become obsolete). In fact, approximately 120 different purely local taxes exist. For such purely local taxes, municipalities can set the tax base as well as the tax rate independently and fully autonomously (see also Goeminne *et al*., 2008).

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noted exception of cases where mathematically superfluous parties are taken up in the ruling majority, all parties in the College are important to reach the necessary majority to pass legislation in the council.

As far as surcharges on higher-level governments' taxes are concerned, local governments can set any tax rate they desire, although the tax base is determined by the higher-level government. Specifically, the primary tax base for the local income tax is individual taxpayers' taxable income. From this, via application of the federal tax code, federal income tax revenue is calculated. This revenue then forms the "secondary" tax base from which, by multiplication with the municipal tax rate, local income tax revenue is obtained. In 2002, the local income tax rate (i.e. the level of the surcharge) varied between 0% and 9.5%. For the local property tax, it works in much the same way, except that the underlying primary tax base equals the assessed net rental value of property. By application of the regional property tax code, one obtains regional tax revenues. This tax revenue is the secondary tax base, upon which the municipalities can apply their own local tax rate. In 2002, the local property tax rate lay between 550% and 2250% (such that the bulk of property tax revenues goes to local governments).[6]

Another result of the considerable local fiscal autonomy concerns the wide diversity in the use of various tax sources. Clearly, not all municipalities use all available tax instruments. Nonetheless, although on average approximately 80 percent of local tax revenues derives from surcharges on the federal income and the regional property tax, the average municipality levies no less than 17 different purely local taxes (out of the 120 currently in use). For instance, some municipalities do not use the surcharge on the federal income tax at all (whereas on average this is the most important tax revenue source for the Flemish municipalities; see below) while others rely almost exclusively on surcharge taxes.

This diversity is illustrated in more detail in Table 1, where we present summary statistics concerning the revenue shares of available tax instruments after having grouped these into five areas: taxes on income (the municipal surcharge on the federal personal income tax), taxes on property (including the surcharge on the regional property tax and municipal property taxation), taxes on business (including taxes on employment of personnel, commercial signs and use of motorised equipment), user charges (including waste disposal and fees for use of public facilities) and other own revenues (such as administrative duties). These revenue shares are the main dependent variables in the later analysis.

Table 1: Tax revenue shares – summary statistics (N=290; period 1995-2002)

	1995	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*overall*
Income	44.73 (11.08)	44.07 (10.80)	44.02 (10.67)	44.25 (10.78)	44.97 (10.83)	45.92 (11.04)	45.99 (11.25)	45.41 (10.97)	44.92 (10.93)
Property	39.49 (8.97)	39.87 (8.79)	40.09 (8.73)	40.30 (8.82)	39.52 (9.04)	39.31 (9.09)	38.92 (8.92)	39.95 (8.67)	39.68 (8.88)
Business	2.63 (4.53)	2.62 (4.48)	2.46 (4.45)	2.50 (4.39)	2.47 (4.41)	2.43 (4.41)	2.55 (4.75)	2.65 (4.80)	2.54 (4.52)
Fees	8.39 (4.82)	8.73 (4.90)	8.47 (4.79)	8.33 (4.64)	8.10 (4.49)	7.91 (4.41)	7.82 (4.44)	7.45 (4.39)	8.15 (4.62)

Note: Numbers are averages across all municipalities; standard deviation between brackets.

It is immediately apparent from Table 1 that income and property taxes are, on average, the most prominent revenue sources. Fees are the third-largest group, but,

[6] For further details, see Ashworth and Heyndels (2001).

somewhat surprisingly in the light of what can be observed in other Western countries, have lost some importance over the period analysed.

4. Empirical model and methodology

The theoretical model in section 2 generates a number of empirical predictions regarding both the absolute use of different tax sources depending on the total budget requirement (i.e. the scale effect), as well as the relative use of tax instruments as a function of the size of the tax bases and political and administration costs. Clearly, however, the empirical approach required to assess those effects differs.

First, for scale effects, we need to test whether all available tax instruments generate more revenues as the total size of the budget increases. In order to do so, we estimate a system of (five) equations that have total (real) revenues in jurisdiction i and year t from each tax base k (r_{itk}, with k=income, property, business, user charges, and other) as a percentage of total income of the jurisdiction (y_{it}) as the dependent variable. The set of explanatory variables includes the total municipal budget ($r_{it}=\Sigma_k r_{itk}$) as a percentage of total income of the jurisdiction, as well as a number of controls capturing the socio-economic complexion of the jurisdiction:

$$(r_{itk} / y_{it}) = \gamma_k(r_{it} / y_{it}) + x_{it}'\beta_k + f_{ik} + h_{tk} + \varepsilon_{itk} \qquad (1)$$

where, for each tax instrument equation, f_{ik} is a fixed jurisdiction specific effect, h_{tk} is a fixed time effect, and ε_{itk} is a random term.

Second, although an increase in the total size of the budget is expected to result in an absolute increase in revenue drawn from each revenue source, the competitive political system framework outlined above also suggests that the relative reliance on any given tax base will differ depending on the relative shapes of the political cost functions. Hence, the empirical analysis needs to investigate to what extent the relative importance of different tax instruments depends on observable exogenous variables that proxy tax base, political and administration cost effects. Therefore, we estimate a system of equations where the share of revenues from each tax source (r_{itk} / r_{it}) is the dependent variable, and include a number of proxies for base, political and administration cost effects as independent variables:

$$(r_{itk} / r_{it}) = \phi_k r_{it} + x_{it}'\delta_k + g_{ik} + m_{tk} + \nu_{itk} \qquad (2)$$

where, for each tax instrument, g_{ik} and m_{tk} represent jurisdiction and time specific fixed effects. Vector x_{it} includes the following variables as proxies for base, political and administration cost effects.

First, in order to capture the size of tax bases, x_{it} includes per capita income, per capita assessed net rental value of property, and the number of firms per inhabitant. These variables represent proxies for the size of income, property and business tax revenue potential respectively.

Second, a number of socio-demographic characteristics of the jurisdiction – population size, population density, the degree of income inequality (ratio of interquartile difference in income to the median value), the rate of unemployment, and the share of elderly people (population over 65 as a percentage of total population) – are included to capture the traits of a jurisdiction that are commonly

expected to affect the political and administrative costs of raising revenues through different tax sources.

Finally, four political variables are included in the model. First, a measure of the government's ideology is included to examine whether parties' political persuasion – and the potential difference in perceived political costs of different types of taxes – affects the local tax mix. We measure the ideological complexion of the local government as $\sum_{i=1}^{n}(p_i.Complexion_i)$, where p_i is the seat share of party i in the College of Mayor and Aldermen and 'Complexion' refers to the ideological position of this party on a Left-Right scale (from 0 to 10).[7] Second, we account for potential policy effects from the number of parties in the local government. This variable is included as recent evidence has shown that the size of local government coalitions (in terms of the number of parties) often significantly affects government decision-making in Flemish municipalities (e.g., Ashworth *et al*., 2005, 2006; Geys, 2007; Goeminne *et al*., 2008; Werck *et al*., 2008). Third, an indicator of voter turnout – measured as the number of valid votes cast as a share of the total eligible population – is introduced to capture the degree of control of the electorate on governments' choices.

Finally, the share of females in the executive body of the municipality is included. This follows a number of recent studies indicating that gender is an important indicator of policy preferences (e.g., Lott and Kenny, 1999; Edlund and Pande, 2002; Funk and Gathmann, 2008) and that female representation often significantly affects policy outcomes (e.g., Pande, 2003; Chattopadhyay and Duflo, 2004; Svaleryd, 2007). All previous work on this issue, however, looks at the effect of female representation on the size of the public sector or the composition of public spending. This is the first study, to the best of our knowledge, assessing the role of female representation on the revenue side of the budget.

5. Results

The results of estimating the system of equations (1) – addressing the "scale effect" hypothesised in the theoretical model – are reported in Table 2. For each equation, all variables are taken as deviations from the group (municipality) means in order to get rid of the fixed jurisdiction effect, thus leading to a standard within-groups estimator. In the upper panel of Table 2, only time effects and total revenue as a share of local income are included as explanatory variables, while the results in the lower panel are based on a specification of the system of equations (1) that also includes a number of additional controls (as discussed above). However, to preserve space and since the focus here is on the effect that the size of government has on the absolute use of available revenue sources, the effects of the other variables are not reported (results available upon request).

A first observation from Table 2 is that the inclusion of additional control variables has little effect on our main findings. Indeed, the results are very similar in

[7] The data concerning a party's ideological position were obtained from Deschouwer (1996) and Rihoux (2001). They are based on a self-placement survey asking presidents and spokesmen of the parties in the municipalities to locate their party on an ideological scale between 0 (Left) and 10 (Right). The figures range from 2.6 (the Green party) to 6.1 (the Liberal party) (the extreme-right-wing party Vlaams Blok – now Vlaams Belang – was not represented in any local government and is therefore not in the dataset).

the two specifications. Secondly, we find that total revenue as a percentage of a jurisdictions' income has a positive and significant impact on all five sources of revenue. This result lends support to the scale effect hypothesis, according to which, as government gets larger, more revenues are obtained from each tax source. Nonetheless, a third finding is that the strength of this scale effect varies considerably across the available revenue sources. In particular, and given that the sum of the coefficients across the five equations is equal to 1, property tax revenues are estimated to respond in a relatively elastic way to increases in the budget requirement, with a coefficient of almost 0.5. The response of business taxes and user charges to changes in the size of the budget is, on the other hand, close to zero. The elasticity of income tax revenues to budget expansions is also quite low (just above 0.1). Hence, our results suggest that property taxes as well as "other" sources of revenues (which have a coefficient of almost 0.3) are a preferred source of revenues by Flemish local governments in need of extra funds. Business and income tax revenues (which are levied on more mobile tax bases) appear much less elastic.

One potential explanation of the above result is that Flemish local governments are aware of the fact that it is generally more difficult to extract resources from mobile tax bases in a competitive environment. Indeed, property taxes (which are levied on immobile capital) react elastically, while business and income tax revenues (which are levied on more mobile tax bases) appear much less elastic. This is in line with a large tax competition literature showing that tax burdens tend to be shifted towards less mobile tax bases (e.g., Gordon, 1986; Bucovetsky and Wilson, 1991; see Eggert and Haufler, 1999, for a review). A second explanation lies in the fact that the local income tax is residence based, while the property tax is source based. As a result, tax exportation may occur for the property tax since the tax payer (i.e. the house owner) need not necessarily live in the municipality where the house stands (see also Vermeir and Heyndels, 2006). This is likely to lower that political cost of that tax.

Tables 3 and 4 turn to the within-groups estimation of the system of equations (2). The share of each tax source in total local government revenues is the dependent variable here. Note that, given that we employ deviations from group means and that the five tax shares necessarily sum to one, the sum of the coefficients on each variable across the five tax instruments must equal zero. Table 3 presents the results from a specification that only includes the economic and socio-demographic characteristics of the jurisdiction, while table 4 adds the political variables.

In discussing the results, we go over the main findings for each tax source separately. Still, before we go into the details, it can be observed from a comparison of tables 3 and 4 that a jurisdiction's economic and financial characteristics tend to have a significant impact on the observed tax mix that is very similar in the two specifications, while the political variables at the bottom of Table 4 have a much more diverse (and generally statistically weaker) effect.

Turning to a more detailed look at the results, we first of all find that the size of the tax bases turns out to be the most important determinant of the share of revenues from income, property and business taxes. In particular, the share of the income tax rises with its tax base (per capita income), while it is negatively correlated with the property and business tax bases. Moreover, the income tax share decreases with the overall size of the budget (confirming the "scale effect" findings in Table 2), the size of population, the percentage of elderly residents, and the degree of income inequality. The latter effect might be due to the limited redistributive impact of local

income taxation due to the absence of any additional progressive elements in the local income tax system.

As far as the political variables in Table 4 are concerned, they have no significant effect on the share of income tax revenues in total local government tax revenues, except the proportion of females in the executive body. A higher share of female representatives is related to a higher reliance on both income and property taxes, mainly at the expense of "other" revenues such as administrative duties. One potential explanation is that women tend to be more egalitarian and socially conscious (cf. Lott and Kenny, 1999; Edlund and Pande, 2002; Funk and Gathmann, 2008). Hence, they may be more likely to see the provision of local services as basic necessities which should be 'free' (i.e. paid for from general tax revenues received through income and property taxes) while also being in favour of higher tax burdens on high-income earners and property owners.

The share of the property tax is strongly positively affected by the property tax base and the size of government (once again confirming the "scale effect" findings in Table 2). In addition, population density and the proportion of elderly people are estimated to exert a positive effect on the property tax share. This makes sense given that higher population density involves more housing, and older people are more likely to own their own house. There is also a positive effect of government fragmentation, suggesting that more fragmented governments rely to a larger extent on property taxation.[8]

The relative reliance on business taxes and user charges is almost unrelated with the total size of the budget (once again confirming the "scale effect" findings in Table 2). More generally, the explanatory power of the model for these two revenue sources remains rather weak. Nonetheless, for business taxation, the results suggest that reliance on this revenue source increases with the size of the tax base (in terms of the number of firms) and income inequality (which can be related to the stronger demand for redistribution and decreased reliance on proportional income taxation in that setting; see above). It decreases with voter turnout and female representation in the executive. In each case, however, the substantive as well as statistical importance is relatively weak.

Finally, the rest category (including administrative duties) is strongly positively associated with the total size of the budget. This suggests that 'free' administrative services become less pervasive in situations where budget requirements become more stringent. The other variables have little explanatory power in this equation, although there is some (relatively weak) evidence that more left-wing oriented governments and those that have a higher representation of women are less likely to charge more extensive administrative duties. As mentioned above, this may derive from the fact that, like left-wing parties, women tend to be more egalitarian (cf. Lott and Kenny, 1999; Edlund and Pande, 2002; Funk and Gathmann, 2008) and want such basic administrative services to be 'free' (i.e. paid for from general tax revenues received through income and property taxes).

Overall, we find that a predominant role in determining the local tax mix is played by the respective tax base sizes. More generally, it appears that economic

[8] A potential explanation here lies in the fact the government fragmentation is often associated with indecision and gridlock (Roubini and Sachs, 1989; Boix, 1997; Ashworth *et al*., 2005). In such a setting, it may be easier to agree upon taxing politically less costly tax bases (such as immobile capital). This interpretation is also consistent with the negative effect of this variable on the share of business taxation.

variables – such as the tax base – are far more important to explain variations in the local tax mix than political variables. Indeed, although we employ political variables that are 'standard' in estimations of public policy equations, they play virtually no role in explaining the local tax mix. Interestingly, the single exception appears to be the share of female council-members. The significant effects of female representation on the local tax mix support previous work illustrating its effect on the composition of public spending (e.g., Pande, 2003; Chattopadhyay and Duflo, 2004; Svaleryd, 2007).

6. Testing for inter-jurisdictional dependence

Since the presence of five tax instruments makes estimation of an inter-municipal fiscal reaction function hardly feasible, we search for evidence of interaction among municipal fiscal choices by testing for spatial auto-correlation in the residuals from the system of reduced-form share equations (2). The presence of significant spatial auto-correlation in those residuals represents evidence that, after controlling for the internal economic and political determinants, the tax mix choice in one jurisdiction is not independent of the choices in other jurisdictions, and might be compatible with a process of competition. Moreover, an indirect test of the nature of the competitive forces driving the spatial pattern relies on the extent to which evidence of inter-municipal dependence varies with the degree of mobility of the tax base, with business-related tax bases being arguably more mobile than property-related ones.

Table 5 reports the results of computing the Moran statistic of spatial auto-correlation on the raw tax shares in order to have a preliminary picture of the extent to which spatial auto-correlation is an issue in the Flemish system of local government.[9] Letting Δs_{tk} be the (289×1) vector of deviations from the regional mean of tax share k in year t, the Moran statistic is computed as:

$$M_{tk}(s) = (\Delta s_{tk}' W \Delta s_{tk})/(\Delta s_{tk}' \Delta s_{tk}) \qquad (3)$$

where W is a (289×289) weights matrix that contains the information on the location of municipalities. In particular, we use a binary, contiguity-based and row-standardised matrix, meaning that the (i,j) element of W equals $1/n_i$ if municipalities i and j share a border, with n_i the number of bordering municipalities of municipality i, and 0 otherwise. The Moran statistic is asymptotically normally distributed (Anselin, 1988). Table 5 reports both the values taken by the Moran statistic in each of the eight years and the one based on the eight-year average. The results show that all tax shares – except "other" sources of revenue – are highly positively correlated. The non-findings for this "other"-category, however, most likely derives from the wide variety of tax revenue sources in this group.

Still, the results in Table 5 cannot be directly interpreted as evidence in favour of inter-jurisdictional dependence. Clearly, contiguous municipalities may have similar socio-economic characteristics. To the extent that this influences their tax choice (which we have shown to be the case in Tables 3 and 4), the strong inter-

[9] Previous work suggests significant spatial auto-correlation in the setting of local income and property tax rates in Flanders (e.g., Heyndels and Vuchelen, 1998; Richard *et al*., 2005; Van Parys and Verbeke, 2007; Goeminne, 2008). Geys (2006) also provides evidence of spatial auto-correlation in Flemish local government efficiency ratings (see Revelli and Tovmo, 2007, for a similar finding using Norwegian data).

municipal correlation in the tax mix observed in Table 5 may simply result from failing to control for socio-economic similarities between neighbouring municipalities. Hence, we compute the Moran statistic on the residuals from system (2) including all control variables:

$$M_{tk}(v) = (v_{tk}' W v_{tk})/(v_{tk}' v_{tk}) \quad (4)$$

The results are reported in Table 6, once again depicting both the values taken by the Moran statistic in each of the eight years and the ones based on the eight-year average. Interestingly, and in sharp contrast to the results in Table 5, the analysis on the residuals from the system of equations (2) uncovers virtually no evidence of inter-municipal dependence in the determination of the local tax mix. In fact, only four of the cells Table 6 are statistically significant at the 5% level (three of which are clustered in 1996). This indicates that, after controlling for the observable determinants of the tax shares, the residuals are no longer spatially auto-correlated. We can then conclude that the inter-municipal correlation observed in Table 5 derives from the fact that contiguous municipalities have similar socio-economic structures influencing their tax mix choices in similar directions.

7. Conclusions and discussion

This paper investigated the economic and political determinants of the local tax mix in the Flemish region of Belgium, where local governments enjoy extensive fiscal autonomy and have a wide variety of available tax instruments. Specifically, using panel data of 289 Flemish municipalities over the period 1995-2002, we have estimated a system of five reduced-form tax revenue-share equations corresponding to income, property, business, user fees and other own revenues. This makes it, to the best of our knowledge, the first empirical investigation into the determinants of the local tax mix.

Our analysis points to a number of important economic determinants of the observed tax mix. Indeed, the two most powerful determinants of the local tax mix are the overall size of the revenue requirement and the sizes of the respective tax bases (income, property and business). Other socio-economic characteristics of the municipality – such as the demographic composition, income distribution or population density – likewise affect the tax mix by strengthening the local government's reliance on certain types of taxation. On the other hand, political variables capturing the strength, ideology and composition of the local executive turn out to play a negligible role in the determination of the local tax mix. These results taken together suggest that the tax mix chosen by Flemish local governments is strongly reflecting the needs and socio-economic characteristics of the municipality, and is hardly affected by potential (short-term) political biases. Interestingly, however, and in line with recent studies demonstrating the importance of female representation on the composition of public spending (e.g., Pande, 2003; Chattopadhyay and Duflo, 2004; Svaleryd, 2007), we also show that the share of female council-members significantly affects the chosen tax mix in a more redistributive direction.

Finally, the municipal tax share data exhibit an impressive degree of positive spatial auto-correlation that could be compatible with a process of inter-municipal competition. However, the analysis uncovers virtually no evidence of residual spatial

dependence in the determination of the local tax mix after controlling for the internal determinants of the tax share variables. Hence, the observed spatial pattern is driven almost entirely by the fact that contiguous municipalities have similar socio-economic structures influencing their tax mix choices in similar directions.

References

Anselin, L. (1988), *Spatial econometrics: Methods and Models*, Dordrecht: Kluwer.

Ashworth, J., Geys, B. and Heyndels, B. (2005), Government weakness and local public debt development in Flemish municipalities, *International Tax and Public Finance* 12 (4), 395-422.

Ashworth, J., Geys, B. and Heyndels, B. (2006), Determinants of tax innovation: The case of environmental taxes in Flemish municipalities, *European Journal of Political Economy* 22 (1), 223-247.

Ashworth, J. and B. Heyndels (2001), *The Structural Evolution of Income Tax Revenues and Income Tax Rates in Brussels Municipalities*, Study commissioned by the 'Research in Brussels Programme', Brussels: VUB.

Bergstrom, T.C. and R.P. Goodman (1973), Private demands for public goods, *American Economic Review* 63, 280-296.

Besley, T. and A. Case (1995), Incumbent Behavior: Vote Seeking, Tax Setting and Yardstick Competition, *American Economic Review* 85 (1): 25-45.

Boix C. (1997), Privatizing the Public Business Sector in the Eighties: Economic Performance, Partisan Responses and Divided Governments, *British Journal of Political Science* 27: 473-496.

Borcherding, T.E., and Deacon, R.T. (1972). The demand for services of non-federal governments, *American Economic Review* 62(4): 891-901.

Brueckner, J. (2003), Strategic Interaction among Governments: An Overview of Empirical Studies, *International Regional Science Review* 26 (2): 175-188.

Bucovetsky S. and J.D. Wilson (1991), Tax competition with two tax instruments, *Regional Science and Urban Economics* 21 (3): 333-350.

Chattopadhyay, R. and E. Duflo (2004), Women as Policy Makers: Evidence from a Randomized Policy Experiment in India, *Econometrica* 72(5): 1409-1443.

Deschouwer, K. (1996), Nationale partijen en gemeenteraadsverkiezingen, In J. Buelens & K. Deschouwer (Eds.), *De dorpsstraat is de wetstraat niet* (pp. 13-25). Brussels: VUBPress.

Edlund, L. and R. Pande (2002), Why have Women Become Left-Wing? The Political Gender Gap and the Decline in Marriage, *Quarterly Journal of Economics* 117(3): 917-961.

Eggert, W. and A. Haufler (1999), Capital Taxation and Production Efficiency in an Open Economy, *Economics Letters* 62: 85-96.

Fiva, J. and J. Rattso (2007) Local choice of property taxation: Evidence from Norway, *Public Choice* 132(3-4): 457-480.

Fuest, C., B. Huber and J. Mintz (2005), Capital Mobility and Tax Competition: A Survey, *Foundations and Trends in Microeconomics* 1(1): 1-62.

Funk, P. and C. Gathmann (2008), Gender Gaps in Policy Making: Evidence from Direct Democracy in Switzerland, University of Pompeu Fabra, *mimeo*.

Geys, B. (2006), Looking across Borders: A Test of Spatial Policy Interdependence using Local Government Efficiency Ratings, *Journal of Urban Economics* 60(3): 443-462.

Geys, B. (2007), Government Weakness and Local Public Debt Cycles: Evidence from Flemish Municipalities, *Local Government Studies*, 33 (2), 239-253.

Goeminne, S. (2008), Essays on strategic fiscal policy in Flemish municipalities, *unpublished PhD dissertation*. Brussels: VUB.

Goeminne, S., B. Geys and C. Smolders (2008), Political Fragmentation and Projected Tax Revenues: Evidence from Flemish Municipalities, *International Tax and Public Finance*, 15, 297-315.

Gordon, R.H. (1986), Taxation of investment and savings in a world economy, *American Economic Review* 76: 1086-1102.

Hettich, W. and Winer, S. (1984), A positive model of tax structure, *Journal of Public Economics 24*, 67-87.

Hettich, W. and Winer, S. (1988), Economic and political foundations of tax structure, *American Economic Review 78(4)*, 701-712.

Hettich, W., Winer, S. (1999). Democratic Choice and Taxation, a Theoretical and Empirical Analysis. Cambridge University Press, Cambridge.

Heyndels, B. and J. Vuchelen (1998), Tax mimicking among Belgian municipalities, *National Tax Journal* 51(1): 89-101.

Hines, J.R. and R.H. Thaler (1995), Anomalies – The Flypaper Effect, *Journal of Economic Perspectives*, 9(4): 217-226.

Kenny, L.W. and S.L. Winer (2006), Tax Systems in the World: An Empirical Investigation into the Importance of Tax Bases, Administration Costs, Scale and Political Regime, *International Tax and Public Finance*, 13(2/3), 181-215.

Lott, J.R. and L.W. Kenny (1999), Did Women's Suffrage Change the Size and Scope of Government? *Journal of Political Economy* 107: 1163-1198.

Pande, R. (2003), Can Mandated Political Representation Increase Policy Influence for Disadvantaged Minorities? Theory and Evidence from India, *American Economic Review* 93(4): 1132-1151.

Revelli, F. (2005), On Spatial Public Finance Empirics, *International Tax and Public Finance* 12 (4): 475-492.

Revelli, F. and P. Tovmo (2007), Revealed Yardstick Competition: Local Government Efficiency Patterns in Norway, *Journal of Urban Economics* 62(1): 121-134.

Richard, J.F., H. Tulkens, H. And M. Verdonck (2005), Tax interaction dynamics among Belgian municipalities 1984-1997, *CORE Discussion Paper* 2005/48.

Rihoux, B. (2001), Iedereen naar het politieke centrum en voorstander van de Nieuwe Politieke Cultuur?: de ideologische positionering van de lokale partijafdelingen in België, *Tijdschrift van Dexia* Bank, 2001, 216, 7-18.

Roubini N. and J.D. Sachs (1989), Political and Economic Determinants of Budget Deficits in the Industrial Democracies, *European Economic Review* 33: 903-938.

Salmon, P.G. (1987), Decentralization as an Incentive Scheme, *Oxford Review of Economic Policy* 3 (2): 24-43.

Svaleryd, H. (2007), Female Representation: Is it Important for Policy Decisions? Paper presented at the 1st World Public Choice Conference, April 2007, Amsterdam.

Tovmo, P. (2007), Budgetary procedures and deficits in Norwegian local governments, *Economics of Governance*, 8(1), 37-49.

Van Audenhove M. (1990), *Geschiedenis van de gemeentefinanciën in de economische, financiële en sociale evolutie van België 1918-1985*, Gemeentekrediet, Brussel.

Van Parys, S. and T. Verbeke (2007), Tax competition among Belgian municipalities: A multi-dimensional battle?, *paper presented at the Spatial Econometrics Conference*, July 2007, Cambridge.

Vermeir, J. and B. Heyndels (2006), Tax Policy and Yardstick Voting in Flemish Municipal Elections, *Applied Economics* 38(12): 2285-2298

Volkerink, B. and J. De Haan (1999), Political and institutional determinants of the tax mix: An empirical investigation for OECD countries, *SOM Working Paper* n° 99-05.

VVSG (2007), *Verslag Raad van Bestuur van VVSG aangaande het overleg met de Vlaamse regering oveer het financieel*, Brussel: VVSG.

Werck, K., B. Heyndels and B. Geys (2008), The Impact of 'Central Places' on Spatial Spending Patterns: Evidence from Flemish Local Government Cultural Expenditures, *Journal of Cultural Economics*, 32(1), 35-58.

Winer, S.L. and W. Hettich (1991), Debts and Tariffs: An empirical investigation of the evolution of revenue systems, *Journal of Public Economics* 45: 214-242.

Wilson J. (1999), Theories of Tax Competition, *National Tax Journal* 53: 269-304.

Table 2: Tax instrument absolute reliance: system (1)

	income	***property***	***business***	***user fees***	***other***
Total revenue	0.123 (21.77)	0.451 (50.19)	0.075 (17.42)	0.077 (13.34)	0.274 (28.41)
Municipality effects	Yes	yes	yes	Yes	yes
Time effects	Yes	yes	yes	Yes	yes
Other controls	No	no	no	No	no
R^2	0.50	0.57	0.13	0.10	0.26
Observations (units)	2312 (289)	2312 (289)	2312 (289)	2312 (289)	2312 (289)
	income	***property***	***business***	***user fees***	***other***
Total revenue	0.130 (23.01)	0.427 (48.38)	0.074 (16.68)	0.079 (13.36)	0.289 (29.32)
Municipality effects	Yes	yes	yes	Yes	yes
Time effects	Yes	yes	yes	Yes	yes
Other controls	Yes	yes	yes	Yes	yes
R^2	0.53	0.61	0.14	0.12	0.28
Observations (units)	2312 (289)	2312 (289)	2312 (289)	2312 (289)	2312 (289)

Note: *t* statistics in parentheses; controls: population, population density, property value, number of firms per inhabitant, income, income inequality, unemployment, % old, fragmentation, ideology, turnout, female representation in the executive.

Table 3: Tax instrument relative reliance:

System (2), economic determinants

	income	***property***	***business***	***user fees***	***other***
Total own revenues	-0.050 (9.83)	0.012 (2.35)	0.002 (0.73)	-0.006 (1.36)	0.042 (7.82)
Income tax base	***0.937*** ***(4.05)***	-0.370 (1.60)	-0.198 (1.66)	-0.334 (1.77)	-0.035 (0.14)
Property tax base	-0.017 (6.15)	***0.030*** ***(10.50)***	-0.005 (3.15)	-0.005 (2.10)	-0.003 (0.93)
Business tax base	-41.898 (3.46)	-0.851 (0.07)	***27.478*** ***(4.40)***	5.880 (0.60)	9.391 (0.74)
Population (,000)	-0.518 (3.02)	0.184 (1.08)	-0.115 (1.30)	0.264 (1.89)	0.184 (1.02)
Population density	0.013 (1.65)	0.018 (2.19)	-0.001 (0.23)	-0.026 (3.94)	-0.004 (0.47)
Income inequality	-0.032 (3.04)	0.011 (1.09)	0.011 (2.10)	0.006 (0.74)	0.003 (0.25)
Unemployment	-15.256 (0.93)	-2.450 (0.15)	-14.432 (1.71)	9.190 (0.69)	22.948 (1.34)
Old	-26.271 (1.93)	58.548 (4.32)	-6.038 (0.86)	-18.234 (1.64)	-8.006 (0.56)
Fragmentation	---	---	---	---	---
Ideology	---	---	---	---	---
Turnout	---	---	---	---	---
Female representation	---	---	---	---	---
Municipality effects	yes	yes	yes	yes	yes
Time effects	yes	yes	yes	yes	yes
R^2	0.17	0.10	0.03	0.06	0.03
Observations (units)	2312 (289)	2312 (289)	2312 (289)	2312 (289)	2312 (289)

Note: *t* statistics in parentheses.

Table 4: Tax instrument relative reliance:

System (2), economic & political determinants

	income	***property***	***business***	***charges***	***other***
Total own revenues	-0.050 (9.88)	0.012 (2.30)	0.002 (0.64)	-0.005 (1.28)	0.041 (7.94)
Income tax base	***0.890*** ***(3.84)***	-0.377 (1.63)	-0.209 (1.74)	-0.303 (1.60)	-0.002 (0.01)
Property tax base	-0.017 (6.07)	***0.029*** ***(10.35)***	-0.004 (3.05)	-0.005 (2.05)	-0.003 (0.93)
Business tax base	-41.103 (3.39)	-0.640 (0.05)	***26.552*** ***(4.25)***	4.805 (0.49)	10.387 (0.82)
Population (,000)	-0.507 (2.95)	0.138 (0.81)	-0.124 (1.40)	0.285 (2.03)	0.208 (1.16)
Population density	0.014 (1.73)	0.020 (2.55)	-0.001 (0.36)	-0.026 (4.00)	-0.007 (0.77)
Income inequality	-0.032 (2.99)	0.017 (1.66)	0.010 (1.86)	0.004 (0.45)	0.001 (0.25)
Unemployment	-16.273 (0.98)	-1.035 (0.06)	-10.277 (1.20)	3.190 (0.24)	24.394 (1.41)
Old	-27.430 (2.02)	58.301 (4.32)	-6.246 (0.89)	-17.565 (1.58)	-7.060 (0.50)
Index of fragmentation (number of parties)	-0.054 (0.32)	0.575 (3.47)	-0.194 (2.27)	-0.047 (0.34)	-0.280 (1.61)
Index of executive ideology (0 (left) to 10 (right) scale)	-0.023 (0.13)	-0.267 (1.47)	-0.037 (0.39)	-0.178 (1.19)	0.506 (2.64)
Voter turnout	7.413 (0.52)	-15.876 (1.12)	-22.422 (3.04)	26.554 (2.27)	4.331 (0.29)
Female representation	1.856 (3.20)	2.100 (3.64)	-0.798 (2.67)	-0.574 (1.21)	-2.584 (4.25)
Municipality effects	yes	yes	yes	yes	Yes
Time effects	yes	yes	yes	yes	Yes
R^2	0.18	0.11	0.03	0.06	0.04
Observations (units)	2312 (289)	2312 (289)	2312 (289)	2312 (289)	2312 (289)

Note: *t* statistics in parentheses.

Table 5: Moran test on raw tax shares

	income	***property***	***business***	***charges***	***other***
1995	0.353**	0.316**	0.211**	0.134**	0.081
1996	0.332**	0.303**	0.193**	0.147**	0.039
1997	0.334**	0.298**	0.191**	0.139**	0.024
1998	0.326**	0.300**	0.186**	0.131**	0.033
1999	0.322**	0.289**	0.189**	0.131**	0.030
2000	0.336**	0.290**	0.150**	0.132**	0.029
2001	0.341**	0.272**	0.122**	0.158**	0.047
2002	0.343**	0.340**	0.149**	0.132**	0.021
Average 1995-2002	**0.351****	**0.317****	**0.189****	**0.155****	**0.061**
Observations	289	289	289	289	289

Note: *, ** significant at 5%, 1%.

Table 6: Moran test on the residuals from system (2)

	income	***property***	***business***	***charges***	***other***
1995	0.052	-0.021	-0.105*	0.010	-0.001
1996	-0.039	0.105*	-0.079	0.093*	-0.099*
1997	0.003	-0.004	-0.028	0.048	-0.018
1998	0.022	-0.025	-0.002	-0.030	0.002
1999	0.029	0.047	0.032	0.039	-0.021
2000	0.048	0.061	-0.063	-0.014	-0.014
2001	0.035	0.042	-0.080	0.074	0.017
2002	-0.062	0.077	-0.069	0.015	0.046
Average 1995-2002	**0.033**	**0.040**	**0.057**	**0.016**	**-0.054**
Observations	289	289	289	289	289

Note: *, ** significant at 5%, 1%.