Tax competition and income sorting

Evidence from the Zurich Metropolitan Area

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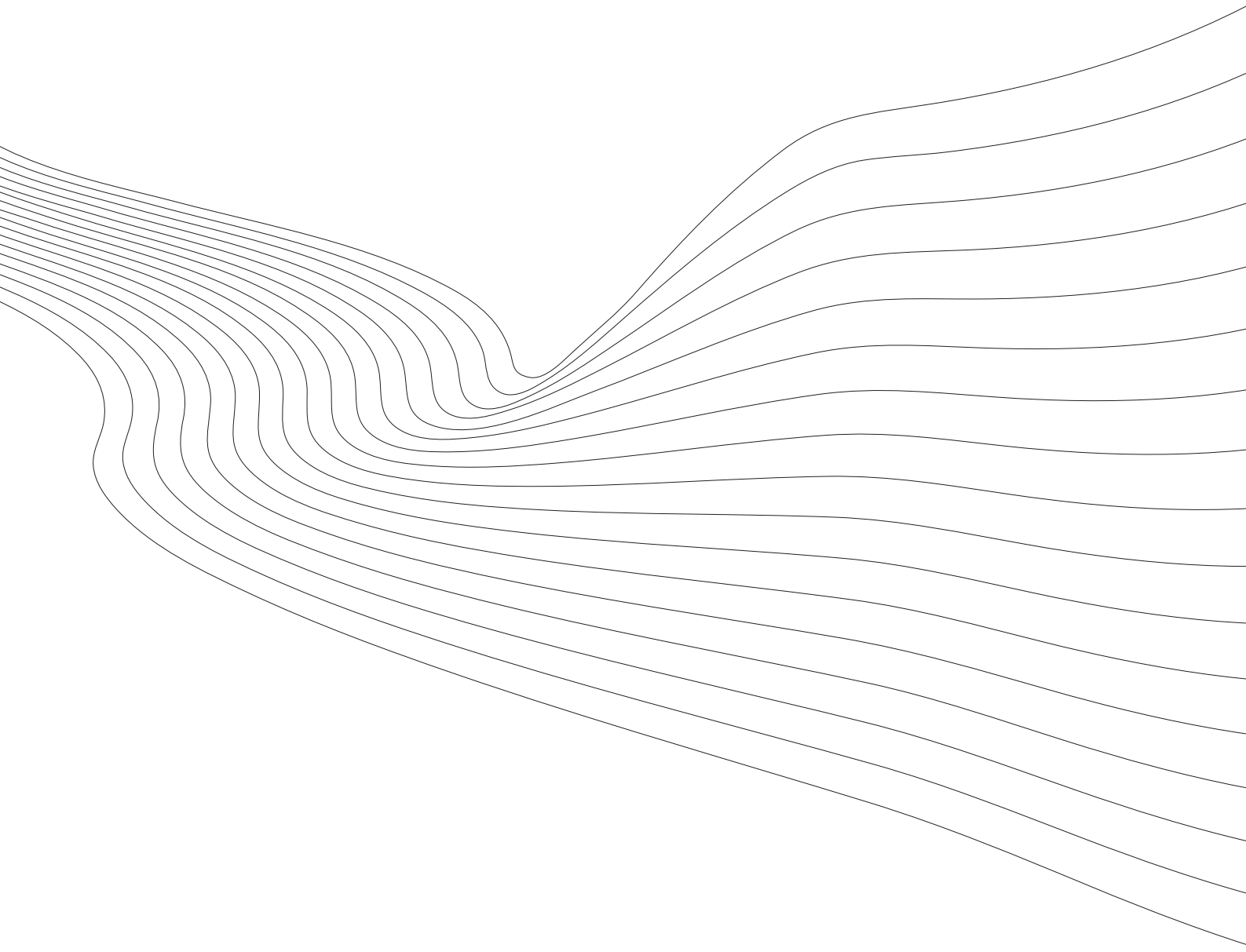

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Tax Competition and Income Sorting: Evidence from the Zurich Metropolitan Area

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Abstract

In this paper, we provide empirical evidence for the influence of income taxes on the choice of residence of taxpayers at the local level. The fact that Swiss communities can individually set tax multipliers thereby shifting the progressive tax scheme which is fixed at the cantonal (state) level enables us to study the effect of differences in income taxation on individuals' choice of location within an economically and culturally homogeneous region. Using panel IV regressions covering the years 1991-2003 and 171 communities in the Swiss canton of Zurich and spatial error regressions for the 171 communities in 2003, we find substantial evidence for income sorting.

Keywords: tax competition, fiscal federalism, income segregation, income tax.

JEL classifications: H71, H73, R50

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1. Introduction

Since the seminal contribution of Tiebout (1956), a strong focus of the literature on fiscal federalism has been put on the analysis of market-like competition between jurisdictions. Tiebout showed that by voting with one's feet, there exists a mechanism that can reveal individual preferences for local public goods. Hence, fiscal decentralization appears to be efficiency enhancing, as it allows people with similar preferences concerning the provision of public goods to settle in communities that provide public goods at levels close to their preferences.[1]

Many of the results in this literature[2] rest on the assumption that households differ in their preference for public goods, but have equal incomes. The influence of income heterogeneity on households' locational decisions and the local provision of public goods were first studied by Ellickson (1971) and Westhoff (1977).[3] A core result of these models is the income segregation hypothesis. It postulates that if rich households esteem public goods less than poor households, fiscal federalism induces self sorting of the population by income. Following Schmidheiny (2006a), this clustering of rich and poor is even stronger in case of progressive tax schedules.

In this paper, we use community-level data from the Swiss canton of Zurich to study the influence of income taxes on the distribution of households according to their taxable income. The situation in Swiss cantons is quite unique, as the progressiveness of the tax schedule is set at the cantonal level, while the communities within the canton can set the effective tax burden by applying a tax multiplier to the cantonal tax schedule. This enables us to study the effects of tax differentials on the choice of residence within an economically and culturally homogeneous region. Using panel IV regressions covering the years 1991-2003 and 171 communities and spatial error regressions for the 171 communities in 2003, we find substantial evidence for the income segregation hypothesis in the canton of Zurich.

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[1] Similarly, Oates (1972) argues in his "decentralization theorem" that there are no advantages associated with a centralized provision of public goods since differences in public good at the local level reflect differences in preferences across these jurisdictions.

[2] See Oates (1999), Wilson (1999) and Wilson and Wildasin (2004) for surveys.

[3] See also Ross and Yinger (1999) for a survey.

The paper is organized as follows. The next section discusses previous theoretical and empirical findings. Section 3 gives an introduction to the tax system in Switzerland and in the Canton of Zurich. The fourth section presents the data. The results of the empirical analysis are discussed in section 5. Section 6 concludes.

2. Theoretical Foundations and Empirical Evidence

Tiebout's (1956) paper on the efficiency properties of fiscally induced migration has inspired many scholars in different fields of the public finance literature (see Oates, 2006 for an overview). The segregation hypothesis is one of the central propositions in multi-community models in the tradition of Tiebout. Endogenous segregation means that different people choose different locations in equilibrium. While the Tiebout model focuses on heterogeneity of preferences, Ellickson (1971) and Westhoff (1977) focus on income as the main cause of difference. Several mechanisms have been proposed that explain why rich households make different choices than poor households (see Ross and Yinger, 1999, for property tax models and Schmidheiny, 2002, for income tax models). Similar to the classic Tiebout model, one strand of the literature argues that rich and poor households differ in their preferences for public goods, which in turn will induce income sorting if tax rates, and hence levels of public goods provision, differ among jurisdictions. Another strand of the literature investigates the effect of the income elasticity for housing and the stylized fact that housing prices are typically higher in low tax communities (Epple, Filimon and Romer, 1993, Stadelmann and Billon, 2009). If housing is a normal good, housing expenditure becomes less important with increasing income, which means that rich households will benefit more from low taxes than they will lose from high housing prices. These studies, however, have assumed that tax rates are flat. In two recent papers, Schmidheiny (2006a) and Schmidheiny and Hodler (2006) draw on the empirical fact that income taxes are progressive and that local jurisdictions can often only set tax levels within a given tax scheme. High income households are then more likely to choose low tax communities, as their tax burden is relatively higher due to the progressiveness of the tax schedule.

Except for the two latter papers, the studies discussed above suggest strict income sorting, which is not observed empirically. De Bartolome and Ross (2003) solve this issue by introducing commuters and commuting cost into a model of fiscal competition and derive multiple equilibria with both income sorting and income mixing. Schmidheiny (2006b)

derives imperfect income segregation in a model where households differ in both income and preferences for housing.

The segregation hypothesis of the Tiebout type models has been challenged by a number of empirical studies. A first strand of research investigates the equilibrium predictions of multi-community models using data on aggregate community characteristics.

Epple and Sieg (1999) and Epple, Romer and Sieg (2001) estimate the household preference parameters of a full equilibrium model where the local income distribution and local policy variables are simultaneously determined. They show that the differing income quantiles across 92 communities in the Boston area can be explained by the model predictions. Using data from US federal states, Bakija and Slemrod (2004) find that wealthy retirees change their state of residence to avoid high state taxes. Feld and Kirchgässner (2001) regress the share of seven income classes in Swiss cantons and main cities on income tax rates. They find a strong negative relationship between the tax rate and the share of rich households.

Schmidheiny (2006a) studies the locational choice of households in the Swiss metropolitan region of Basel and finds that rich households are substantially more likely to move to low tax communities than poor households.

The study closest to ours is Schmidheiny and Hodler (2006) who simulate a model of locational choice with progressive taxes at the federal level and a local tax multiplier using income and tax data from the canton of Zurich. Schmidheiny and Hodler's study generates two main insights. First, their model, calibrated with real-life values from the canton of Zurich, produces income sorting effects, and second, they find that, due to income sorting, the resulting actual tax progressiveness is lower than intended by the cantonal tax scheme, as high income individuals are more likely to reside in low tax communities, while low income individuals tend to live in high tax communities, which flattens the effective progressiveness of the tax scheme relative to the intended progressiveness.

In this paper, we show that income sorting effects are not only an outcome of a theoretical model, but can also be observed empirically in the case of the Zurich metropolitan area. To our best knowledge, we are the first to study income sorting using panel data from a small[4] and culturally homogeneous region. Hence, we are not only able to make use of cross-sectional variation, as is the case in e.g. Feld and Kirchgässner (2001), but can also take

[4] The Canton of Zurich with its 171 communities is only slightly larger than London, UK.

account of variations in tax rates and income shares over time. Unlike the previous literature, by using data from one single canton we avoid having to take account of factors determining locational decisions that are hard to measure or even not measurable, such as differences in mentality, attachment to the local community, family ties, or differences in the school system.

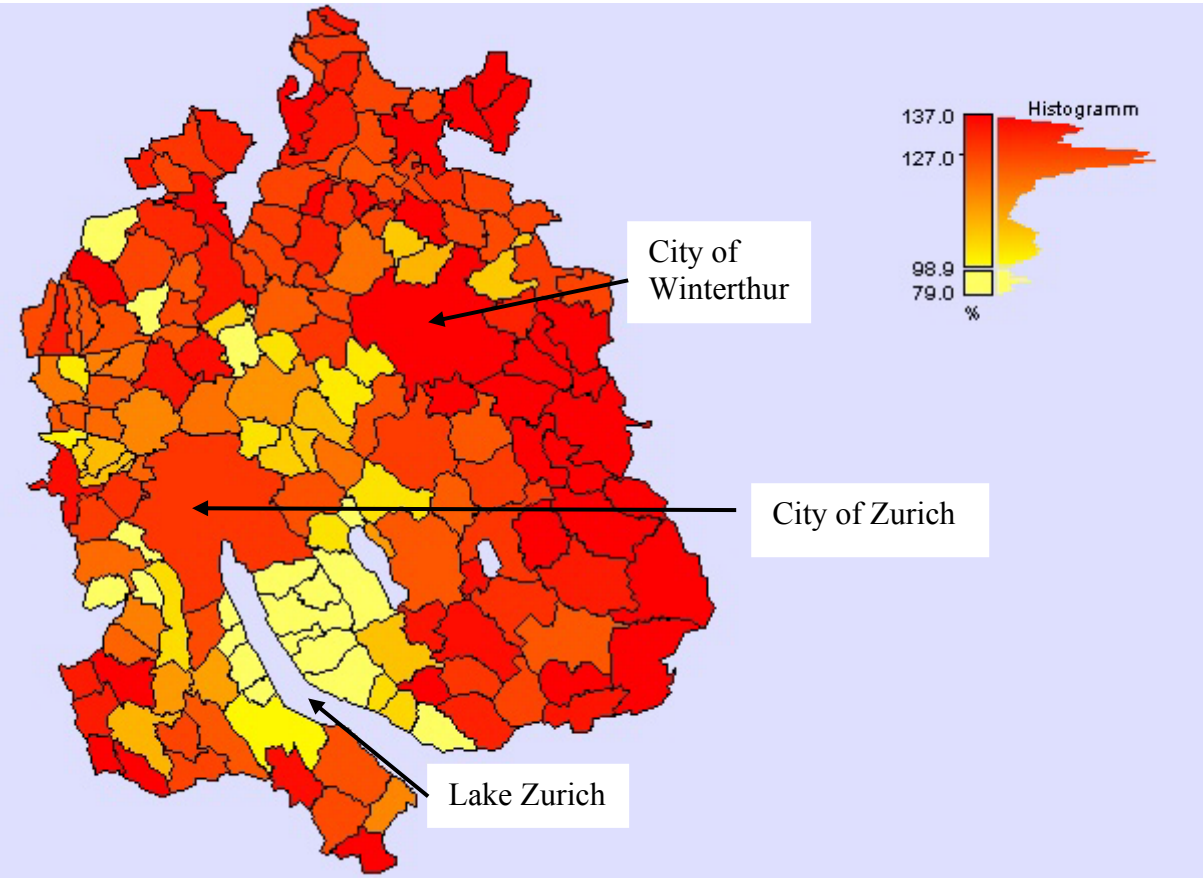
3. Tax Competition in the Canton of Zurich

Switzerland has a federalist constitution granting tax autonomy to the sub-federal governments. The Swiss federation consists of 26 states, the so-called cantons. The cantons are divided into roughly 3,000 communities of varying size, population, culture and language. All three state levels finance their expenditures essentially by their own taxes and fees. While the federal government is mainly financed by indirect taxes such as VAT, customs duties and excise dues, the cantons and communities largely rely on direct taxes. Income taxes account for 60% of cantonal and 84% of communal tax revenue. However, in addition the federal government levies a highly progressive and profit-yielding income tax which – in return for 17% of the revenues – is administrated by the cantons and has an equalizing effect across cantons. Second, a withholding tax on capital income by 35% is levied and will be refunded in case of declaration in the income tax form (Feld, 2000).

The cantons organize their tax systems autonomously within the constitutional requirements and legal specifications by the federal harmonization law. For example, they decide upon the level of income and corporate taxes and the degree of tax progression as well as the level of tax exemptions (Feld, 2000).

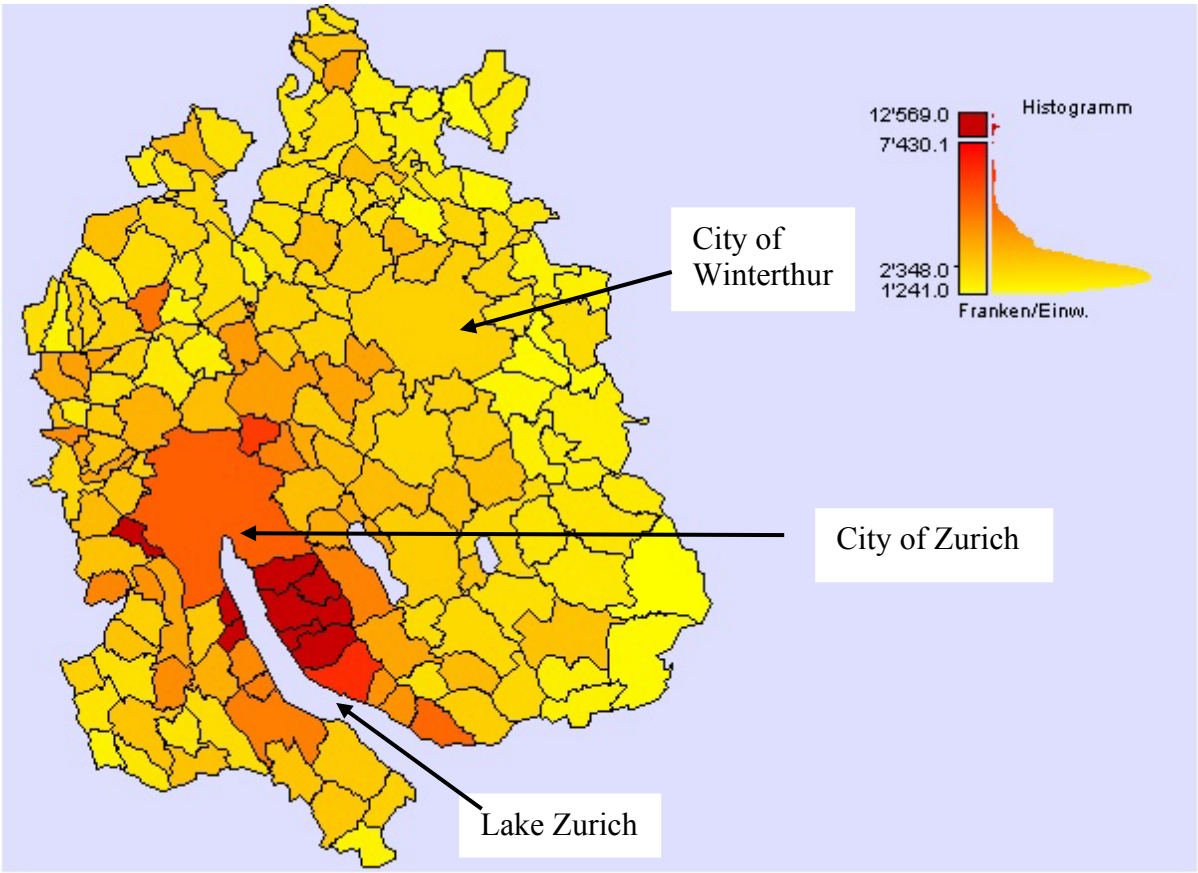
The individual communities in turn can set a tax multiplier for income and corporate taxes on the cantonal tax tariff. The communal income tax is then the cantonal tax rate multiplied by the communal tax multiplier. Income is taxed at the community of residence, which has led to the grouping of low tax suburban communities around large Swiss cities such as Basel and Zurich. Figure 1 displays the distribution of the local income tax multiplier among the 171 local communities of the canton Zurich for the fiscal year 2008 (Appendix 1b shows the tax progression of the cantonal tariff).

Figure 1: Local income tax burden in the Zurich metropolitan area



As Figure 1 reveals, the light-colored low-tax communities are sorted around the lake of Zurich, whereas the dark-colored high-tax communities are located near Winterthur (for a more detailed map of the canton Zurich see Appendix 1). Compared to Figure 1, Figure 2 displays the corresponding local per capita tax revenues. The picture is very similar with a simple correlation coefficient of -0.77: the local communities around the shores of Lake Zurich, especially the districts of Meilen and Horgen generate high per capita tax revenues while the tax capacity of the region around the city of Winterthur is much weaker.

Figure 2: Local income tax revenues per capita in the Zurich metropolitan area



Tax competition in many countries is constrained by tax equalization programs. This is also the case in Switzerland on the federal as well as on the cantonal level (Schaltegger and Frey, 2003). In the canton of Zurich, for example, there are horizontal and vertical tax equalization programs that limit tax competition among communities: First, there is a program that redistributes tax revenues from the communities with the highest per capita tax bases to those with the lowest. Second, the canton of Zurich subsidizes the communities with the highest tax multipliers. Despite the existence of tax equalization schemes, differences in local taxation are still substantial. In the canton of Zurich, the tax multiplier for the fiscal year 2008 of communities with the highest tax multiplier (137 per cent) is almost 1.75 times higher than that of the community with the lowest tax multiplier (79 per cent), with an arithmetic mean of 121.4 per cent and a median of 127 per cent.

4. Data and Empirical Strategy

In this study, we use community level data from all 171 communities, grouped in 12 different districts in the Swiss canton of Zurich (for summary statistics see Appendix 2). We choose

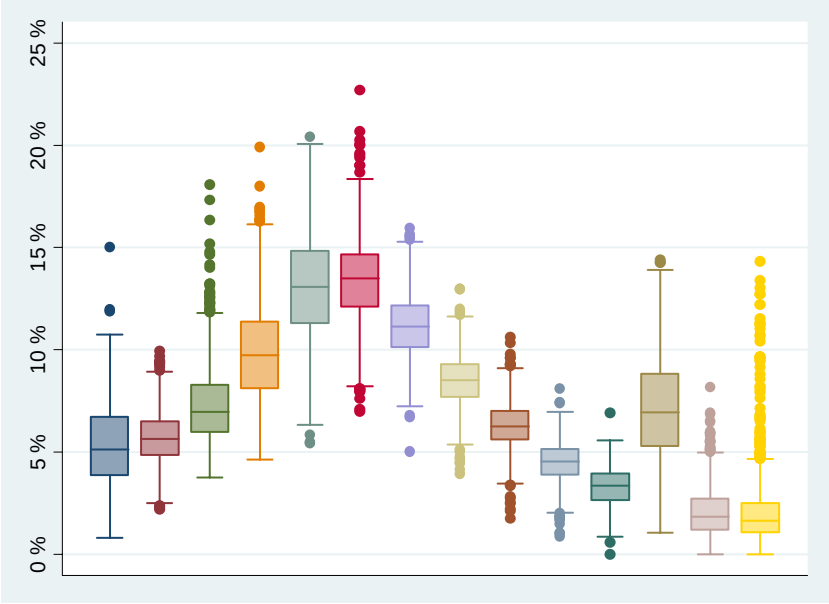
the canton of Zurich for our analysis, as the canton is the core economic region of Switzerland and attracts the largest share of immigration and intra-Swiss relocation; i.e. the number of locational choices to be done in the canton of Zurich can be assumed to be substantial. Data were collected from the Swiss Federal Office of Statistics, the Swiss Department of Finance, and the Zurich Cantonal Office of Statistics.

The dependent variables are the shares of different income groups in the population of a community. Since the income group ratios vary between zero and one and are therefore censored, they are transformed to log odds. If p is the share of an income group of a community, then $p/(1-p)$ is the corresponding odds, and the logit of the share is the natural logarithm of the odds.

In the original source, there exist 14 classes of individual taxable income, which have been set by the cantonal statistical office. Data on income classes are available for the years 1991, 1995, 1999 and 2003. The box plot in Figure 3 shows the average shares of the 14 income classes in the population among the 171 local communities in the Zurich metropolitan area over the whole period of observation.

Figure 3: Boxplot: income shares for 14 income classes over 171 local communities

Income class	Swiss Francs p.a. and p.c. (in thousands)
1	0
2	0.0001-9999
3	10-19.9999
4	20-29.9999
5	30-39.9999
6	40-49.9999
7	50-59.9999
8	60-69.9999
9	70-79.9999
10	80-89.9999
11	90-99.9999
12	100-149.9999
13	150-199.9999
14	> 200.000



As our main explanatory variables, we use the local tax multiplier and the average tax multiplier of the other communities in the same district. If there exists inter-jurisdictional sorting according to the incentives given by tax competition with a progressive tax rate and varying tax multipliers, we expect a negative impact of the own tax multiplier on the share of high income residents and vice versa for low-income residents. For the average tax multiplier

of the neighboring communities, the opposite should appear as long as there is tax competition: the share of high-income residents is positively associated with high tax burdens in neighboring communities and vice versa for low-income residents.

As control variables, we first use the local unemployment rate. Unemployment is a proxy for the business cycle, which is mostly determined at the federal level. Ignoring the unemployment rate would bias the results for our analysis of income sorting, as a move from employment to unemployment is an exogenous and in most cases temporary move from a higher income group into the low income group, and not an endogenous change in the share of the low income group caused by the choice of a residential location. Second, since the level of publicly provided goods may influence residential decisions[5] we include the following variables: per capita payments to the cantonal public transport association, the share of pupils in local public schools, the share of locally practicing physicians, locally targeted per capita transfer payments from the cantonal fiscal equalization scheme and a dummy-variable for highway connectivity. Third, residential decisions are supposed to be influenced by the land price, which is consequently included in the regressions. Fourth, since tax rates are politically defined, the ideological position of the electorate may also be associated with residential decisions. To capture this aspect, we include the local vote-share of the largest Swiss party, the right-wing SVP (Swiss People's Party) on total votes for the election of the cantonal parliament. Also, the local capacity to finance public goods by government's per capita net wealth as well as public debt per capita can be seen as a reason for residential decisions (Eichenberger and Stadelmann, 2009). Finally, we include socio-demographic variables, namely total population and the share of elderly inhabitants (over age 65), the share of young inhabitants (under age 15), share of net migration in total population and the share of foreigners.

5. Empirical Analysis

In order to test the interjurisdictional sorting hypothesis, we regress the community's tax multiplier and the average neighboring tax multiplier in the district and the above mentioned

[5] See e.g. Stadelmann (2009).

control variables on the shares of 14 income classes in the local communities. The following 14 equations are estimated:

$$\ln [p_{git} /(1 - p_{git})] = \beta T_{it} + \delta T_{jt} + X_{it} + \varepsilon_{it}. \quad (1)$$

where the index i refers to the local communities within the territory of the canton of Zurich (i = 1,…, 171), j denotes the average local community of the 12 districts within the canton Zurich (j = 1,…, 12) and the index t refers to the fiscal year (t = 1991, 1995, 1999, 2003). ln $[p_{git} /(1 - p_{git})]$ represents the share of income class g (g= *1, ..., 14*) among all taxpayers in a community i in year t. β, δ and γ are unknown parameters and ε_{it} is an error term. X_{it} is a matrix of explanatory variables specific to community i in year t.

The Davidson-MacKinnon test of exogeneity with a value of 0.638 (p-value = 0.528) indicates endogeneity of the tax multipliers and the land prices.[6] To tackle the problem, we use an instrumental variables (IV) method. As instruments we use distance to the city of Zurich, a dummy variable if a community has a train station, and dummy variables if the community is situated at the lake Zurich or the lake Greifensee. To take account of the panel structure of the data, we perform fixed effects regressions over the 12 districts. In a first step, we run regressions including the full set of control variables described above. We then follow a general-to-specific approach eliminating variables (community net worth, tax revenue per capita[7]) that turn out insignificant in all regression sequentially. Theoretically, we expect higher tax rates in communities with a train station and direct connection to the central city as an important public good in the Zurich metropolitan area. In the case of land prices, we expect a positive correlation with the view on Lake Zurich and the Lake Greifensee in the suburban area of Zurich, and a negative correlation with distance to Zurich. The first-stage results in Table 1[8] support the relevance of our instruments. We find that taxes are lower in communities located at Lake Greifensee, while taxes are higher in communities that are further away from the city, and in communities that have a train connection. Concerning land prices, we find that prices are significantly higher in communities situated at Lake Zurich,

[6] The test statistics correspond to income class 10 (taxable income 80-89.9999 p.a.). Test for other income classes reject exogeneity of tax multipliers and land prices as well.

[7] Public debt per capita however is significant, indicating evidence for the hypotheses put forth in Eichenberger and Stadelmann (2009).

[8] First stage results for all 14 income classes are given in Tables 1A and 1B.

while they are lower in communities located at Lake Greifensee, and in communities that are further away from the city.

Table 1C reports the results of our analysis: in line with the prediction of the theory, we find a significantly negative relationship between local tax multipliers and the share of high income earners residing in a community, and a significantly positive relationship with the share of low income earners. Very much the same applies for neighbor tax multipliers: there is a significant positive effect of neighboring tax multipliers on the share of own high income earners and vice versa for low income earners in the own local community. High income individuals seem to esteem public transport more than low income earners, which is somewhat contrary to our theoretical considerations, but can be explained by the fact that high income earners are more likely to be commuters working in the city of Zurich, while low income earners are more likely to work in their community of residence and are hence not in need of public transportation. In the case of highway access, it is the middle class which esteems close connectivity, while high income earners prefer communities with a larger number of local physicians.

Table 1: Results of first stage regression (income class 10)

Instruments	**Tax multiplier**	**Land price**	**Relevance tests**	
Lake Zurich	-4.916	374.762***	Anderson canon.	14.11
	[1.34]	[6.86]	corr. LM statistic	(p-val.=0.007)
Distance to Zurich	0.937***	-8.870***		
	[10.80]	[6.37]	Anderson-Rubin	4.56
Lake Greifensee	-9.823**	-314.162***	Wald test	(p-val=0.001)
	[2.09]	[4.36]		
Train Station	1.156	32.991**		
	[1.38]	[2.39]		

Summary results for first-stage regressions				
	Shea Partial R2	Partial R2	F(4, 661)	p-value
Land price	0.075	0.22	28.84	0
Tax multiplier	0.04	0.117	46.07	0

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

Socio-demographic variables play an important role for inter-jurisdictional sorting: high-income communities have less foreigners and more elderly residents[9]. The influence of financial transfers from both the state and between the communities is found to have almost no impact on the shares of the income groups in a community. The same applies for net migration, government ideology, debt levels and the share of pupils. Land prices, unsurprisingly, are found to have a negative effect on some of the lower income classes, and a positive (but hardly significant) effect in the upper classes. Airport noise seems to reduce the share of very high income earners in a community and to raise the share of people with mid-range taxable income, while reducing the share of people at the very low end of the income distribution.

Parsimonious Model

As a robustness check, we leave out all variables concerning public finances except for the tax rates, all variables that proxy the amount of public goods provision and all socio-demographic variables except for the unemployment rate and population size in the second stage estimation. Our main results, presented in Table 2, remain robust to this drastic change in the regression setup. Again, we find a community's own tax multiplier to be positively related to the shares of low income earners, and negatively related to the share of high income earners. The reverse result holds for the tax rates of the district neighbors: a higher average tax rate in neighboring communities is associated with lower share of low income earners in the community, and a higher share of high income earners.

Spatial Correlation

In the estimations presented in the above section, we tackled the endogeneity problem arising from the fact that land prices and tax rates are endogenous to the income of a community's inhabitants. In this section, we address two other issues. The first is the possibility that a community's income distribution is endogenous to the income distribution of neighboring communities, which may be the case because of clustering effects caused by e.g. an increased attractiveness of community A due to a positive socio-demographical change in the

[9] Note that we are looking at taxable income. Public pensions are only partially taxed.

neighboring community B. A second related issue is spatial correlation of the error terms which is caused by omitted spatial variables.

For our analysis, we use two different spatial weighting matrices. First, we employ the inverse of the distance between the communities, and second, we use a matrix containing a 1 if the communities share a common border and 0 otherwise. When computing the weighting scheme, the matrices are row standardized.

Using the standard specification test as discussed in Anselin et al. (1996), we find that we can exclude a spatial lag model. The test indicate however the existence of spatial correlation in the error term. This only holds when we apply the inverse distance matrix as spatial weights. Using the matrix considering only neighboring communities, we find no evidence for spatial correlation. A first conclusion is thus that individuals do not care about tax rates of neighboring communities in choosing their place of residence, but take the whole canton, or at least communities further away than the neighboring community, into account.

As the tests however suggest spatial dependency in the error terms, we estimate a spatial lag model as described in Anselin (1988) and Anselin and Bera (1998). The equations are estimated using Maximum Likelihood take the following form

$$ln\,[p_{gi}/(1-p_{gi})] = \alpha + \beta T_i + \delta X_i + \varepsilon_{l,}$$

$$\text{with } \varepsilon = \lambda W\varepsilon + u$$

where ln $[p_{gi}/(1 - p_{gi})]$ are the log odds of the respective income share g, ε is a vector of spatially autocorrelated error terms, u is a vector of i.i.d. errors, T_i is the tax multiplier of community i and X_i is a vector of observations of the other explanatory variables and λ, β and δ are parameters.

The results, which are presented in Table 3, show that our main finding is robust in this setup. Again, we find that high tax multipliers cause a larger share of low income earners, indicated by the positive and significant coefficient of the tax multiplier in the columns for income classes up to 50.000 Swiss Franks, and the negative and significant coefficient for the income classes above 80.000 Swiss Franks. Furthermore, for the higher income classes the importance of the tax rate in the choice of location seems to increase, as indicated by the (absolute) increase of the coefficient from middle to high income classes. The findings on the control variables remain also robust.

6. Conclusion

In this paper, we have investigated the empirical validity of the inter-jurisdictional income sorting hypothesis, which is a core result of the theoretical tax competition literature. It states that in a system with fiscal federalism, individuals differing in income and preferences for public goods and/or housing will self-select into different communities, where communities differ in income tax rates. This self-selection process will then lead to substantial differences in the income distributions between the communities.

In our empirical analysis covering 171 communities over the share of 14 income classes on the whole population in the Swiss canton of Zurich, we have found ample evidence for the income segregation hypothesis. We provide empirical evidence that high income earners are more likely to reside in low tax communities especially if neighboring communities in the same district have higher taxes. The opposite holds for low-income earners: they settle more likely in high tax communities especially, if neighboring communities offer lower taxes.

While the tax competition literature in the Tiebout tradition suggests that this kind of income sorting enhances overall efficiency in the economy, the literature on education highlights the negative aspects of income sorting. In general, advocates argue that fiscal federalism allows tailoring public goods towards the specific needs of local residents, enhances efficiency while reducing inefficiency in public administration due to the pressure created by systems competition. In addition, the more homogenous a local community, the more targeted fiscal equalization schemes across the canton can work and the more efficiently the redistributive capacity of such a transfer program will be. Critics argue on the other hand, that with fiscal federalism it is found that the opportunities of an individual are highly correlated with his or her neighborhood and social background. An uneven distribution of high and low income individuals between communities is thus likely to reduce human capital accumulation and social mobility, and to produce persistent inequality and poverty traps. These social problems might be enforced by increasing worldwide economic integration. The literature, however, suggests that economic globalization leads to an increasing wage gap between low-skilled and high-skilled workers, and to an increasing taxation of the relatively more immobile factor of production, namely labor.

In combination with the results of the income sorting literature, increasing globalization can be expected to lead to an increase in income sorting in countries with income tax competition at the local level, yielding new challenges for both politicians and researchers.

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Table 1A, First stage panel regression, 1991-2003, 171 communities, dependent variable: tax multipliers

Income Class, Swiss Francs p.a.	*0*	*0.0001-9999*	*10-19.9999*	*20-29.9999*	*30-39.9999*	*40-49.9999*	*50-59.9999*	*60-69.9999*	*70-79.9999*	*80-89.9999*	*90-99.9999*	*100-149.9999*	*150-199.9999*	*> 200.000*
Lake Zurich	-4.916	-4.916	-4.916	-4.916	-4.916	-4.916	-4.916	-4.916	-4.916	-4.916	-4.912	-4.916	-4.871	-4.887
	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.34]	[1.33]	[1.34]
Distance to Zurich	0.937***	0.937***	0.937***	0.937***	0.937***	0.937***	0.937***	0.937***	0.937***	0.937***	0.938***	0.937***	0.939***	0.946***
	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.80]	[10.79]	[10.80]	[10.74]	[10.84]
Lake Greifensee	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.823**	-9.829**	-9.823**	-9.854**	-9.796**
	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.09]	[2.10]	[2.08]
Train Station	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.156	1.164	1.156	1.151	1.113
	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.38]	[1.39]	[1.38]	[1.37]	[1.32]
Constant	99.449***	99.449***	99.449***	99.449***	99.449***	99.449***	99.449***	99.449***	99.449***	99.449***	99.428***	99.449***	99.398***	99.338***
	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]	[32.32]	[32.07]
Observations	684	684	684	684	684	684	684	684	684	684	683	684	680	681
# of districts	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Absolute value of z statistics in brackets

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

Table 1B, First stage panel regression, 1991-2003, 171 communities, dependent variable: land price

Income Class, Swiss Francs p.a.	*0*	*0.0001-9999*	*10-19.9999*	*20-29.9999*	*30-39.9999*	*40-49.9999*	*50-59.9999*	*60-69.9999*	*70-79.9999*	*80-89.9999*	*90-99.9999*	*100-149.9999*	*150-199.9999*	*> 200.000*
Lake Zurich	374.762***	374.762***	374.762***	374.762***	374.762***	374.762***	374.762***	374.762***	374.762***	374.762***	375.022***	374.762***	375.624***	375.610***
	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.86]	[6.87]	[6.89]
Distance to Zurich	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.870***	-8.884***	-8.870***	-9.000***	-9.054***
	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.37]	[6.38]	[6.37]	[6.41]	[6.48]
Lake Greifensee	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.162***	-314.367***	-314.162***	-315.414***	-315.930***
	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.36]	[4.38]	[4.39]
Train Station	32.991**	32.991**	32.991**	32.991**	32.991**	32.991**	32.991**	32.991**	32.991**	32.991**	32.894**	32.991**	33.335**	34.022**
	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.39]	[2.38]	[2.39]	[2.40]	[2.45]
Constant	764.557***	764.557***	764.557***	764.557***	764.557***	764.557***	764.557***	764.557***	764.557***	764.557***	764.770***	764.557***	765.769***	766.239***
	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.06]	[20.09]	[20.19]
Observations	684	684	684	684	684	684	684	684	684	684	683	684	680	681
# of districts	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Absolute value of z statistics in brackets

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

Table 1C, Second stage Panel IV regression results, district fixed effects, 1991-2003, 171 communities, instrumented variables: tax multiplier and land price

Income Class, Swiss Francs p.a.	*0*	*0.0001-9999*	*10-19.9999*	*20-29.9999*	*30-39.9999*	*40-49.9999*	*50-59.9999*	*60-69.9999*	*70-79.9999*	*80-89.9999*	*90-99.9999*	*100-149.9999*	*150-199.9999*	*> 200.000*
Tax multiplier	0.011*	0.007*	0.006	0.010**	0.019***	0.011***	0	-0.003	-0.001	-0.008*	-0.021***	-0.028***	-0.051***	-0.061***
	[1.72]	[1.79]	[1.38]	[2.14]	[4.63]	[3.54]	[0.16]	[1.04]	[0.28]	[1.86]	[3.57]	[3.78]	[4.33]	[3.81]
Land price	0.2	0.011	-0.264*	-0.487***	-0.108	-0.105	-0.132	0.044	0.117	0.212	0.09	0.435	0.629	1.242**
	[0.87]	[0.08]	[1.76]	[2.95]	[0.76]	[0.98]	[1.38]	[0.46]	[0.98]	[1.40]	[0.44]	[1.61]	[1.51]	[2.18]
Neighbor tax, district average	-0.001	-0.003**	-0.005***	-0.006***	-0.005***	-0.002**	0.001	0.002***	0.002**	0.004***	0.008***	0.014***	0.014***	0.018***
	[0.42]	[2.34]	[4.10]	[4.98]	[4.64]	[2.50]	[0.81]	[2.84]	[2.32]	[3.17]	[4.86]	[6.30]	[3.98]	[4.08]
Airport noise	-0.163***	-0.082***	-0.016	-0.039	0.013	0.084***	0.093***	0.082***	0.02	0.037	0.01	-0.019	-0.154*	-0.255**
	[3.22]	[2.64]	[0.58]	[1.22]	[0.45]	[3.65]	[4.83]	[4.46]	[0.65]	[1.43]	[0.27]	[0.38]	[1.95]	[2.45]
Share of elderly	1.695***	0.601	2.155***	2.083***	0.359	-0.808***	-1.067***	-1.160***	-2.123***	-2.762***	-2.751***	-2.939***	-2.159*	1.99
	[2.67]	[1.54]	[5.55]	[4.91]	[0.93]	[2.68]	[4.04]	[4.65]	[6.68]	[6.65]	[4.76]	[4.00]	[1.76]	[1.22]
Share of young	-4.634***	-1.435**	1.101	0.401	-1.384*	-1.149*	0.804*	0.477	-0.644	-0.1	1.653	0.996	3.298	5.824**
	[3.93]	[2.20]	[1.54]	[0.51]	[1.92]	[1.88]	[1.73]	[1.04]	[1.09]	[0.14]	[1.53]	[0.72]	[1.51]	[2.07]
Net migration, perc.	-0.098	-0.47	-0.663	0.128	0.37	0.696*	0.15	0.044	-0.217	-1.368**	-0.051	0.365	-0.844	-0.219
	[0.11]	[0.83]	[1.24]	[0.23]	[0.68]	[1.74]	[0.39]	[0.10]	[0.39]	[2.04]	[0.06]	[0.36]	[0.54]	[0.11]
Share of pupils	-2.292	-0.76	-0.54	-1.898	-0.373	-0.398	2.044***	1.091	0.658	0.64	1.989	0.052	2.272	2.55
	[1.22]	[0.62]	[0.46]	[1.29]	[0.24]	[0.38]	[2.71]	[1.21]	[0.64]	[0.51]	[0.88]	[0.02]	[0.52]	[0.43]
Contributions to public transport	-3.046***	-1.269**	1.005**	-0.699	-1.055**	-0.192	-0.156	-0.276	-0.765	-0.34	0.527	1.915**	3.505**	3.506**
	[3.52]	[2.19]	[2.02]	[1.35]	[2.34]	[0.55]	[0.44]	[0.52]	[1.13]	[0.46]	[0.75]	[2.17]	[2.46]	[2.11]
Physicians p.c.	-5.772	-22.415	-24.398	-2.378	-19.311	-14.175	5.614	14.491	-4.225	19.8	38.081*	46.786*	56.796	47.478
	[0.23]	[1.38]	[1.54]	[0.16]	[1.32]	[1.11]	[0.54]	[1.42]	[0.36]	[1.31]	[1.70]	[1.76]	[1.30]	[0.83]
Share of foreigners	-0.001	-0.003	0.004**	0.007***	0.010***	0.005***	0.001	0.001	-0.002	-0.008***	-0.011***	-0.017***	-0.020***	-0.021***
	[0.37]	[1.60]	[2.24]	[3.68]	[5.35]	[3.37]	[1.33]	[1.30]	[1.10]	[4.34]	[4.74]	[5.26]	[4.16]	[3.25]
Share of right wing party	0.006***	0.002	-0.003**	0.001	0	-0.002*	-0.001	0.001	-0.002**	0	-0.001	0	0.007**	0.010*
	[3.43]	[1.36]	[2.32]	[0.65]	[0.09]	[1.78]	[0.62]	[1.26]	[2.03]	[0.07]	[0.61]	[0.05]	[2.07]	[1.86]
Population	-0.002	0	0.002***	0.002**	0	0	0.001	0	-0.001	-0.001	0	-0.002	-0.001	-0.002
	[1.64]	[0.55]	[2.70]	[2.05]	[0.14]	[0.12]	[1.10]	[1.08]	[1.46]	[1.62]	[0.02]	[1.10]	[0.28]	[0.75]
unemployment rate	0.092***	-0.029***	-0.077***	-0.099***	-0.073***	-0.016**	0.022***	0.023***	0.049***	0.066***	0.092***	0.118***	0.105***	0.079***
	[6.53]	[3.22]	[9.76]	[10.92]	[8.90]	[2.42]	[4.30]	[3.96]	[7.39]	[8.08]	[7.57]	[7.58]	[4.50]	[2.76]
Revenue from fiscal equalization	0	0	-0.002	-0.001	0	0	0.001*	0.002**	0.001**	0.002	-0.003**	-0.001	-0.001	-0.002
	[0.19]	[0.05]	[1.59]	[0.77]	[0.07]	[0.53]	[1.74]	[2.29]	[2.06]	[0.83]	[2.47]	[0.55]	[0.35]	[0.42]
Community net wealth	0.031***	0.008	-0.015**	-0.004	0.001	0.001	-0.004	-0.007	0.004	0.002	-0.007	-0.012	-0.025	-0.046
	[2.59]	[1.01]	[2.07]	[0.45]	[0.19]	[0.11]	[0.90]	[1.39]	[0.64]	[0.29]	[0.64]	[0.94]	[1.25]	[1.53]
Highway access	-0.125***	-0.022	0.01	0.025	0.050**	0.035**	0.035**	0.022	0.004	0.001	-0.043	-0.084**	-0.073	-0.013
	[3.77]	[0.97]	[0.49]	[1.17]	[2.44]	[2.11]	[2.48]	[1.64]	[0.26]	[0.06]	[1.46]	[2.25]	[1.24]	[0.17]
Debt p.c.	0.144	0.083	0.077	0.033	-0.02	-0.042	-0.046	-0.182***	-0.01	-0.265***	0.049	-0.103	-0.239	-0.272
	[0.94]	[0.99]	[0.78]	[0.35]	[0.25]	[0.63]	[0.84]	[2.66]	[0.14]	[3.31]	[0.39]	[0.73]	[0.97]	[0.79]
Constant	-3.965***	-3.067***	-2.742***	-2.557***	-3.092***	-2.486***	-2.242***	-2.366***	-2.568***	-2.330***	-2.013***	-0.995	-0.672	-1.266
	[5.55]	[7.03]	[6.10]	[5.24]	[7.22]	[7.55]	[7.70]	[8.01]	[6.68]	[5.20]	[3.15]	[1.23]	[0.53]	[0.76]
Observations	684	684	684	684	684	684	684	684	684	684	683	684	680	681
Centered R-Squared	0.2424	0.0925	0.3648	0.3064	0.1918	0.1859	0.2371	0.1852	0.2216	0.2468	0.0348	0.1199	-0.0369	0.0113

Robust z statistics in brackets

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

Table 2, Second stage Panel IV regression results, district fixed effects, 1991-2003, 171 communities, instrumented variables: tax multiplier and land price, parsimonious model

Income Class, Swiss Francs p.a.	*0*	*0.0001-9999*	*10-19.9999*	*20-29.9999*	*30-39.9999*	*40-49.9999*	*50-59.9999*	*60-69.9999*	*70-79.9999*	*80-89.9999*	*90-99.9999*	*100-149.9999*	*150-199.9999*	*> 200.000*
Tax multiplier	0.023**	0.006	0.007	0.014***	0.015***	0.006*	-0.002	-0.004	-0.008**	-0.014***	-0.023***	-0.031***	-0.051***	-0.046***
	[2.17]	[1.60]	[1.48]	[2.72]	[3.91]	[1.81]	[0.66]	[1.37]	[2.08]	[2.89]	[3.59]	[3.95]	[4.55]	[3.38]
Land price	1.420***	0.16	-0.285	-0.223	-0.07	-0.251	-0.415**	-0.172	-0.175	-0.176	-0.316	-0.032	-0.303	0.827
	[2.61]	[0.82]	[1.20]	[0.89]	[0.35]	[1.56]	[2.37]	[1.10]	[0.85]	[0.68]	[0.99]	[0.08]	[0.55]	[1.15]
Neighbor tax, district average	0	-0.002**	-0.005***	-0.006***	-0.004***	-0.001**	0	0.002**	0.002***	0.004***	0.006***	0.012***	0.012***	0.015***
	[0.07]	[2.24]	[4.65]	[5.81]	[4.75]	[1.99]	[0.46]	[2.54]	[2.59]	[3.23]	[4.22]	[6.22]	[3.96]	[4.52]
Airport noise	-0.129*	-0.070**	-0.061**	-0.044	0.046*	0.112***	0.103***	0.098***	0.048	0.066**	-0.002	-0.045	-0.217***	-0.352***
	[1.88]	[2.47]	[2.13]	[1.41]	[1.65]	[5.25]	[4.86]	[5.67]	[1.64]	[2.30]	[0.04]	[0.90]	[2.84]	[4.04]
Share of foreigners	-0.004	-0.004**	0.003*	0.006***	0.010***	0.006***	0.003**	0.003***	0	-0.006***	-0.010***	-0.016***	-0.023***	-0.023***
	[0.98]	[2.26]	[1.87]	[3.20]	[6.25]	[4.41]	[2.40]	[2.63]	[0.09]	[3.03]	[4.24]	[5.29]	[4.74]	[4.00]
Population	-0.006**	0	0.003**	0.002	0	0.001	0.001	0	0	0	0.001	0	0.002	-0.002
	[2.01]	[0.12]	[2.36]	[1.53]	[0.40]	[1.08]	[1.56]	[0.54]	[0.10]	[0.22]	[0.47]	[0.28]	[0.61]	[0.59]
unemployment rate	0.164***	-0.011	-0.085***	-0.082***	-0.061***	-0.019***	0.008	0.015***	0.038***	0.054***	0.059***	0.084***	0.059***	0.050*
	[7.95]	[1.36]	[9.13]	[8.92]	[8.13]	[2.98]	[1.20]	[2.63]	[4.94]	[5.68]	[4.98]	[5.64]	[2.66]	[1.92]
Constant	-6.573***	-3.284***	-2.488***	-2.886***	-3.157***	-2.275***	-1.697***	-2.117***	-2.043***	-1.791**	-1.325	-0.393	0.892	-0.675
	[4.47]	[5.79]	[3.66]	[4.11]	[5.61]	[4.93]	[3.52]	[4.77]	[3.50]	[2.48]	[1.42]	[0.34]	[0.55]	[0.34]
Observations	684	684	684	684	684	684	684	684	684	684	683	684	680	681
Centered R-Squared	0.2424	0.0925	0.3648	0.3064	0.1918	0.1859	0.2371	0.1852	0.2216	0.2468	0.0348	0.1199	-0.0369	0.0113

Robust z statistics in brackets

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

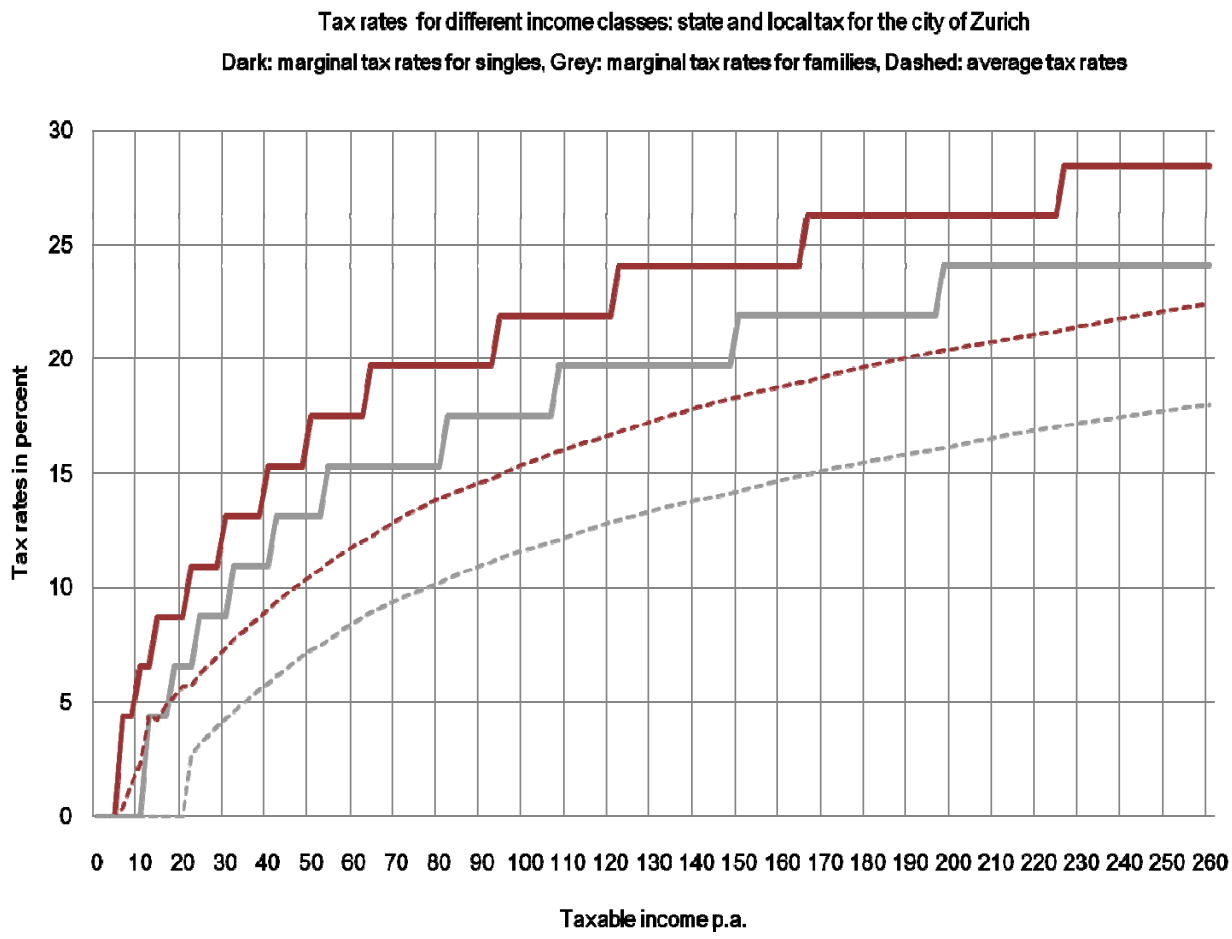
Table 3: Spatial error regressions for interjurisdictional income sorting among 14 income class shares, 2003, 171 communities

Income Class, Swiss Francs p.a.	*0*	*0.0001-9999*	*10-19.9999*	*20-29.9999*	*30-39.9999*	*40-49.9999*	*50-59.9999*	*60-69.9999*	*70-79.9999*	*80-89.9999*	*90-99.9999*	*100-149.9999*	*150-199.9999*	*> 200.000*
Tax multiplier	0.002	0.002	0.008***	0.010***	0.008***	0.006***	0.002**	-0.002	-0.003**	-0.005***	-0.008***	-0.012***	-0.017***	-0.021***
	[0.66]	[1.16]	[4.80]	[6.30]	[6.67]	[5.60]	[2.45]	[1.63]	[2.49]	[3.43]	[5.14]	[6.19]	[5.51]	[4.91]
Land price	0.18	0.019	-0.034	-0.011	-0.120**	-0.111**	-0.063	-0.08	-0.092	-0.047	0.011	-0.004	0.07	0.360*
	[1.60]	[0.26]	[0.45]	[0.11]	[1.96]	[2.07]	[1.06]	[1.44]	[1.19]	[0.67]	[0.12]	[0.04]	[0.53]	[1.82]
Neighbor tax, district average	0.003	-0.001	0.001	0.001	0.001	-0.001	-0.002	0.001	-0.002	-0.002	-0.001	-0.001	-0.004	0.003
	[1.10]	[0.73]	[0.43]	[0.72]	[0.82]	[0.60]	[1.25]	[0.49]	[1.07]	[1.10]	[0.47]	[0.25]	[1.17]	[0.54]
Airport noise	-0.077	-0.078	0.041	0.046	0.049	0.094***	0.079**	0.067*	-0.001	-0.061	-0.062	-0.102	-0.189*	-0.337***
	[0.99]	[1.13]	[0.92]	[0.98]	[1.18]	[3.08]	[2.19]	[1.87]	[0.03]	[1.42]	[1.08]	[1.62]	[1.87]	[3.38]
Lake Zurich	-0.048	0.014	0.194**	0.065	0.099*	-0.029	-0.096	-0.05	-0.096	-0.027	-0.138	0.056	0.179	0.063
	[0.45]	[0.17]	[1.97]	[1.09]	[1.65]	[0.50]	[1.54]	[0.97]	[1.47]	[0.31]	[1.48]	[0.60]	[1.38]	[0.32]
Lake Greifensee	0.008**	0.007**	0.002	0.007**	0.005*	0.002	0	-0.001	-0.004	-0.004	-0.007*	-0.011**	-0.016***	-0.041***
	[2.21]	[2.00]	[0.56]	[2.33]	[1.90]	[0.83]	[0.00]	[0.55]	[1.38]	[1.24]	[1.80]	[2.46]	[2.61]	[3.29]
Sea level	-0.024	0.039	-0.107	0.019	-0.118*	0.02	0.06	-0.031	0.085	-0.005	0.138	0.017	0.022	0.199
	[0.20]	[0.42]	[1.13]	[0.28]	[1.80]	[0.31]	[0.99]	[0.62]	[1.25]	[0.06]	[1.46]	[0.18]	[0.16]	[0.88]
Train Station	0.001**	0.000*	0.001***	0.000*	0	-0.000**	0	0	-0.001***	-0.001*	-0.001***	-0.001	0	0.001
	[2.56]	[1.76]	[4.16]	[1.76]	[0.35]	[2.44]	[1.37]	[1.39]	[2.75]	[1.87]	[3.40]	[1.52]	[0.53]	[1.33]
Highway access	0.018	0.037	0.01	0.044	0.045**	0.026	-0.014	-0.008	0.018	-0.01	-0.055	-0.109***	-0.132**	-0.143
	[0.36]	[0.94]	[0.28]	[1.39]	[2.07]	[1.03]	[0.62]	[0.33]	[0.60]	[0.28]	[1.32]	[2.60]	[2.14]	[1.64]
Share of elderly	-0.137***	0.028	0.04	-0.002	0.04	-0.004	0.011	0.008	-0.008	0.081**	-0.055	0.031	0.009	-0.055
	[3.02]	[0.61]	[1.14]	[0.05]	[1.38]	[0.16]	[0.48]	[0.33]	[0.29]	[2.18]	[1.32]	[0.64]	[0.11]	[0.47]
Share of young	-0.835	-1.049	1.168	1.814**	0.454	-0.423	-0.122	-0.554	-0.333	-1.2	-1.882**	-1.835*	-1.506	4.427
	[0.79]	[1.00]	[1.41]	[2.13]	[0.72]	[0.62]	[0.18]	[0.96]	[0.43]	[1.15]	[1.98]	[1.74]	[0.90]	[1.10]
Net migration	-3.295*	-0.04	-0.301	-1.751	-0.392	-2.291**	-0.747	1.362	1.039	1.704	0.082	1.468	2.882	3.134
	[1.81]	[0.02]	[0.22]	[1.36]	[0.38]	[2.15]	[0.87]	[1.17]	[0.93]	[1.18]	[0.05]	[0.82]	[0.94]	[0.97]
Share of pupils.	0.163	-0.948	-1.222	-1.088	1.209	0.313	-0.225	-0.379	0.125	-1.031	0.705	1.178	0.669	7.478**
	[0.11]	[0.70]	[0.98]	[0.96]	[1.59]	[0.41]	[0.33]	[0.50]	[0.13]	[0.76]	[0.57]	[0.94]	[0.43]	[2.53]
Contributions to public transport	-2.279	-6.466	3.437	2.76	-1.819	5.586	8.078**	-1.595	3.312	4.076	4.299	-7.502	-21.566**	5.254
	[0.35]	[1.04]	[0.60]	[0.62]	[0.53]	[1.29]	[2.22]	[0.38]	[0.67]	[0.63]	[0.84]	[1.24]	[2.10]	[0.24]
Physicians p.c.	-0.456	-0.662	-0.702	-1.522**	0.005	0.198	0.108	-2.070***	-0.554	1.066	0.974	0.945	3.818***	2.634
	[0.62]	[0.51]	[0.93]	[2.22]	[0.01]	[0.33]	[0.25]	[2.91]	[0.66]	[1.30]	[0.90]	[0.94]	[2.89]	[1.43]
Share of foreigners	9.984	-6.703	-24.666	-10.73	5.533	9.616	-2.031	4.788	-13.596	-9.628	17.583	-16.121	-8.258	45.055
	[0.34]	[0.28]	[1.16]	[0.64]	[0.34]	[0.59]	[0.16]	[0.31]	[0.84]	[0.52]	[0.71]	[0.58]	[0.21]	[0.83]
Right wing party share	0.011**	0.006	0.001	0.003	0.006**	0.002	-0.001	-0.001	-0.001	0.001	-0.004	-0.012**	-0.009	-0.009
	[2.19]	[1.20]	[0.26]	[0.80]	[2.16]	[0.74]	[0.22]	[0.45]	[0.20]	[0.34]	[0.98]	[2.34]	[0.97]	[0.89]
Population	-0.005	-0.001	0	0.009***	0.010***	0.005**	0	-0.002	-0.003	-0.008***	-0.007**	-0.016***	-0.020***	-0.002
	[1.57]	[0.16]	[0.05]	[4.20]	[5.10]	[2.27]	[0.26]	[1.04]	[1.37]	[2.65]	[2.45]	[5.56]	[3.82]	[0.16]
Unemployment rate	0	0	0.001**	0.001	0	0	0	0	0	-0.001**	0	-0.001*	-0.002***	-0.002*
	[0.04]	[0.05]	[2.19]	[1.40]	[0.53]	[0.21]	[1.02]	[0.56]	[0.25]	[2.06]	[0.42]	[1.71]	[2.61]	[1.81]
Revenue from fiscal equalization	-0.055	-0.070**	-0.01	-0.007	0.014	0.016	0.034**	0.022	-0.005	-0.04	-0.018	-0.012	-0.028	-0.068
	[1.63]	[2.08]	[0.43]	[0.30]	[0.78]	[1.07]	[2.07]	[1.08]	[0.26]	[1.50]	[0.64]	[0.36]	[0.57]	[1.26]
Community net wealth	0	-0.000**	0	0	-0.000**	0	0.000**	0.000***	0.000***	0	0	0	0	0
	[1.45]	[2.46]	[1.48]	[0.60]	[2.41]	[0.76]	[2.15]	[2.84]	[4.31]	[1.08]	[0.91]	[0.75]	[0.27]	[0.74]
Debt p.c.	0.002	0.009	-0.009	-0.006	-0.013*	-0.007	-0.005	-0.007	0.001	0.009	0.006	0.014*	0.034***	0.011
	[0.17]	[1.09]	[1.11]	[0.93]	[1.96]	[1.33]	[1.15]	[1.32]	[0.16]	[1.32]	[0.74]	[1.75]	[2.60]	[0.54]
Constant	0.028	-0.118	0.256	0.034	-0.134	-0.073	-0.026	0.05	-0.081	-0.291**	0.003	-0.021	-0.359*	-0.184
	[0.16]	[0.83]	[1.60]	[0.31]	[1.10]	[0.72]	[0.31]	[0.54]	[0.70]	[2.23]	[0.02]	[0.16]	[1.86]	[0.50]
Number of observations	171	171	171	171	171	171	171	171	171	171	171	171	171	171

* significant at 10%; ** significant at 5%; *** significant at 1%; standard errors below coefficients

Appendix 1: The canton Zurich: 171 local communities in 12 districts

Appendix 1b: Progressiveness of the Tax Scheme in the Canton of Zurich, 2008.[10]



[10] Family is defined as a married couple with two children; family tariff includes tax allowance for two children. There is no married couples tax splitting in Switzerland.

Appendix 2: Summary statistics

	Obs	Mean	St. Dev.	Min.	Max.
logoddsperccl1	676	-2.940	0.411	-4.808	-1.735
logoddsperccl2	676	-2.822	0.236	-3.809	-2.204
logoddsperccl3	676	-2.571	0.276	-3.248	-1.634
logoddsperccl4	676	-2.236	0.273	-3.027	-1.391
logoddsperccl5	676	-1.927	0.242	-2.859	-1.361
logoddsperccl6	676	-1.882	0.190	-2.588	-1.226
logoddsperccl7	676	-2.089	0.167	-2.637	-1.663
logoddsperccl8	676	-2.391	0.168	-3.145	-1.903
logoddsperccl9	676	-2.722	0.210	-3.847	-2.130
logoddsperccl10	676	-3.077	0.261	-4.585	-2.430
logoddsperccl11	676	-3.422	0.330	-5.144	-2.602
logoddsperccl12	676	-2.624	0.422	-4.546	-1.783
logoddsperccl13	676	-3.983	0.622	-6.117	0.000
logoddsperccl14	676	-4.023	0.840	-6.724	0.000
Tax multiplier	676	113.797	13.375	69.000	131.000
Neighbor tax, district average	676	112.865	9.094	86.000	130.000
Land Price	676	613.648	248.660	148.000	3,272.000
Lake Zurich	676	0.101	0.301	0.000	1.000
Lake Greifensee	676	0.041	0.199	0.000	1.000
Lake Pfäffiker See	676	0.018	0.132	0.000	1.000
Airport noise	676	0.107	0.309	0.000	1.000
Distance to Zurich	676	17.709	7.644	0.000	36.000
Train Station	676	0.515	0.500	0.000	1.000
Highway Access	676	0.371	0.484	0.000	1.000
Sea level	676	475.528	84.664	360.000	870.000
Share of elderly	676	0.121	0.033	0.040	0.240
Share of young	676	0.187	0.030	0.109	0.306
Net migration, perc.	676	0.007	0.018	-0.042	0.100
Share of pupils	676	0.025	0.009	0.000	0.082
Contributions to public transport, p.c.	676	0.026	0.027	0.001	0.207
Physicians p.c.	676	0.001	0.001	0.000	0.004
Share of foreigners	676	13.001	7.423	1.000	42.100
Share of right wing party	676	37.424	11.226	12.300	71.500
Population	676	7,063.240	27,059.762	251.000	350,815.000
Unemployment rate	676	1.919	1.357	0.000	7.500
Tax revenue	676	18,185,068.000	81,645,549.000	277,189.600	1,200,000,000.000
Community income from tax equalization scheme	676	1,332,793.800	6,089,766.800	0.000	124,000,000.000
Community net wealth	676	3,762.336	2,407.643	0.000	13,849.000
Debt p.c.	676	381.980	150.139	-560.993	1,236.596
Community net worth p.c.	676	1,519.939	3,291.217	-14,599.000	11,901.000

Appendix 3: Data sources and Definitions

Variable	Description	Source
Income shares	Percentage share of taxpayers in an income class (taxable income)	Zürcher Staatssteuerstatistik 1991, 1995, 1999, 2003.
Tax multiplier	Tax multiplier determining local tax rates, percentage of cantonal tax rate.	Statistisches Amt des Kantons Zürich (2008),
Land price	Mean price per square meter in Swiss Francs	Statistisches Amt des Kantons
Neighbor tax, district average	Average of tax multipliers of all other communities in a district	Statistisches Amt des Kantons Zürich (2008),
Share of elderly	Share of inhabitants over age 65	Statistisches Amt des Kantons
Share of young	Share of inhabitants below age 15	Statistisches Amt des Kantons
Net migration	Net migration into a community	Statistisches Amt des Kantons
Share of pupils	Share of Pupils (Kindergarden, elementary school, high school and vocational education) on total population	Statistisches Amt des Kantons Zürich (2008)
Payments to public transport	Per capita spending to the local public transport association ZVV (Zürcher Verkehrsverbund)	Statistisches Amt des Kantons Zürich (2008)
Doctors p.c.	Share of medical doctors on total population	Statistisches Amt des Kantons
Share of foreigners	Share of foreigners on total population	Bundesamt für Statistik
Right wing party share	Share of SVP (right wing party) voters in cantonal parliamentary election	Statistisches Amt des Kantons Zürich, Ergebnisse
Population	Absolute number of population	Statistisches Amt des Kantons
Unemployment rate	Unemployment rate, percentage	Bundesamt für Statistik
Tax revenue	Per capita tax revenue	Statistisches Amt des Kantons
Payments from fiscal equalization	Per capita payments from the canton to the local communities according to the fiscal equalization scheme	Statistisches Amt des Kantons Zürich (2008)
Debt p.c.	Per capita debt	Statistisches Amt des Kantons
Community net wealth	Per capita public net wealth on financial assets	Statistisches Amt des Kantons
Lake Zurich	Dummy for location at lake Zurich	http://www.gis.zh.ch/gb4/blue
Lake Greifensee	Dummy for location at lake Greifensee	http://www.gis.zh.ch/gb4/blue
Airport noise	Dummy for communities that need extra noise protection on houses due to airport noise as determined by the Zurich airport authority (unique)	http://www.programm2010.ch/wissen/wissen_02.html, Noise level ES II
Distance to Zurich	Distance to the city of Zurich, linear distance	Own calculations
Train station	Dummy for a train station in the community	http://www.zvv.ch