



## Tax competition and income sorting: Evidence from the Zurich metropolitan area

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### ABSTRACT

We provide empirical evidence on the influence of income taxes on the choice of residence of taxpayers at the local government level. The fact that Swiss communities can independently set tax multipliers, thereby shifting the progressive tax scheme that 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 of sorting according to income.

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### 1. Introduction

Since the seminal contribution of Tiebout (1956), there has been investigation of locational choice as a substitute for markets in public goods. Tiebout showed that, by choosing location, individuals reveal preferences for local public goods. Hence fiscal decentralization allows people with similar preferences concerning public goods to sort themselves into communities where supply is consistent with their preferences.<sup>1</sup>

Many of the results in this literature<sup>2</sup> rest on the assumption that households differ in their preferences 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).<sup>3</sup> A core result of these models is the income segregation hypothesis, which postulates that if rich households value public goods less than poor households, fiscal federalism induces self sorting of the population by income. Following Schmidheiny (2006a), the clustering of rich and poor is even stronger in case of progressive taxation.

In this study, 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. We use Swiss data because of a unique characteristic of Swiss cantons: the progressiveness of the tax schedule is set at the cantonal (state) level, while the communities within a canton can set

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<sup>1</sup> 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 goods at the local level reflect differences in preferences across these jurisdictions.

<sup>2</sup> See Oates (1999), Wilson (1999) and Wilson and Wildasin, (2004) for surveys.

<sup>3</sup> See also Ross and Yinger (1999) for a survey.

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 a small and hence, in comparison to studies using data from US federal states or Swiss cantons, an economically and culturally homogeneous region. With the use of data from one single canton, we avoid having to take account of factors determining the decision to move that are difficult to measure or may not be measurable, such as differences in language, culture, attachment to the local community, family ties, or differences in the school system. To the best of our knowledge, we are the first to study income sorting using panel data from such a small region. By using panel data, we are not only able to make use of cross-sectional variation, as is the case in for example [Feld and Kirchgässner \(2001\)](#), but we can also take account of variations in tax rates and income shares over time. As a further improvement over most of the past literature on the topic, we also include the house price channel into our study, which is often ignored in the literature on tax competition and income sorting (an important exception is [Feld and Kirchgässner \(1997\)](#) with their analysis of the Tiebout-Hypothesis within Switzerland), and control for possible endogeneity of the tax multipliers by employing instrumental variables regressions.<sup>4</sup> Another improvement in comparison with the existing studies is that we take spatial correlation into account. 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 supportive of the income segregation hypothesis in the canton of Zurich.

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 subsequent section presents the data. The results of the empirical analysis are discussed in [Section 5](#). [Section 6](#) concludes.

## 2. Theoretical foundations and empirical evidence

The paper by [Tiebout \(1956\)](#) on the efficiency properties of fiscally induced migration has inspired many scholars [Oates \(2006\)](#). The segregation hypothesis is one of the central propositions in multi-community models in the tradition of Tiebout.

For a pure public good, the first-best solution is as proposed in [Lindahl \(1919\)](#), where everyone is located in the same jurisdiction and individuals are taxed according to their marginal benefits from public goods. However, this solution is not feasible because of asymmetric information. The second-best solution for pure public goods is that of Tiebout, in which individuals reveal their preferences for public goods through choice of location. If however the tax-financed good is not a pure public good, but is subject to congestion, or if the benefit from the public good declines with the distance from the facility providing the public good, partitioning populations into separate jurisdictions results in efficient cost sharing arrangements. The same holds if the types of public goods sought by different groups are quite different.<sup>5</sup> The Tiebout solution requires consumers to be perfectly mobile and completely informed about supply opportunities via location. Additional conditions for the efficiency of the Tiebout solution are the absence of spillovers<sup>6</sup> and flexible size of communities, i.e. communities need to be able to choose their optimal size for the provision of public goods. However, the violation of one of these rather strict efficiency conditions does not imply that the predictions of the Tiebout model concerning the choice of residence are void.

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 according to quantity and quality as well as willingness or ability to pay. The differences 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 et al., 1993](#); [Stadelmann and Billon, 2010](#)). 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 more 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 \(2003, 2004\)](#) resolve 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 in which 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 et al. \(2001\)](#) 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's predictions. Using data from US federal states, [Bakija and Slemrod \(2004\)](#) find that wealthy retirees change their state of residence to avoid high state inheritance and estate

<sup>4</sup> The endogeneity problem arises due to the fact that a community of high income households can be taxed at a lower rate in order to raise the same amount of tax revenue as a community of lower income households, and vice versa.

<sup>5</sup> For a detailed discussion of the assumptions of the Tiebout model, see ([Hillman \(2009\)](#), p. 123).

<sup>6</sup> See also [Giuranno \(2010\)](#) on the effects of spillovers in public goods provision on the choice of centralized vs. decentralized public goods provision.

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