Should I Stay or Should I Go?
Tax-Induced Mobility and the Taxable Income Elasticity in Switzerland

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Abstract

This paper develops a theoretical model of how individuals react to income taxation in a setting of pronounced local tax competition, so that they can react by adjusting taxable income or by ‘voting with their feet’ and move to a community with a lower tax rate. Based on the theoretical framework, and using a unique data set of individual tax records in Switzerland for the period 1999-2008, which allows following individuals over time and across municipalities, I estimate the elasticity of taxable income and mobility responses applying different panel methods. Switzerland, with its pronounced federal institutional setting, serves as an ideal natural laboratory to study these questions. First estimates of the elasticity of taxable income from the canton of Zurich suggest that individuals throughout the income distribution react to tax changes, although estimates are smaller than what has been found in other countries, especially the U.S. Estimations of the mobility behavior is current work in progress.

JEL-Classification: H24, H31, H71, H73, R23
Key words: Personal income tax; Taxable income elasticity; Mobility; Tax competition

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1 Introduction

With the outbreak of the financial crisis in 2008, followed by a severe sovereign debt crisis, discussions about the optimal taxation of top incomes and tax competition among sovereign states trying to attract wealthy, high-income individuals has gained renewed attention. The idea to finance mounting public debt through higher income and wealth taxes has been gaining ground among some OECD countries, most prominently France, Germany and the UK. The discussion is not only fueled by the need of financing public debt, but also by considerations of growing income inequality at the top observed especially in developed English speaking countries (Atkinson et al., 2011; Alvaredo et al., 2014). In his prominent publication “Capital in the 20th Century” Thomas Piketty advocates a global wealth tax to counteract trends in increasing inequality, and, in a few instances, even some super-rich exponents such as, e.g., Warren Buffet, advocated higher taxes for the rich, and more so in times of crisis (Buffet, 2011, August 14).

Recent studies have tried to estimate potential increases in government revenue through increasing income and wealth tax rates (Brewer and Browne, 2009; Bach et al., 2011). The elasticity of taxable income (henceforth ETI) with respect to marginal tax rates, and tax competition among sovereign states both constitute limiting factors for revenue increases through tax raises. Tax setting authorities need to consider these responses when they aim at optimizing revenues through income taxes. Therefore, accurate estimates of the ETI and individuals’ tax-induced mobility-responses are of major interest to tax setting jurisdictions.

These are the two behavioral responses this paper aims at shedding more light on. I develop a framework which allows to jointly analyze these responses to taxation in Switzerland, rather than separate from each other. I analyze the effect of tax changes on the ETI and mobility responses by using individual tax return data from Switzerland for the years 1989–2008. This rich and promising data set has been made available recently to researchers through the SNF-Sinergia Project No. 130648 “The Swiss Confederation: A Natural Laboratory for Research on Fiscal and Political Decentralization”. However, the individual data and especially the panel structure thereof has not yet been used for research.
Switzerland is a particularly interesting case to study behavioral responses to taxation because (i) its tax system is characterized by strong income tax competition at the municipal level, and (ii) there are many different cantonal tax systems in place, increasing the variation needed for identification in empirical studies. I follow a comprehensive approach by taking into account that in such an environment individuals can cope with personal income taxes by adjusting their taxable income, measured by the ETI, or by geographical mobility, measured by the probability of moving after a tax increase. The present research project aims at exploring how the aggregate tax base of a municipality reacts to taxation and what role the different responses triggered by taxation play. Also, estimating the ETI for Switzerland sheds more light on the conjecture made in Saez et al. (2012) that the ETI is probably not a universal parameter, but that estimates are contingent on the specific tax system.

The findings of my study have implications beyond Switzerland. Other federal nation states, such as the U.S., give their states competences to set taxes, allowing for tax competition and corresponding behavioral responses of the citizens. The European Union is another prominent example of how economic integration and liberalization of labor markets and migratory policies on the one hand, may conflict with the fiscal power of autonomous nation states have over their citizens on the other. Even though within the European context mobility costs are higher than within Switzerland, these considerations still matter for households living in border regions, and, more generally, for high income earners who are known to be more mobile.

The remainder of this paper is organized as follows. Section 2 gives an overview of previous research on tax-induced mobility and the ETI. Strategies of avoiding taxation depend on the specific setting, especially on the tax laws, but also on institutions enforcing them, for example. Section 3 lays out the theoretical model, tailored to the Swiss tax system. The empirical strategy and the data used for estimation are presented in Section 4.1. Section 5 presents and discusses the results, and Section 6 concludes.
2 Previous Research

The literature I draw on can be divided into two fields, mobility responses to taxation, and the literature on the ETI. Since the goal of this research project is to bring these two different types of responses to taxation together, I lay out the main aspects of these two strands of the literature in the two subsequent chapters.

2.1 Tax-Induced Mobility

There is a long tradition in the study of tax competition and strategic tax setting on the one hand,\(^1\) and fiscal decentralization on the other (Tiebout, 1956; Oates, 1969). Through ‘voting with their feet’, citizens can choose the municipality which best fits their preferences, reaching an equilibrium in which public goods are supplied optimally according to the preferences of the residents. A related strand of the literature analyzes whether fiscal policy capitalizes in property prices as suggested in the seminal paper of Oates (1969).

A substantial body of the empirical literature is based on data from Switzerland, which due to its federal structure with substantial tax setting competences on the cantonal and municipal levels has long served as a natural laboratory to study tax related questions. Furthermore, its small size and well-developed infrastructure keep mobility costs and cultural differences—at least within cantons—low. Based on aggregate data, Kirchgässner and Pommerehne (1996), Feld and Kirchgässner (2001) and Schaltegger \textit{et al.} (2011) find evidence supporting the hypothesis that there is income segregation across cantons or municipalities, respectively. This seems to be especially true for high-income earners. While aggregate studies can tell a lot about the main correlates of the allocation patterns of households, they may suffer from reverse causality. A municipality with a large share of high-income households can implement a lower tax rate but still raise the same amount of tax revenue as a municipality with only a small share of high-income households.

In order to avoid the aforementioned issue, Liebig \textit{et al.} (2007) and Schmidheiny (2006) use individual level data from Switzerland. Both studies regress the moving probability of a household on different individual and municipality characteristics.

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\(^1\)Early theoretical contributions are Wilson (1986); Wildasin (1988); for recent applications on the Swiss case see for example Feld and Reulier (2005); Parchet (2012); Eugster and Parchet (2013).
The advantage of using individual data is that from the perspective of the individual, local tax rates can be seen as exogenously given, thereby circumventing potential endogeneity affecting the estimates based on aggregate data. Schmidheiny (2006) develops an extensive location choice model, which he estimates using conditional and nested logit models. He finds that for relocating households in the area of Basel in 1997, low tax levels attract high income individuals. This is only partly explained by progressivity, rather the results suggest that the rich prefer low taxes to a greater extent than explained by the tax schedule. He therefore finds the hypothesis of income segregation confirmed. His results suggest further that households tend to choose locations close to similar households, and that richer families avoid school districts with a large share of foreign pupils. Building on Schmidheiny’s (2006) model, Schmidheiny and Roller (2014) estimate the effective tax progressivity for Swiss tax payers, taking into account that they may sort into low-tax municipalities. Their finding, that rich households face lower tax rates can be explained by the effect of income sorting. Liebig et al. (2007), who use data from the Swiss census in 2000, look more specifically into tax rate changes between 1995 and 2000 in the roughly 700 largest Swiss municipalities. However, they do not reach such a strong conclusion as Schmidheiny (2006). They find that migratory responses are small and concentrate among Swiss college graduates. The authors explicitly address the problem of potential endogeneity by first regressing out-migration from a municipality between 1995-2000 on tax changes in the period 1990-1995, and then regressing tax changes in 2000-2005 on the out-migration in the former five-year period. According to the authors, reverse causation seems negligible. A shortcoming of the census data is that income is not covered, a problem the authors try to overcome estimating Mincer-type wage regressions. This income measure is far from perfect, as the $R^2$ is about 56 percent and because capital incomes, which are taxed together with labor incomes, cannot be considered. If one is interested in knowing how responsive the tax base is to taxation, it is of crucial importance to include capital incomes, as households deriving income from capital rather than labor presumably face lower mobility costs. Another caveat of the data is that it only reveals the place of residence in 1995 and 2000, not
specifying the point in time of moving and whether the household has moved more than once.

Concerning the hypothesis of capitalization of lower tax rates into property prices, the conclusion of previous studies is that such capitalization happens only partially. In line with the theoretical model by Stadelmann and Billon (2012), which predicts that full capitalization is only possible if the elasticity of supply in the housing market is zero, the empirical studies find that capitalization of lower tax rates into property prices is imperfect (Kirchgässner and Pommerehne, 1996; Schmidheiny, 2006; Schaltegger et al., 2011). In a recent study based on Swiss data, Morger (2013) further shows that such capitalization differs for different types of apartments and household groups, so that there is no “one true capitalization rate” (Morger, 2013, p.35). Capitalization is moderate in most cases, except for low-quality apartments (demanded by low-income households) in nearby municipalities.

Recent studies on migratory responses to tax changes from other countries rely on natural experiments. Young and Varner (2011) examine the migratory responses to a substantial ex post increase in the top marginal tax rate (plus 2.6 percentage points) in the state of New Jersey in 2004. As New Jersey lies in the New York metropolitan area, it is easy to move to one of the three other states in the metropolitan area and still commute to the same job. Using a difference-in-differences model of out-migration, they find only small migratory responses of the affected group and therefore conclude “that, at least in terms of the migration response to state income taxes, the rich are not different – they seem to have much the same non-response as the general populatio” (Young and Varner, 2011, p.278). A possible explanation is that due to turnover in the top group, spikes in income are transitory rather than permanent, therefore migration might not be the best option to avoid higher taxes. Because of the lack of individual identifiers in their 2000-2007 individual tax data however, Young and Verner are not able to test this hypothesis. Kleven et al. (2013a) analyze the migratory responses of European football players between the top 14 leagues and find that differences in the tax regime indeed plays an important role in the decision to move. Namely,
“[t]he elasticity of the number of foreign players with respect to the net-of-tax rate on foreigners is around one, and even larger for the highest-quality players” (Kleven et al., 2013a, p.1922). Therefore, in line with the results on location decisions in Switzerland, the authors also find strong evidence for sorting effects. Being an extremely mobile group of ‘workers’, these estimates should of course be interpreted as an upper bound on the tax-induced migratory responses in the labor market as a whole. In another paper, Kleven et al. (2013b) investigate the effects of a preferential tax scheme for high-income expats in Denmark. They find that the scheme had a very large effect on the number of high-income foreigners in the country and estimate an elasticity between 1.5 and 2.

In a wider context, these studies also relate to the body of literature on potentially harmful tax competition (e.g., OECD, 1998; Avi-Yonah, 2009). Especially for the case of the European Monetary Union, the general view suggests, that a currency union also needs common fiscal rules. Auerbach (2011), e.g., admits that there is some logic for including tax policy coordination among such fiscal rules to limit tax competition and cross-border fiscal externalities. “For example, if variations in consumption tax rates have weaker fiscal spillovers than variations in income tax rates, as they would if cross-border shopping is of less concern than factor mobility, then a greater general reliance on consumption taxation may be necessary under a coordinated tax structure” (Auerbach, 2011, p.22).

2.2 The Elasticity of Taxable Income (ETI)

Originally, concerns about distortive effects of taxation focused on the elasticity of labor supply with respect to taxes. However, in the modern public finance literature the ETI has become the focal point for two main reasons. First, from the perspective of the government, reported income is what matters as this constitutes the tax base. To which extent reported income differs from real income due to tax evasion is another question which has to be assessed separately. However, any kind of behavioral response is a potential source of inefficiency and the ETI implicitly takes into account all margins of behavioral responses (Saez et al., 2012). Second, tax returns provide a valuable and extensive data source, yet reported incomes are the only form of income researchers can measure with these data. The advantage
is that tax returns cover the whole income distribution, including incomes at the very top, and incomes are measured with high precision, both features survey data often lack. Feldstein (1999) further shows that for deadweight loss and revenue raising considerations it does not matter, whether the response is ’real’, i.e. in terms of labor supply, or avoidance—as long as behavioral responses do not generate fiscal externalities. In presence of fiscal externalities efficiency and optimal tax analysis depend on the effect of the tax on total revenue.

Saez et al. (2012) present an extensive overview of the ETI literature and estimation procedures, together with a conceptual framework, upon which I draw in this research project. In a utility maximizing framework, individuals decide how much effort they put into generating taxable and non-taxable, or lower-taxed income, which they use to finance consumption. Solving the maximization problem, one obtains a “supply function of reported income”, from which one can derive the ETI with respect to tax changes.

The empirical literature on the ETI has focused on changes in the marginal tax rate of the top bracket in the income distribution, which is due to the fact that in most developed countries changes in the tax rate have been most distinct for top income-earners and because behavioral responses have been found to be concentrated at the top of the income distribution (Saez et al., 2012, p.6). Most empirical papers, such as Gruber and Saez (2002), Kopczuk (2005), and Giertz (2007), look at tax rate changes in the U.S., in particular at two major tax changes for the top 1 percent group in 1986 and 1993. The crucial finding is that the estimated parameters differ for the two decades. This suggests that the ETI is not a universal, structural parameter. Rather, it can be understood as a function of preferences, the breadth and size of the tax base and the enforcement parameters. Empirical evidence in Kopczuk (2005) and Giertz (2007) supports this hypothesis. Alternatively, the differences in the estimates could be due to methodological issues. One such potential issue is that the model is unable to adequately control for exogenous income trends. ETI estimates for other countries like Denmark (see Kleven and Schultz, forthcoming), which have not experienced such large differences in the increase of income shares among top groups as the U.S., might therefore be more
reliable. The estimates in Kleven and Schultz (forthcoming) are indeed much smaller than those for the U.S., and, what is more important, they seem to be much less sensitive to model specification. In a very recent paper Brülhart and Parchet (2014) analyze how the falling or even disappearing cantonal bequest taxes in Switzerland affected the distribution of high-income elderly individuals across cantons. Using individual income tax returns covering the universe of retirees, they find no statistically significant relationship between bequest taxes and the size of the tax base. Therefore, they conclude that the alleged tax pressures for tax reforms due to mobile tax bases are not apparent in the available data. However, their estimates also indicate “that high-income retirees attach greater weight to income taxation than to bequest taxation” (Brülhart and Parchet, 2014, p.74).

Focusing on top earners, Piketty et al. (2014) present a model where individuals react to taxation through three channels: labor supply, tax avoidance and compensation bargaining. Each of these responses to taxation translate to a particular elasticity. Taken together, however, these channels all affect the overall ETI. The latter can then be expressed as a combination of the three different elasticities. It is their model I adapt to a context where, from the perspective of a municipality, the elasticity of the tax base with respect to taxation can be split into two different reactions, real labor supply responses and moving responses.

3 A Model of Responses to Taxation in the Swiss Setting

This section briefly introduces the Swiss tax system, laying out the mechanisms of local tax competition within cantons. The theoretical framework is tailored to this system and motivates the empirical models in Section 4.1.

3.1 The Swiss Tax System

In Switzerland, personal income is taxed at three levels: the municipality, the canton, and the federal state. All incomes are subject to taxation, and no difference is made between labor and capital incomes when it comes to taxation. The federal income tax has its own set of deductions and the progressive tax structure is applied to federal taxable income. At the cantonal level, each canton has its own
tax code in which the set of allowed deductions and the tax structure are defined. Based on cantonal taxable income the so called ‘simple tax’ (einfache Steuer) is calculated. The tax at the municipality level is the product of the simple tax times the municipal tax multiplier (Steuerfuss), whereby the municipalities enjoy large autonomy in setting the tax multiplier according to their needs. This setting creates tax competition among cantons as well as among municipalities within each canton. Note that even though the tax structure in terms of progressiveness is set at the cantonal level, the marginal tax rates still vary across municipalities. The marginal tax rate in a given municipality equals the cantonal marginal tax rate times the municipality multiplier.

For the analysis in the present context this means that individuals cannot only respond to income taxes along the margins traditionally discussed in the literature, such as adjusting their hours worked or by not reporting some incomes to the tax authorities, for example – they further have the option to move to a municipality (or a canton) where their tax burden is lower. With the empirical evaluation in mind, I limit the development of the theoretical argument to those cases where individuals move within a canton. Besides the limitations set by the data, which only allow identifying individuals over time as long as they stay within the canton, there are also theoretical reasons to do so. These are discussed in detail in the subsection on sample selection in Section 4.3.

### 3.2 Theoretical Model

The behavioral responses can be thought of as two simultaneous decisions. Individuals decide whether they should move to a lower tax municipality and whether they adjust taxable income when taxes change. This implies two different elasticities with respect to taxation, a mobility elasticity and a reported income elasticity.

**Tax Scheme.** Assume there is a progressive, piecewise linear tax scheme in place, with a marginal tax rate $s_b$ which is constant within each income bracket $b = 1, \ldots, B$, but differs across brackets. This tax scheme is defined in the cantonal tax law, which stipulates the so-called ‘simple tax’ $T(z)$. This simple tax results from integrating the area under the tax curve, as shown in Figure 1. The total tax load is defined by multiplying the simple tax with the municipality $j$’s tax
multiplier $\tau_{jt}$. Therefore, the actual marginal tax rate within an income bracket is $s_b\tau_{jt}$, where $s_b$ is independent of the location choice and $\tau_{jt}$ is constant over all income brackets. The municipalities can independently set a different multiplier in each period $t$.

![Figure 1: Non-linear tax scheme](image)

**Utility Maximization.** In each period $t$, individuals $i$ living in a municipality $j$ maximize a utility function

$$U_{jt}^i(c_t, z_t, \mu_{jt}^i) = c_t - h_i^i(z_t) + \mu_{jt}^i,$$

where $c_t$ is consumption in period $t$, $z_t$ is the individual’s reported income, and $h_i^i(z_t)$ denotes the labor supply cost of earning $z_t$. This cost function $h_i^i(z_t)$ is increasing and convex, so that $h'_i(z_t) > 0$ and $h''_i(z_t) > 0$. $\mu_{jt}^i = \mu_{1t}^i, \ldots, \mu_{Jt}^i$ are preference parameters individuals have for each municipality within the canton, and there are $j = 1, \ldots, J$ municipalities to choose to move to within the canton. This is analogous to the location-choice framework in Kleven et al. (2013a). An alternative interpretation of $\mu_{jt}^i$ would be that of the stochastic part in a random utility model (RUM) where individuals decide about moving, nested in the utility function (1).

If $\mu_{jt}^i$ was zero so that the moving decision would be fully explained by the tax multiplier difference and the distance to the new location, this would imply unrealistically high tax-induced mobility. There are only very
The budget constraint takes on the form

\[ c_t = z_t - \tau_{jt} T(z_t) = z_t(1 - s_b \tau_{jt}) + R_t, \]

where \( R_t = \tau_{jt}(z_t s_b - T(z_t)) \) denotes virtual income from the non-linear tax schedule, arising from the fact that incomes below the tax bracket the individual is in are taxed at a lower rate (for an illustration of the virtual income concept, see Gruber and Saez, 2002; Saez, 2013).

**The Elasticity of Reported Income.** Abstracting from income effects, the resulting “reported income supply function” reads as \( z_t (1 - s_b \tau_{jt}) \).\(^4\)\(^5\) This is the crucial function to determine the elasticity of reported income with respect to the net-of-tax rate, defined as

\[ e = \frac{1 - s_b \tau_j}{z} \cdot \frac{\partial z}{\partial (1 - s_b \tau_j)}. \]

**Migration Decision.** From the reported income supply function, it is possible to determine the individually optimal reported income \( z_t^* \) for each location \( j \). \( U_{jt}^i \) is the utility a tax unit \( i \) would enjoy in municipality \( j \). The household chooses the municipality that yields the highest utility, so that moving to \( j \) is optimal if

\[ U_{jt}^i(z_t^*(1 - s_b \tau_{jt})) + \mu_{jt}^i > \max \{ U_{j't}^i(z_t^*(1 - s_b \tau_{j't})) + \mu_{j't}^i \}, \quad \forall j' \neq j. \]

**The Mobility Elasticity.** The presented utility framework corresponds to a random utility model (RUM), where utility is decomposed into a deterministic and an unobservable part: \( U_{jt}^i(c, z) = V_{jt}^i(c, z) + \mu_{jt}^i \) (for a detailed overview of RUMs, see Train, 2009). Assuming that the individual and unobserved term \( \mu_{jt}^i \) follows some extreme value distribution, which will be specified in the empirical section, it is possible to determine the probability of moving, \( P_{jt}^i \). The elasticity
of moving with respect to the net of tax rate is then given by:

\[ \varepsilon_{jt} = \frac{d \log P_{jt}}{d \log (1 - s_b \tau_{jt})}. \]

(5)

**Combining the Elasticities at the Municipality Level.** What has been presented so far were the individual income elasticities and moving probabilities. In this section I develop a framework which allows to divide the total elasticity of a municipality’s tax base into a part of real responses to taxation, e.g. labor supply responses, and into a part of moving responses, which are of an evasive character. Piketty *et al.* (2014) provide a theoretical framework that accounts for behavioral responses to taxation along several margins. What follows, strongly builds upon their work, adding what I will call “tax-avoidance mobility”. Piketty *et al.* (2014, p.6) define tax avoidance as “changes in reported income due to changes in the form of compensation, but not in the total level of compensation.” This means, that some part \( x \) of total real income \( y \) is not taxed in the individual income tax scheme, so that reported income equals \( z = y - x \). Such evasion responses depend critically on the design of the tax system and the avoidance opportunities, but they do not reflect underlying individual preferences for work and consumption. In contrast to their model, I define tax-avoidance mobility as a shift of the total reported income from one jurisdiction to another.\(^6\)

Rather than an individual’s taxable income, let now \( z_t \) be a municipality \( j \)'s tax base, i.e. the sum of reported incomes, in a given year \( t \) and for a tax bracket \( b \).\(^7\) \( x_t \) denotes the sum of incomes in that bracket \( b \) that moved away to lower-tax municipalities during period \( t \), so that \( z_t = z_{t-1} - x_t \). Individuals maximize utility along the lines set out above. Aggregating over all taxpayers in a given income bracket \( b \), and taking all other municipalities’ multipliers as given, one obtains the overall elasticity of reported income for each bracket: \( e = \frac{1 - s_b \tau_{jt}}{x_t} \cdot \frac{dz_t}{d(1 - s_b \tau_{jt})} \).

Now assume there are two municipalities \( m \) and \( l \), where \( \tau_{mt} > \tau_{lt} \). A part of the taxpayers residing in \( m \) may decide to take advantage of the lower tax rate in \( l \) and move to that municipality, taking their taxable income \( x_t \) with them. Those

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\(^6\)As in the present context the avoidance possibilities are independent of the location choice within the canton, I abstract from such responses. However, it would be possible to include the classical tax avoidance responses as presented by Piketty *et al.* (2014) into the model, but significantly increasing the complexity of the analysis.

\(^7\)I omit the indexes \( b \) and \( j \) for convenience of notation.
remaining have an elasticity of reported income of
\[ e_1 = \frac{(1 - sb\tau_{mt})}{z_{t-1}} \frac{dz_{t-1}}{d(1 - sb\tau_{mt})}. \] (6)

The part of taxable income lost to other municipalities \( x_t = x_t(\tau_{mt} - \tau_{lt}) \) is increasing in the tax rate difference \( \tau_{mt} - \tau_{lt} \). \( x(0) = 0 \) as there is no reason to move away for tax reasons if tax rates are identical. Hence, \( z_t = z_t(1 - sb\tau_{mt}, \tau_{lt}) = z_{t-1}(1 - sb\tau_{mt}) - x(\tau_{mt} - \tau_{lt}) \) is increasing in the net-of-tax rate \( (1 - sb\tau_{mt}) \) and the other municipality’s multiplier \( \tau_{lt} \). Following the lines of Piketty et al. (2014), the moving elasticity of the tax base with respect to taxation can be defined as \( e_2 = s \cdot e \), i.e., \( s \) denotes the fraction of the behavioral response of \( z_t \) to \( dsb\tau_{lt} \) due to individuals moving to lower-tax municipalities.

\[ s = \frac{dx/d(\tau_{mt} - \tau_{lt})}{dz_t/d(1 - \tau_{mt}) + dx/d(\tau_{mt} - \tau_{lt}) = \frac{dx/d(\tau_{mt} - \tau_{lt})}{\partial z_t/\partial(1 - \tau_{mt})},} \] (7)

and

\[ e_2 = s \cdot e = \frac{1 - \tau_{mt}}{z_t} \frac{dx}{d(\tau_{mt} - \tau_{lt})}. \] (8)

By construction \((1 - s)e = (z_{t-1}/z_t)e_1 \) or \( e = (z_{t-1}/z_t)e_1 + e_2 \). Starting from a situation with no loss of the tax base due to taxed-induced out-migration, \( z_t = z_{t-1} \), the total elasticity is the sum of the standard labor supply elasticity and the taxed-induced out-migration elasticity: \( e = e_1 + e_2 \).

4 Identification Strategy

To estimate the ETI, I use a panel difference-in-differences approach. Contrary to previous studies, where the control group usually is a different income group not affected by the tax change, I can exploit variation in the municipal tax multipliers within the canton for identification. This is an important improvement because if behavioral responses differ among income groups, comparing responses for different income groups leads to biased results. The major extension to the previous literature is that can I control for individuals moving between municipalities and see whether their ETI differs significantly from those who have stayed.

For the moving decisions, I apply a RUM, where the dependent variable is the location \( j \) chosen. I estimate the model using panel probit and logit methods.
The aggregate elasticity of a municipality’s tax base with respect to taxation is then again estimated using panel data methods.

4.1 Estimating the ETI with Panel Regressions

Baseline Specification

The panel approach laid out here follows Gruber and Saez (2002), who derive the following panel regression equation from a basic micro-economic framework similar to the one presented in Section 3.2 above, but including income effects. They use several years of data, which encompass several tax changes, and stack year-to-year differences in net-of-tax rates and incomes for each individual. These differences between \( t_1 \) and \( t_2 \) need not to be of period length one, but could as well be two, three, or more years long, depending on the assumption of how long it takes for households to respond to tax changes. Abstracting from income effects leads to the following baseline panel specification

\[
\log\left( \frac{z_{it_2}}{z_{it_1}} \right) = e \cdot \log\left[ \frac{(1 - s_b \tau_{t_2})}{(1 - s_b \tau_{t_1})} \right] + \nu_{it},
\]

where \( z_{it_1} \) and \( z_{it_2} \) is reported income in year \( t_1 \) and \( t_2 \), respectively, and \( e \) is the ETI. Note that OLS estimates of (9) are biased, as the term capturing the tax rate change is correlated with the error term \( \nu_{it} \). If there is a positive shock to income \( (\nu_{it} > 0) \), then, due to progressivity, the progressive tax rate part \( s_b \) increases mechanically. Gruber and Saez (2002) propose as a natural instrument the predicted log net-of-tax rate change if income does not change from year 1 to year 2, i.e., \( \log(1 - s_{b\,t_2}) \).

Such an IV-estimation is still susceptible to bias, due to mean reversion (because of transitory incomes) and exogenous changes in the income distribution, both phenomena resulting in a correlation between \( z_{it_1} \) and \( \nu_{it} \). The solution proposed by Auten and Carroll (1999) and adopted in Gruber and Saez (2002) is to include a large set of base year (i.e., \( t_1 \)) income controls. However, as Weber (2013) shows, base year incomes are still correlated with the error in a panel setting. She therefore suggests to use lagged base year income controls, \( z_{it_1-s} \). Having many

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8For an extensive discussion on consistent ETI estimates, circumventing the problems of mean reversion and exogenous income trends, see Weber (2013).
years of data, it is possible to add a rich set of such controls, as the effects from mean reversion and changes in the income distribution are probably not linear. Therefore, in addition to log income in period $t_1 - s$, a 10-piece spline in lagged log base year income (i.e., a spline for each decile of the gross income distribution in $t_1 - s$) is included (Gruber and Saez, 2002). Because the endogeneity of $z_{it}$ also affects the tax rate instrument, I use a lag of base year income to mitigate the bias from endogeneity (Weber, 2013).

I further include a vector of individual controls, $x_{it}$, containing the civil status, a dummy for children, and (for the married) whether it is a double-earner household. Time dummies $\lambda_t$ control for period effects. Including all these controls in equation (9), the econometric model reads as follows:

$$
\log \left( \frac{z_{it2}}{z_{it1}} \right) = \alpha_0 + e \cdot \log \left[ \frac{1 - s_{b_1,t_2} \tau_{t_2}}{1 - s_{b_1,t_1} \tau_{t_1}} \right] + x_{it} \beta + \alpha_1 \log(z_{it1-s}) + \sum_{k=1}^{10} \alpha_{2k} \text{SPLINE}_k(z_{it1-s}) + \lambda_t + w_{it} 
$$

(10)

This identification strategy relies on the assumption that mean reversion or changes in inequality are not correlated with year-specific tax changes, so that the relationship between $z_{it}$ and $v_{it}$ remains constant over time (see Gruber and Saez, 2002, p.12). Given that in the Swiss case there are two channels, $s_b$ and $\tau_j$, changing the net-of-tax rate, this assumption is likely to be satisfied.

In these baseline specifications I exclude those households who have moved, as otherwise changes in the multiplier are not exogenous. Individuals anticipating a large increase in future income may move to a low tax municipality, in which case the direction in the relationship between the two reverses. In an extension of this baseline model, I plan to include movers in the sample and run regression (10) including an interaction term for movers and stayers, respectively, with the net of tax rate change.

4.2 Estimating Mobility Responses with Discrete Choice Models

**Model Specification**

Specifying equation (1) as a log-function makes the different arguments additively separable. Household $i$ obtains the following utility from living in community
The individual specific error term $v_{jt}^i$ is the empirical counterpart of the individual specific preference parameters $\mu_{jt}^i$. The following factors are assumed to influence the preference for a location, and are therefore added to the above specification. Individual characteristics, $x_{it}^i$, including civil status, the number of kids, and whether it is a double-earner household. Moving costs are captured controlling for the commuting distance, $\delta_j^i$, between the home municipality and the municipality under consideration. This ensures that the utility associated with staying differs from the utility of moving, even in the case that all municipality characteristics are identical. To control for municipality specific unobserved heterogeneity, the municipality fixed effects $\gamma_j$ are included. Hence, the empirical utility function extends to:

$$U_{jt}^i = \alpha_1 \log(1 - s_b \tau_{jt}) + \alpha_2 \log(z_{it}^i) + x_{it}^i \beta + \delta_j^i + \gamma_j + v_{jt}^i$$

(12)

**Multinomial Logit**

In a first step and in line with the approaches taken by Schmidheiny (2006), Day and Winer (2006), and Kleven et al. (2013a), I estimate a multinomial logit model. The conditional logit assumes that the error terms $v_{jt}^i$ are i.i.d. and that irrelevant alternatives are independent. These assumptions are most probably violated in the present setting: unobserved factors related to one community are probably similar to those related to other communities with very similar conditions. Schmidheiny (2006) indeed reports such evidence for the Swiss case of location decisions at community level. The preferred specification in such a case is the more general nested logit model, where the vector of all location specific error terms follows the generalized value distribution (GEV, see Train, 2009, Ch. 4) and the cumulative distribution function of the vector of unobserved utility, $u^i = (u_{1jt}, \ldots, u_{Jjt})$, is given by:

$$F(u_{jt}^i) = e^{\left[ -\sum_k^{K} \left( \frac{\sum_{h \in C_k} e^{-u_{ht} / \lambda_k}}{\sum_{h \in C_k}} \right)^{\lambda_k} \right]}.$$
The marginal distribution for each $v^j_i$ is univariate extreme value, but within nests $C_k$ the unobserved portions of utility are correlated. The probability that household $i$ chooses location $j$ is:

$$P^i_{jt}(\theta) = \frac{e^{V_{ijt}/\lambda}}{\sum_{k=1}^{K} \left( \sum_{h \in C_k} e^{V_{ihlt}/\lambda_k} \right)^{\lambda_k}} \lambda_{l-1},$$

where $V_{ihlt}$ is the deterministic part of the utility obtained in municipality $h$. $\theta$ denotes the set of parameters to be estimated among alternatives. $\lambda_k$ captures the correlation within a nest, whereby $\lambda_k$ may differ among nests. As correlation of the errors within a nest increases, $\lambda_k$ decreases. In the case where $\lambda_k = 1$, there is no correlation within nest $k$, and if $\lambda_k = 1 \forall k$ the nested logit converges to the conditional logit model (Schmidheiny, 2006, pp. 443–444). In the empirical model, a nest of municipalities is defined as the next larger jurisdictional entity, the districts.

**Multinomial Panel Probit**

As the choice model applies to sequences of choices over time, the next step is to estimate a panel probit model. These models have the advantage that they allow any correlation pattern of the unobserved factors across alternatives and time, while panel logit models assume that errors are uncorrelated across time. The alternatives can change over time, for example if communities within a canton merge, and $J$ and $T$ may also differ for different households. This feature is needed, as in the data not all households are observed over the whole time span. The only assumption made with respect to the error structure is that unobserved factors are jointly normal over time and alternatives: $v^j_{it} = \langle v_{i11}, \ldots, v_{i1T}, v_{i21}, \ldots, v_{i2T}, \ldots, v_{iT1}, \ldots, v_{iTJ} \rangle \sim N(0, \Omega)$. The probit of the choice probabilities is the same as for situations with one choice per household $i$, but with a larger dimension, $JT$ instead of $J$, for the covariance matrix $\Omega$ (see Train, 2009, Ch. 5.5 for an overview of panel probit estimation).

---

9The normal distribution implies that some people have positive and some negative choice preferences for low tax communities. As log income approximately follows a normal distribution, this is a reasonable assumption.
This specification allows for the inclusion of individual fixed effects $\eta_i$ and exogenous variables for other time periods to capture dynamic aspects of behavior. Including future taxable income $z_{i,t+s}$ allows estimating the moving probability when particularly high or low incomes are of a transitory nature. The conjecture is that especially if large incomes are transitory rather than permanent, a tax change favoring the rich should lead to a lower moving probability than unconditional on future income.

4.3 Data

The main data source I use are the individual income tax returns from Switzerland for the period 1989 to 2008, provided by the Federal Tax Administration in Bern.\textsuperscript{10} These data contain the following household and community level variables: household and community IDs, occupation type (employee, self-employed, retiree, others), marital status (married, single parents, others), number of dependent children, double earner deductions, “gross” income (Reineinkommen,\textsuperscript{11}) federal taxable income and federal tax load. Note that as individuals report their income to cantonal tax authorities, changes in reported income must reflect in federal taxable income just as much as in cantonal taxable income.

Municipal tax multipliers are kindly provided by Raphaël Parchet (Parchet, 2012). Cantonal tax schedules can be found online for recent years, the laws for older years are available from the cantonal tax administrations upon request. The commuting distances are obtained from Beatrix Eugster (Eugster and Parchet, 2013). All incomes are expressed in 2000s Swiss Francs to take into account inflation, using the Swiss CPI (Landesindex der Konsumentenpreise, LIK).

Sample Selection

The individual tax data allow for the identification of tax units over time through a personal identifier. As the personal identification is done at the cantonal level, it is only possible to follow tax units as long as they reside within the same canton, limiting the analysis to the cantonal level.

\textsuperscript{10}These data are made accessible within the SNSF Sinergia Project No. 130648 “The Swiss Confederation: A Natural Laboratory for Research on Fiscal and Political Decentralization”.

\textsuperscript{11}This comes close to an encompassing gross income definition including labor and capital incomes.
However, as taxable income and the progressiveness of the tax structure are constant within a canton for a given year (often even over several years), it is easy to compare average and marginal tax rates across different municipalities, even if income changes. This is important as agents first need to understand the tax code in order to respond to it (see for example Chetty and Saez, 2013, on the Earned Income Tax Credit in the U.S.). Across cantons the marginal and average tax rates for any given income differ and so do the cantonal taxable income definitions, due to differing deductions.

Additionally, most cantons have changed their identification system during the period individual tax data is available; most of them in the tax period 1989/90. Therefore, even though data from 1971 onward is available, only those years after the change are used for the empirical analysis. Another important change in the Swiss tax system was the one from the biennial praenumerando taxation to the annual postnumerando taxation. Under the former system, a tax period was two years long, while under the new it is only one year long. The change happened at different points in time for different cantons, although most of them switched after the period 1999/2000, with periods corresponding to actual calendar years from 2001 onward. For the estimates of the ETI to be consistent, I limit the regression analysis to the annual periods, rather than mixing biennial and annual tax periods.

In line with the literature (Auten and Carroll, 1999; Gruber and Saez, 2002, and subsequent studies), also low-income households are excluded from the analysis. For each year, I exclude those individuals with a real taxable income below CHF 10,000. At the top, those with real taxable incomes above 5 million Swiss Francs are excluded. Excluding the lowest incomes and some of the largest helps improving the mean reversion problem addressed in Section 4.1. Furthermore, only the so-called normal cases are considered, i.e., those taxed according to the regular tax scheme; tax units getting some special tax deal (Pauschalbesteuerte) are excluded. In the baseline specification I further exclude the retirees, the unemployed and single parents, and include a dummy for self-employed.

---

12 In some specifications I instead restrict the sample to those above the bottom decile of the real taxable income distribution. This does not affect the results.

13 This is another peculiarity of the Swiss tax systems: cantons are allowed to tax high net-worth foreigners according to their expenditures, as long as they are not earning any labor income in Switzerland.
Descriptive Statistics

As a pretest to a larger analysis including more cantons, I first run the estimations focusing on the canton of Zurich. This is a large and important Swiss canton, exhibiting features such as rural and urban differences, some mountain areas, and a large city. Figure 2 presents the variation in tax multipliers over time for this canton.

![Figure 2: Variation in tax municipality multipliers in the canton of Zurich](image)

*Data source: Parchet (2012).*

The figure clearly indicates a falling trend in municipal tax multipliers since the 1970ies. Besides changes in the tax multipliers, also the cantonal tax laws were adjusted several times in the observed periods. In Zurich only the brackets were changed, in order to adjust for inflation; the corresponding marginal tax rates have remained constant. These small adjustments in brackets happened in 1991, 1993, 1997, 1999, 2006 and 2012. Figure 3 shows the tax schedule of the simple tax and the changes thereof for married couples and singles in terms of real taxable income.
Table 1 presents the descriptives statistics of the sample used for the ETI estimates in the next section.

### Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real taxable income</td>
<td>76149</td>
<td>90739</td>
<td>10000</td>
<td>498685</td>
<td>2,825,827</td>
</tr>
<tr>
<td>Real gross income</td>
<td>83658</td>
<td>92698</td>
<td>10000</td>
<td>501287</td>
<td>2,825,827</td>
</tr>
<tr>
<td>ln Δ(taxable income)</td>
<td>0.096</td>
<td>0.409</td>
<td>-5.213</td>
<td>5.409</td>
<td>2,181,578</td>
</tr>
<tr>
<td>ln Δ(gross income)</td>
<td>0.092</td>
<td>0.369</td>
<td>-5.107</td>
<td>5.152</td>
<td>2,181,578</td>
</tr>
<tr>
<td>ln Δ(1 − τ)</td>
<td>-0.044</td>
<td>0.081</td>
<td>-1.443</td>
<td>1.186</td>
<td>2,120,352</td>
</tr>
<tr>
<td>Marrieds</td>
<td>0.463</td>
<td>0.499</td>
<td>0.000</td>
<td>1.000</td>
<td>2,825,827</td>
</tr>
<tr>
<td>Dummy for children</td>
<td>0.167</td>
<td>0.373</td>
<td>0.000</td>
<td>1.000</td>
<td>2,563,618</td>
</tr>
<tr>
<td>Employees</td>
<td>0.894</td>
<td>0.307</td>
<td>0.000</td>
<td>1.000</td>
<td>2,825,811</td>
</tr>
<tr>
<td>Self employed</td>
<td>0.106</td>
<td>0.307</td>
<td>0.000</td>
<td>1.000</td>
<td>2,825,811</td>
</tr>
<tr>
<td>Panel length</td>
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<td>2.994</td>
<td>1.000</td>
<td>10.000</td>
<td>2,825,827</td>
</tr>
<tr>
<td>Years</td>
<td>1999-2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of municipalities</td>
<td>261</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Real income values are in CHF of 2000. These summary statistics are for years 1999-2008 and match the restrictions imposed by the baseline estimates in Table 2. The difference length of all variables measuring changes is 2 years.

### 5 First Results

The results of the regressions estimating the ETI in the canton of Zurich are presented in Table 2. Each specification is estimated twice, once with the change.
in logged taxable income as dependent variable, and once with the change in
logged gross income. This allows testing whether indeed taxable income reacts
more strongly to taxation than gross income as suggested by the theoretical and
empirical literature.

In order to assess the importance of mean reversion and changes in the income
distribution, I first estimate the elasticity without any further controls and then
proceed by adding lagged base-year income controls. The second specification
includes year and municipality fixed effects. The third specification further adds
socioeconomic controls. The fourth specification adds logged lagged base-year
income as a control, and the fifth further adds logged lagged base-year income
splines for each income decile.

The results are all highly significant, suggesting that individuals react to tax-
ation. Also, all estimates indicate that gross income reacts less strongly than
taxable income, as proposed by the theory, even though the difference in the esti-
mates is not always statistically significant. While the socioeconomic controls do
not alter the estimates a lot, once lagged base-year income controls are added, the
estimates drop considerably. This is in line with the theory and the literature, un-
derlining the importance to control for mean reversion and changes in the income
distribution over time.

However, all estimates are negative, implying that an increase in the net-of-tax
rate, i.e., a decrease in marginal tax rates, triggers a decrease of taxable and gross
incomes. The negative estimates remain even using different sampling restrictions,
such as using different years, including retirees and single parents or when running
them for different income groups. This indicates that there is reversed causality
which the model does not control for. Especially, if the municipalities lower their
tax rates because they see incomes rising, the model will capture this part of the
relationship between taxes and reported incomes. Interestingly, the estimates in
specification (2), where only year dummies and municipality dummies are included
as controls, are even larger in absolute terms than without any controls. With
some minor exceptions, the dummies for the municipalities are all not statistically
significant.
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln ∆(1 − τ)</td>
<td>-0.936**</td>
<td>-0.813**</td>
<td>-1.327**</td>
<td>-1.163**</td>
<td>-0.977**</td>
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<tr>
<td></td>
<td>(0.0285)</td>
<td>(0.0251)</td>
<td>(0.0480)</td>
<td>(0.0423)</td>
<td>(0.0363)</td>
</tr>
<tr>
<td>ln z_{t-1}</td>
<td>-5.24e-05**</td>
<td>-4.62e-05**</td>
<td>-0.00213**</td>
<td>-0.00190**</td>
<td>-0.00123**</td>
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<tr>
<td></td>
<td>(1.68e-06)</td>
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<td>(3.77e-05)</td>
<td>(3.32e-05)</td>
<td>(3.04e-05)</td>
</tr>
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<td>Spline 2nd decile control</td>
<td>0.00166**</td>
<td>0.00151**</td>
<td>0.00167**</td>
<td>0.00148**</td>
<td>0.00188**</td>
</tr>
<tr>
<td></td>
<td>(5.02e-05)</td>
<td>(4.44e-05)</td>
<td>(4.11e-05)</td>
<td>(3.63e-05)</td>
<td>(3.32e-05)</td>
</tr>
<tr>
<td>Spline 3rd decile control</td>
<td>0.00189**</td>
<td>0.00178**</td>
<td>0.00199**</td>
<td>0.00178**</td>
<td>0.00206**</td>
</tr>
<tr>
<td></td>
<td>(4.53e-05)</td>
<td>(4.00e-05)</td>
<td>(4.48e-05)</td>
<td>(3.95e-05)</td>
<td>(3.86e-05)</td>
</tr>
<tr>
<td>Spline 4th decile control</td>
<td>0.00209**</td>
<td>0.00185**</td>
<td>0.00205**</td>
<td>0.00184**</td>
<td>0.00207**</td>
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<td></td>
<td>(4.13e-05)</td>
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<td>(3.95e-05)</td>
<td>(3.36e-05)</td>
</tr>
<tr>
<td>Spline 5th decile control</td>
<td>0.00211**</td>
<td>0.00195**</td>
<td>0.00211**</td>
<td>0.00189**</td>
<td>0.00212**</td>
</tr>
<tr>
<td></td>
<td>(4.38e-05)</td>
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<td>(3.06e-05)</td>
</tr>
<tr>
<td>Spline 10th decile control</td>
<td>0.00160**</td>
<td>0.00145**</td>
<td>0.00155**</td>
<td>0.00140**</td>
<td>0.00155**</td>
</tr>
<tr>
<td></td>
<td>(4.07e-05)</td>
<td>(3.01e-05)</td>
<td>(4.07e-05)</td>
<td>(3.01e-05)</td>
<td>(2.74e-05)</td>
</tr>
</tbody>
</table>

Estimates from 2SLS regressions. Income range is CHF 10,000-5,000,000. Robust standard errors in parentheses; ** p<0.01, * p<0.05.

The difference length of all variables measuring changes is 2 years.
The negative coefficients, implying some sort of reversed causality, suggest that cantons and municipalities adjust their tax rates as a reaction to changes in the income distribution. This reversed causality is addressed by using the first lag of the tax rate instrument running a GMM IV regression. Table 3 below reports the results of these estimations for specifications without any controls (1), adding period and municipality dummies (2), adding logged lagged base-year income (3), and adding a ten-piece income spline (4).

The first specification without any income controls again leads to negative results. Assuming that there is mean reversion and that there are changes in the income distribution, this is as expected. Once controls are added, however, the estimates change sign and become positive. Already adding the period and municipality dummies leads to this result. By adding controls for lagged logged base-year income, the magnitude of the estimates diminishes slightly. Again the estimates are smaller for gross income than for taxable income, yet the difference is smaller in the GMM specifications than in the regressions presented in Table 2.

Compared other empirical studies, estimates are are rather low, suggesting that individuals in Switzerland do not react as much to taxation as they do in the U.S., for example. This may be due to three reasons. First, taxes are overall rather low in Switzerland, therefore reactions to changes are probably also smaller than in countries with a higher tax burden. Second, the tax changes that took place in Zurich over the analyzed period have been small and they affected all income groups. Previous research indicates that reactions to changes in reported income are smaller around small changes in the tax rate compared to large changes of the latter. Third, the sample used for estimation excludes those individuals who have changed the municipality. As in the Swiss setting individuals may react not only by adjusting their taxable income, but also by moving to another municipality, the taxable income elasticity estimated here can be seen as a lower bound. Extending the baseline model, I intend to extend the sample to those who have moved and include an interaction term of the elasticity with a moving dummy, to see how the elasticity is different for those individuals who are especially mobile.
Table 3: Income elasticity estimates using lagged net-of-tax rate instrument

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Taxable</td>
<td>Gross</td>
<td>Taxable</td>
<td>Gross</td>
</tr>
<tr>
<td>1st lag of $ln\Delta(1-\tau)$</td>
<td>-0.334**</td>
<td>-0.260**</td>
<td>0.292**</td>
<td>0.262**</td>
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<tr>
<td></td>
<td>(0.0196)</td>
<td>(0.0172)</td>
<td>(0.00153)</td>
<td>(0.00140)</td>
</tr>
<tr>
<td>$lnz_{t-1}$</td>
<td>-2.30e-05**</td>
<td>-2.06e-05**</td>
<td>0.292**</td>
<td>0.262**</td>
</tr>
<tr>
<td></td>
<td>(8.96e-07)</td>
<td>(8.37e-07)</td>
<td>(8.96e-07)</td>
<td>(8.37e-07)</td>
</tr>
<tr>
<td>Spline 2nd decile control</td>
<td>0.000418**</td>
<td>0.000455**</td>
<td>0.000419**</td>
<td>0.000455**</td>
</tr>
<tr>
<td></td>
<td>(3.64e-05)</td>
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<td>(3.20e-05)</td>
<td>(2.91e-05)</td>
</tr>
<tr>
<td>Spline 3rd decile control</td>
<td>0.000365**</td>
<td>0.000377**</td>
<td>0.000419**</td>
<td>0.000434**</td>
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<tr>
<td></td>
<td>(2.83e-05)</td>
<td>(2.58e-05)</td>
<td>(2.91e-05)</td>
<td>(2.19e-05)</td>
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<tr>
<td>Spline 4th decile control</td>
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<td>0.000532**</td>
<td>0.000522**</td>
<td>0.000532**</td>
</tr>
<tr>
<td></td>
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<td>(2.72e-05)</td>
<td>(2.98e-05)</td>
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<td></td>
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<td>(2.58e-05)</td>
<td>(2.83e-05)</td>
<td>(2.58e-05)</td>
</tr>
<tr>
<td>Spline 6th decile control</td>
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<tr>
<td>Spline 7th decile control</td>
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<td>Spline 8th decile control</td>
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<td>(2.10e-05)</td>
<td>(1.93e-05)</td>
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<td>Spline 10th decile control</td>
<td>0.0745**</td>
<td>0.0705**</td>
<td>0.102**</td>
<td>0.123**</td>
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<tr>
<td>Constant</td>
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<td>(0.000442)</td>
<td>(0.00931)</td>
<td>(0.00849)</td>
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<td>Dummy for marrieds</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dummy for double earners</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<td>Dummy for children</td>
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</tr>
<tr>
<td>Dummy for self employed</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Year dummies</td>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
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Estimates from GMM regressions. Income range is CHF 10,000-5,000,000. Robust standard errors in parentheses; ** p<0.01, * p<0.05.
The difference length of all variables measuring changes is 2 years.
6 Conclusion and Outlook

In this paper I have addressed behavioral responses to taxes at two different margins. In a setting with pronounced local tax competition, individuals can react to taxation by adjusting their taxable income as well as by moving to another municipality. The theoretical model laid out in Section 3 conceptualizes these possibilities in a utility maximization framework which is tailored to the Swiss tax system. The peculiarities of the Swiss tax structure with a cantonal tax scheme combined with local tax competition allow to separate the progressive tax structure from the location decision, which only shifts the level. The estimates of the reported income elasticities in the canton of Zurich show that individuals do respond to taxation, and the responses in taxable income are stronger than those in gross income. As the first set of results further indicates, there is potential reversed causality, which can be explained by the large autonomy in setting taxes and expenditures at both, the cantonal and municipal levels. Using the first lag of the change in individuals' net-of-tax rate alleviates this issue and the obtained estimates are of reasonable magnitude along different model specifications. With estimates between 0.24 and 0.29 the ETI for Switzerland (more specifically: for the canton of Zurich) is lower than what has been estimated for other countries. This is possibly due to the possibility of reacting to taxes not only by adjusting real and reported incomes, but also by moving to municipalities with lower taxes. Those individuals reacting most to taxes are therefore probably not covered by the presented estimates, as moving individuals are excluded from the analysis.

These considerations highlight the importance of estimating mobility responses to taxation in order to get a better and more complete understanding of behavioral responses to taxation. Based on the theoretical model presented in Section 3, I will estimate mobility responses in the Swiss setting and combine them with the ETI estimates in future research.
References


http://www.estv.admin.ch/dokumentation/00075/00805/index.html?lang=de&download=NHzLpZeg7t,1np61ONTU04212Z61n1acy4Zn4Z2q2pn02Yuq2Z6gpJCDqR7e2ym162epYbg2c_JjKbNoKSn6A--.


