Decentralization and progressive taxation

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Abstract

While an important strand of the literature argues that decentralization might enhance allocative efficiency, standard theory of fiscal federalism also suggests negative redistributive effects. For this reason, centralized redistribution is proposed. The assignment of these two public sector functions, i.e. resource allocation at the local level and income redistribution at the upper level of government, is thus well established. Based on the joint direct taxation system in force in Switzerland – the separation of the decision to set the rate of progression at the cantonal level from the decision to set the 'level' of taxation at the municipal level – we investigate the influence of varying degrees of decentralization on the general 'level' as well as the degree of redistribution in the cantonal income tax schedules. Our empirical results indicate that more decentralized jurisdictions feature generally lower income taxes and impose higher rates of progression.

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1 Introduction

We analyze the effect of decentralization on local tax schemes in a setting in which upper-level jurisdictions decide on a redistributive income tax schedule and lower-level jurisdictions decide on a tax shifter to generate tax revenue to finance local public goods. We want to investigate the consequences of tax competition at the lower level on the design of the income tax schedule. Such a division of competences is the case in Switzerland, where the cantons (comparable to US states) decide on the income tax schedule and the local municipalities decide on a tax shifter. Both government levels rely heavily on this income tax to finance public expenditures. We investigate empirically the consequences of cantonal decentralization (and the induced tax competition between municipalities) on the level and progressivity of the income tax schedule. Hence, we want to investigate two dimensions: first, the effect of decentralization on the level of taxation and, second, the influence of decentralization on the redistributive component of the income tax schedule.

On the one hand, Oates (1972) discusses the role of decentralization to achieve a more efficient allocation of public funds. In his famous decentralization theorem he argues, that if there are neither cost-saving effects from the centralized provision of a local public good nor spillovers "[…] the level of welfare will always be at least as high (and typically higher) if Pareto-efficient levels of consumption are provided in each jurisdiction than if any single, uniform level of consumption is maintained across all jurisdictions" (Oates 1972, p. 54). He argues that in a decentralized system the political outcome is closer to the preferences of the citizens because local politicians have a better knowledge of local preferences[1]. Moreover, from a politico-economic perspective Brennan and Buchanan (1977, 1980) emphasize the government in the role of a revenue maximizing monopoly (Leviathan) where only the federal level possesses the power to tax. In such a situation it is more difficult to tame Leviathan than in a situation in which the power to tax is decentralized to various levels of government. If state and local governments levy their own taxes people may migrate to jurisdictions with a lower tax burden. This tax competition, enhanced by the mobility of taxpayers, as well as their ability to compare the functioning of their own jurisdiction with the neighboring ones ("yardstick competition", Besley and Case, 1995), tends to restrict the discretionary power of the governments and thus, should allow gains in terms of productive efficiency.

[1] From this perspective the gains from decentralization should be greatest in areas with more heterogeneous preferences and thus, we could expect to observe more decentralized policy making in such areas. Strumpf and Oberholzer-Gee (2002) test this assumption for the case of liquor control policies at the U.S. state and county level and confirm that more heterogeneous preferences lead to more decentralized decision-making.

Existing empirical evidence from cross-country investigations (e.g. Jin and Zou, 2002; Rodden, 2003) as well as from the U.S. (e.g. Shadbegian, 1999) and the Swiss case (e.g. Kirchgässner, 2002; Feld, Kirchgässner and Schaltegger 2010) tend to suggest smaller and more efficient governments.

On the other hand, a strand of the theoretical literature suggests that, with increasing tax competition and sufficient mobility of the taxpayers, decentralized redistribution policies leads to an underprovision of public goods and inefficiently low redistribution (e.g. Oates, 1972; Zodrow and Mieszkowski, 1986; Brown and Oates, 1987; Sinn, 1990 and Wildasin, 1991)[2]. As a consequence, redistributive policies should be centralized. As Musgrave (1971: 7) puts it: "Progressive income taxation at the upper as well as transfers at the lower end of the [income] scale – if substantial in scope – must be uniform within the entire area over which there is a high degree of capital and labor mobility, which means they have to be a function of the national government."

The empirical evidence on the distributional effects of fiscal decentralization is scarce. Brueckner (2000) surveys the empirical literature on US decentralized *welfare spending*. Some studies find patterns that indicate that indeed some welfare migration is to be observed, although, the effects are mostly rather small. He concludes that the empirical evidence is mixed and "[…] at best mildly positive in favor of the hypothesis of welfare migration" (Brueckner, 2000: 519). In line with US findings, the evidence for Switzerland – besides the US, another highly decentralized country – is also not convincingly in favor of the theoretical arguments. Feld (2000) and Feld and Kirchgässner (2001a) only find small or insignificant effects of social transfer payments on migration decisions.

Another instrument to redistribute income is *progressive income taxation*. However, there are not many countries which feature decentralized progressive income taxes. The US states have some limited possibilities to levy progressive income taxes but rely heavily on sales and property taxes. The case in Switzerland is more pronounced. As further developed in Section 2, the sub-federal jurisdictions (cantons and municipalities) levy their own progressive income taxes and the empirical evidence does not suggest strong negative effects as expected by the theoretical literature (e.g. Kirchgaessner and Pommerehne, 1996; Feld, 2000; and Feld and Kirchgaessner, 2001a).

We contribute to the understanding of the influence of decentralization on decentralized income taxation by analyzing income taxation at the municipality level in Swiss cantons where

[2] One of the key aspects in these models is the degree of factor mobility. Different models take various possibilities of factor mobility into account.

municipalities enjoy varying degrees of autonomy in local decision making. In the Swiss system, where upper-level jurisdictions define a tax schedule (and hence set the rate of progression) and the municipalities levy a tax surcharge (tax shifter), we find that more decentralized areas levy lower personal income tax rates and tend to adopt *more* progressive income tax schedules. Given the theoretical results this finding is somewhat surprising.

The next section provides a brief overview the Swiss federal structure and shows in greater details the system of decentralized income taxation in force in Switzerland. Turning to the core of our study, Section 3 presents our empirical analysis. After a short description of the data that have been used, we explain our empirical strategy and review the obtained estimation results. Before adding some concluding remarks (Section 5), Section 4 discusses the possible interpretations of our empirical results.

2 The Swiss context: fiscal decentralization and institutional architecture

As it is the case in the US, Switzerland is a federal state with a highly decentralized political structure which consists of three hierarchical government layers: the federal government (Confederation), the cantons and the communes (municipalities). The country counts 26 cantons (the equivalent of US states) and 2408 local municipalities (status as at 1st January 2013). Both regional and local jurisdictions enjoy a high degree of autonomy and take a wide range of political decisions independently. Therefore, the institutional design differs strongly not only across the municipalities but also across the 26 cantons. Moreover, Swiss citizens generally enjoy an important degree of political participation rights via instruments of direct democracy such as voter initiatives and different forms of referenda. Given the federal structure, the modalities of exercise of these participation rights differ across cantons and municipalities (for details see e.g. Stutzer, 1999; Frey and Stutzer, 2000, 2001; Feld and Matsusaka, 2003). In addition, municipalities in different cantons enjoy varying degrees of local autonomy (for details see e.g. Ladner, 1994). These and other institutional features make the Swiss case especially interesting for empirical research[3].

Looking at the relative weight of each layer of government in terms of public sector revenues, we observe that the Confederation accounts for 33 percent, the cantons for 43 percent and the municipalities for 24 percent of the total revenues of the public sector (without social security funds). The share of expenditures respects the same order of magnitude [figures of 2010]. About 50 percent of the federal incomes come from consumption taxes (mostly the value added tax).

[3] For an overview of Swiss institutions see the detailed study by Trechsel and Serduelt (1999).

Revenues of direct taxes (on natural persons, as well as on legal entities) are divided among the three layers but represent the most important source of revenue for the cantonal and local levels (more than 40 percent for the cantons, more than 50 percent for the municipalities).

On the expenditure side much of the social insurance are centralized at the federal level. For instance, retirement provisions are mostly centralized. The system contains a pay-as-you-go part (the so-called AHV/IV) and two parts of private saving systems, whereas one of them is a mandatory fully-funded pension system. Social assistance however is mostly administrated at the cantonal and local level[4]. On the revenue side the cantons decide autonomously on their tax scheme – they set their own progression rate as well as their "level" of cantonal income tax – whereas the municipalities can only levy a surcharge (tax shifter) on the cantonal income taxes. Formally, the general tax setting can be written as:

$$T = \sum_{i=1}^{n} t_i \cdot \left[B - \left(D_1 + D_2 + ... + D_n\right)\right] \cdot \left(K_{canton} + K_{commune}\right)$$

where T is the revenue from the direct tax, t the tax rate and its index i the different income classes, B the gross tax base, D the several deductions allowed to obtain the net tax base, and K the annual coefficients of each level of government expressed in proportion of the tax rate. More than the formula itself, the distribution between the three layers of government of the competence to modify one or another parameter is interesting. As introduced previously, in Switzerland, tax sovereignty is mainly in the hands of the cantons. Individually, the cantons indeed define the amounts of deductions tolerated, their own coefficient, and the tax rate, which contains the rate of progression. In contrast, the municipalities set only their coefficient, which corresponds thus to a proportion of the tax rate chosen by the upper level. The federal level only sets the list of possible deductions. Consequently to this joint taxation, the total income tax burden varies considerably across the cantons[5].

In such a system, the municipalities take the rate of progression as given and compete with other municipalities over the 'level' of taxation with their tax shifters. This separation of decision-making power prevents the municipalities under tax competition from simply adjusting the rate of progression to attract (or keep away) a specific part of the tax base. In this setting the decision to set the rate of progression is 'centralized' at some higher-level jurisdiction, while decentralized decision-making and competition is preserved over the 'levels' of taxation at the lower government levels.

[4] For a brief but more detailed discussion of the Swiss tax and social system see e.g. Feld (2000).

[5] As an illustration, the weighted global index of the income tax burden in 2006 for the canton of Zug was 50.0, whereas the canton of Uri struggled with a value of 147.2 (Swiss Federal Tax Administration, 2007: 61).

As the cantons – and not the federal government – decide over the rate of progression the redistributive decision is not perfectly centralized. In the presence of mobile households (across cantonal boundaries), we might expect the tax schedules to be rather flat. However, if we take a brief look at the average tax schedule introduced by the cantons, we clearly observe progressive patterns (Appendix, Graph A1 & A2). This could be mostly due to a more limited amount of migration between the cantons. Feld (2000: 152) finds that "[…] migration between the Swiss cantons does not appear to be considerable […]". Mobility costs between cantons are higher because of increasing moving costs (in the form of transport, housing and information costs) due to greater distances. Moreover, several restrictions on inter-cantonal mobility are imposed because of cantonal regulation for the self-employed (Feld 2000: 148) and other differences such as different schooling systems etc. Cantonal fiscal competition does not seem to be strong enough to undermine progressive income taxation. At the local level though, migration costs are much smaller and tax competition is much more intense as compared to the cantonal level. Feld (2000) reports higher degrees of tax competition at the communal relative to the cantonal level and Schmidheiny (2004) finds a high degree of tax-induced mobility at the municipal level in the metropolitan area of Basel.

As the municipalities compete over the 'level' of taxation with their specific tax shifters, we might worry that this sort of tax competition induces income sorting. The assumption is that if tax rates are very progressive, the tax burden is, relatively to the income, more important for the rich than for the poor (this is a similar mechanism that works for housing decisions for the poor). This mechanism induces an asymmetric reaction to taxation of rich and poor households and could still lead to segregation. In turn, that could undermine the *de facto* progressivity of the tax schedule. Hodler and Schmidheiny (2005) show indeed, in a multi-community model with heterogeneous tastes, that such income sorting can *de facto* lead to lower progressivity. They calibrate their model to the metropolitan area of Zurich where the households are highly mobile (at least 30 percent of a municipality's population commutes every day to the center municipality of Zurich). Even though the model predicts a fair amount of income sorting and the empirical evidence suggests some lower *de facto* rates of progression, the tax schedule still remains fairly progressive. Note that the mobility of the households in the studied area is rather high and we should on average expect the effect to be lower.

In the following empirical part we analyze the effects of cantonal decentralization on both the *level* of income taxation and its degree of *redistribution* as a function of decentralization. In line with the theory of fiscal federalism, we expect to find generally lower tax rates in more decentralized areas. Since empirical evidence on this issue already exists for the Swiss case, our

contribution consists in replicating some of these results with a dataset at the municipal level. In a second step, we analyze the influence of decentralization on the progressiveness of personal income taxes.

3 Empirical analysis

3.1 The data

Tax rates

As a consequence of the extensive decentralization in Switzerland, financial data at the local level are not easily available and often not comparable across cantons. The problem is even more serious for smaller municipalities, which form an important part of our sample. Our empirical analysis focuses on a new dataset from the Swiss Federal Tax Administration. It provides data on the personal income tax rates for all Swiss municipalities for the period 2010-2012. For the period 1983-2009, the dataset contains only the tax rates of a sample of municipalities (between 646 and 813 municipalities), which however represents more than 75% of the total population. These tax rates include the taxes of the canton, the municipality, and the local official church communities (which have the power to tax) on a natural person's annual income. Our dataset contains 14 income brackets between CHF 20'000 and 1'000'000 and 4 household types: 'single, employed wage earner', 'married, sole wage earner' and 'married, sole wage earner with two children', 'retired'[6]. Because the division of duties and responsibilities between the canton and its municipalities are not similar in all cantons, and because there exists a systematic substitution effect among cantonal and municipal spending and taxation (see Eichenberger, 1994), we have to analyze the total of cantonal and municipal taxes.

Fiscal decentralization

To describe the degree of fiscal decentralization in a specific canton, we use the standard expenditure decentralization ratio. On the basis of the Swiss national accounts published by the Federal Finance Administration[7], we calculate the ratio of the annual municipal expenditures in each canton on the municipal and cantonal expenditures together in the same period $\left(\frac{municipal\ expenditures}{municipal+cantonal\ expenditures}\right)$. We obtain an annual measure of decentralization for each canton. A score of 1 indicates a high degree of decentralization, whereas 0 means 'no

[6] The Appendix contains graphic presentations (Graph A1 & A2) of the mean income tax rate per income class and household type.

[7] In 2008, the FFA introduced a new accounting model in line with the international standards. In order to avoid a major discontinuity in the statistical series, the data for the period 1990-2007 have been reviewed and published according to the new standards. We use these new time series (1990-2011), which are methodologically stable and consistent.

decentralization'. Aware of the shortcomings that this measure may contain – for instance, the absence of distinction between the local expenditures imposed to the municipalities by the upper jurisdiction and the expenditures over which municipalities enjoy discretion – like many authors, we nonetheless consider it as a good proxy of the municipal fiscal power.[8] In general, we expect to observe lower average income tax rates in more decentralized cantons.

Control variables

From a political economic perspective, political and institutional features must be considered. We include a dummy variable that takes one for cantons that feature a mandatory budget referendum. The measure can be qualified as the standard direct democracy measure when fiscal policy is concerned (e.g., Feld and Kirchgässner 2001b; Feld and Matsusaka 2003; Funk and Gathmann 2011). Since most institutions remain fairly constant over time our fixed effects approach already absorbs much of institutional differences across cantons. It is important to note that we observe only five changes to the mandatory budget referendum in the period considered[9]. In order control for specific community characteristics, we include a set of standard controls. Firstly, we include the average net income at the municipal level, as well as its respective Gini coefficient. Secondly, because data regarding the local population size is not available for each period in each municipality, we include instead the number of taxpayers. Table A1 in the Appendix presents summary statistics and information on the data sources.

3.2 Empirical strategy

To evaluate the influence of decentralization on cantonal and municipal tax rates, we firstly estimate the influence of fiscal decentralization on the average level of taxation and, secondly on each income class separately. We estimate the following empirical models:

(a) $Tax_{mct} = \beta_1 Decentralization_{ct} + \beta_2 Institutions_{ct} + \beta_3 Controls_{mct} + \theta_m + \tau_t + \varepsilon_{mct}$

where Tax_{mct} is the average tax rate of all income classes between CHF 40'000 and 200'000 annual income[10] in municipality *m*, canton *c* in year *t*. $Decentralization_{ct}$ is our main variable of interest and $Institutions_{ct}$ is the institutional variable. We control for specific municipality characteristics with a matrix $Controls_{mct}$. The β's are parameters or parameter vectors, θ_m and τ_t are municipal and time fixed effects and ε_{mct} is the error term.

(b) $Tax^{ij}_{mct} = \beta_1 Decentralization_{ct} + \beta_2 Institutions_{ct} + \beta_3 Controls_{mct} + \theta_m + \tau_t + \varepsilon_{mct}$
for i = 1,…, 12 and j = 1,…, 4

[8] For a discussion of the different measures of local fiscal autonomy, see Blöchliger and King (2006).
[9] These cantons are: Berne, Neuchâtel, Obwalden, Valais and Zurich.
[10] We also run the same regression with the average tax of income classes between CHF 20'000 and 1'000'000.

where *i* represents one of the 12 income classes (between CHF 40'000 and 1'000'000) and *j* represents the four different household types (single, married, married two kids, retired). All other variables remain the same. This setting allows us to identify the effect of fiscal decentralization on each income class and household type.

In equation 1 and 2 of Table 1, we simply estimate the effect of decentralization, measured with the above-mentioned ratio, on the average of municipal and cantonal tax rates. In column 1, we just consider the income classes between CHF 40'000 and 200'000 annual personal income because the distribution of incomes is not the same for all municipalities and we lack the relevant information. Hence, very low and very high income classes might not have the same mass of tax payers in each municipality. Unfortunately, data on the municipal income distribution is not available. In column 2, we take the average tax rate of all income classes between CHF 20'000 and 1'000'000 annual income. The lack of information on the municipal income distribution has direct consequences for the average tax measure. Because public authorities define much smaller income brackets for lower incomes we observe many more tax rates up to e.g., CHF 100'000 annual income than for incomes larger than that threshold. Hence, in our average tax measure information on tax rates for lower incomes are strongly overrepresented. To reduce that problem we mainly look at the centered average tax rate between CHF 40'000 and 200'000 annual income. This reduces but does not at all eliminate that problem. The sample contains all officially available information for 646 municipalities in 1990 and up to 2575 municipalities in 2010. We always control for the number of taxpayers, the average municipal income, the income gini, as well as for the availability of a mandatory budget referendum. Moreover, we always include municipal and year fixed effects. We correct the standard errors for clustering at the municipality level.

3.3 Empirical results

Fiscal decentralization and general income taxation

First, we explore if various degrees of decentralization affect the general level of personal income taxes. Following the arguments by Oates (1972) and Brennan and Buchanan (1977, 1980) as well as the result of existing empirical research for Switzerland (e.g., Feld, Kirchgässner and Schaltegger, 2010; Schelker and Eichenberger, 2010), we expect a negative correlation between decentralization and tax rates. Previous studies investigate mostly cantonal data and find negative effects of higher degrees of decentralization on tax revenues and other fiscal variables (e.g. Feld, Kirchgässner and Schaltegger, 2010). Schelker and Eichenberger (2010) find a negative effect of local autonomy on municipal tax rates in a cross section of municipalities in 1999. We replicate

the results with respect to taxes with this new panel dataset at the municipal level. The following Table 1 presents the regression results.

[Table 1 about here]

Our estimates presented in Table 1 are in line with the expected theoretical effects and with general empirical findings for Switzerland (e.g. Feld, Kirchgässner and Schaltegger, 2010; Schelker and Eichenberger, 2010). Decentralization exerts a negative and significant influence on the tax rates. A one percent increase in decentralization reduces tax rates by about 0.05 percent in both specifications.

We find negative coefficients for the number of taxpayers and for the availability of a mandatory budget referendum, while there is no statistically significant effect of the income distribution measured by the municipal income gini on average tax rates. The effect of the budget referendum is in line with previous research at the Swiss cantonal level (e.g., Feld and Kirchgässner, 2001b; Feld, Kirchgässner and Schaltegger, 2010). Cantons featuring a budget referendum are associated with 2.8 percent lower tax rates. It has to be noted, that the influence of budget referendums has to be interpreted with extreme caution. Only five cantons have had changes to their institutional setup in the period considered in this analysis. The fact that we always include municipal and year fixed effects makes the inference in the case of budget referendum to depend on only a few cantons.

A first refinement of existing evidence is to analyze the effect of decentralization on tax rates of different household types. We consider four official categories of wage earners, namely ‘singles’, ‘married’, ‘married with two kids’ and ‘retired’. Table 2 presents results for the effect of decentralization on average tax rates of income classes between CHF 40’000 and 200’000 annual incomes. Results for the full range of income classes are again qualitatively equivalent.

[Table 2 about here]

We find negative coefficients for singles, married, and married with two kids but a positive coefficient for the category of the retired. A one percent increase in decentralization is related to a 0.06 percent reduction of tax rates for singles, 0.134 percent reduction for married couples and 0.177 percent reduction for married couples with two kids. However, the retired feature a 0.097 percent increase in tax rates. This finding is interesting because it shows that decentralization might affect different household types in heterogeneous ways. We discuss potential interpretation later on.

The influence of the number of taxpayers and mean municipal personal incomes are again negative and statistically significant. The effect of personal income is strongest for the category of

the retired and married wage earners with two kids. A very interesting effect is that the mandatory budget referendum has a different effect for the singles. While it is consistently negative for the other categories, the correlation is positive and significant for the category of singles. In cantons with a mandatory budget referendum singles seem to be taxed more extensively[11]. The finding for the retired and the singles would be consistent with an interpretation according to which the older generations are politically more active compared the younger (single) ones.

Fiscal decentralization and distribution

Secondly, to address the question how decentralization affects distributional decisions, we look at the effect of decentralization on every income class separately. This has the advantage that we are not constrained to a variable that captures the degree of progressivity in one number. We are able to take full advantage of the available data and estimate the effect of decentralization on each income class separately. We follow the previously adopted empirical strategy and use the same data for all the right hand side variables. Our dependent variable is still the cantonal and municipal personal income tax rate, but we estimate the effects of fiscal decentralization separately for each of 12 income classes between CHF 40'000 and 1 million annual income as well as the 4 different household types ('single, employed wage earner', 'married, sole wage earner', 'married, sole wage earner with 2 children' and the 'retired'). Therefore, we conduct 48 separate regressions.

Graph 1 presents the 48 estimation results (specifications are according to the equations in Table 1 and 2) for the fiscal decentralization variable for all 12 income classes and 4 household types. The graph contains the estimated coefficients (point estimates) of fiscal decentralization and includes the 95% confidence intervals. All other control variables are included in all estimations but omitted in the presentation.

[Graph 1 about here]

As can be seen in Graph 1, the categories of married, and married with two kids tend to face similar trends in the effect of decentralization on tax rates when considering intermediate and higher incomes (CHF 70'000 to 1'000'000). An increase in decentralization and the related intensity of tax competition due to decentralized decision making reduces the negative coefficients for higher income classes. For married couples with two kids the effects are relatively large and range from -0.574 with CHF 70'000 annual income to -0.116 with CHF 1'000'000 annual incomes. Relatively strong effects are observed for married couples without kids. In this category, the effect is observed over the whole range of incomes. They range from -0.403 for

[11] Note again the caveat in the case of budget referendums that have changed only in five cantons in the time period considered.

CHF 50’000 annual income to -0.116 for CHF 1’000’000 annual income. As shown by the 95%-confidence intervals (dotted lines), the estimated coefficients are always statistically different from zero. Hence, more decentralization seems to lead to relatively *more* progressive income taxes for the married categories with intermediate and higher incomes.

Married wage earners with kids are relatively more strongly taxed in the lower income classes when cantons are more decentralized. The effect is very large for the income class of CHF 40’000 annual income. Here, a one percent increase in decentralization is associated with a 1.08 percent higher income tax rate. It remains unclear however, how many households are actually affected in this income class. In the case of Switzerland, it seems that the mass in the inferior income categories until CHF 50’000 annual income (for married couples with kids) is relatively low.

Single wage earners typically face lower income tax rates in more decentralized cantons. The effect however is not very strong. It ranges from -0.038 for CHF 80’000 annual income to -0.084 for CHF 1’000’000 annual income. In this category, it appears that income tax schedules are slightly regressive.

An interesting result is observed for the category of the retired. There, only the income classes below CHF 60’000 annual income benefit from more extensive decentralization. The trend of the effect is however similar to the categories of married wage earners (with and without kids). Apparently, decentralized cantons feature relatively more progressive income tax schedules for the retired than more centralized cantons. This effect seems rather strong and ranges from -0.474 for CHF 50’000 annual income to 0.154 for CHF 100’000 annual incomes. For incomes higher than CHF 100’000, the effect becomes again a bit weaker and is reduced to 0.066 for the income class of CHF 1’000’000 annual income.

4 Some interpretations of the results

A final interpretation of these results is beyond the scope of the paper (for now). First, the estimates do not allow a causal interpretation because there might be problems of endogeneity that need to be addressed. However, it is very difficult to find valid instruments for the extent of decentralization in the cantons. One road that is pursued is to construct measures of relative distance and changes in migration costs (e.g., due to the harmonization of school systems across cantons that reduce migration cost especially for taxpayers with kids) that are correlated with the extent of tax competition within, as well as (or especially) across cantons. Secondly, a more rigorous interpretation of the results needs clear theoretical guidance. Such attempts require formal models that include important parameters of economic and political decision making.

Therefore, we only propose some ad hoc interpretations that further need to be anchored in economic theory.

Generally, the empirical results indicate that more decentralized areas levy on average lower personal income taxes. Moreover, they tend to adopt *more* progressive income tax schedules with the exception of low income classes in the category of married wage earners with kids and, over all income classes, the single wage earners. Interestingly, the negative distributional effects as described by most of the literature do not prevail. A number of plausible explanations are possible, although further research is needed to understand the mechanisms. Some possible scenarios are briefly introduced below.

1. One interpretation could be that more decentralized cantons tax more strongly according to the benefit principle of taxation. In this case, tax rates should reflect the marginal willingness to pay for public goods, which depends on the ratio of income and the tax price elasticity. If higher incomes tend to demand more public goods and the income elasticity is greater than the tax price elasticity (in absolute terms), more progressive income taxes should be implemented. The different patterns for singles, married couples with kids and the retired could be due to different tax price elasticities. They might differ since the household types face different mobility cost. Single wage earners might be perceived to be the most mobile group, while the retired and the married (especially with kids) seem to be least mobile. In this case, the interpretation leading to the observed patterns could be that more decentralized cantons seem to be more inclined to tax according to the benefits principle.

2. If decentralization and tax competition can lead to income sorting (Hodler and Schmidheiny, 2005), this might flatten the *de facto* tax schedule to some extent. More decentralized cantons might anticipate this and could therefore systematically compensate these effects by strategically introducing higher progression rates to approximate the originally intended *de facto* progression in the absence of income sorting. Cantonal decision makers might again take into account that the mobility of households across cantonal borders is not homogenous. If one believes that the retired are least mobile, we might make progress on explaining the patterns observed.

3. An alternative way would be to suggest mechanisms that take sociological, cultural and political distances into account. Such differences have been suggested to affect the willingness to redistribute. More decentralization and local autonomy also indicates that a larger share of public goods provision is decided and administrated locally. Several mechanisms might enhance the willingness of wealthier citizens to redistribute to poorer

ones, if more decision-making power is allocated at the municipal level. First, Ashworth, Heyndels and Smolders (2002) test Paulys' (1973) theory of redistribution as a local public good and show that the willingness to redistribute is affected by geographical, sociological, cultural, income and political distances. A strong result is that increasing geographical distance affects the willingness to redistribute negatively. Donors are less willing to redistribute the more geographically distant the recipients are. Additionally, the willingness to contribute to public goods also depends on some form of ethical or social distance. Alesina, Baquir and Easterly (1999) find that more ethnically heterogeneous jurisdictions tend to provide less core public goods like education and roads. As lower-level jurisdictions tend to be more homogeneous than higher-level jurisdictions, we could expect that this relationship could increase the willingness to redistribute if more decisions-making power is allocated at the lower level. Second, compared to the cantonal level, the actual implementation of redistribution policies is more visible locally and the government can be monitored more easily. Furthermore, the situation and needs of the recipients might also be more visible than at the cantonal level. Because in more decentralized cantons a larger share of redistribution decisions are taken at the municipal level, geographical closeness, higher visibility of needs and easier monitoring of the government might induce a higher willingness to accept redistribution through more progressive tax schemes adopted at the cantonal level. This again might be a function of the mobility of households.

These possible interpretations of the empirical results are far from being final. As already mentioned, more research needs to be done to understand the mechanisms behind the findings. The results however, clearly indicate that fiscal decentralization must not necessarily involve negative distributional effects.

5 Conclusion

Fiscal decentralization is an important instrument to provide local public goods that match local preferences best. According to some theories, the induced fiscal competition should lead to a more efficient allocation of public funds. From a politico-economic perspective, fiscal decentralization also helps to restrict the government to exploit the tax base. However, standard theory suggests a strong impact on redistribution. When citizens are mobile, we would expect to observe that rich individuals migrate to areas with low taxes, whereas the poor are expected to move in jurisdictions with a higher amount of welfare spending. This causes segregation and

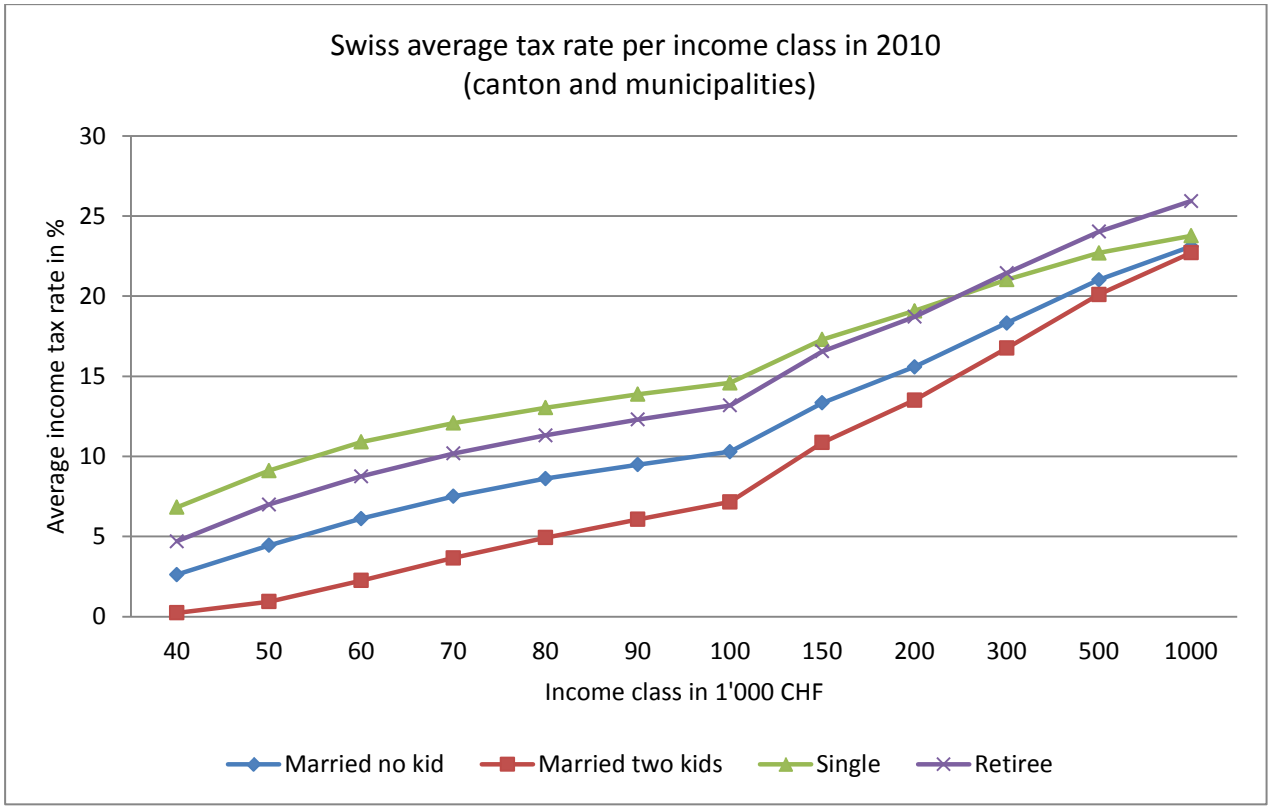
undermines redistributive policies. To prevent the negative dynamics, the centralization of redistribution policies is suggested. This trade-off between efficiency and distribution is well established in the literature and one relatively strong notion is that decentralized taxation leads to an erosion of progressive income taxation.

We focus on decentralized income taxation in Switzerland where the higher levels of government (the cantons) decide on the tax schedule including the definition of the rate of progression, while the lower levels of government (the municipalities) compete over the 'level' of income taxation with different tax shifters. In this setting progressive income taxes persist. We first estimate the influence of decentralization on average income tax rates and find, in line with existing empirical results, that a higher degree of decentralization generally leads to lower income tax rates. Secondly, we address the question how various degrees of decentralization affect the tax rates of different income classes and household types. The findings do not confirm general theories suggesting that decentralization and tax competition undermine redistributive income taxation. To the contrary, we find that in most cases decentralization leads to *more* progressive tax schedules. The observed general tendency of a positive relationship between decentralization and the rate of progression seems to be large and statistically significant. More decentralized jurisdictions feature generally lower income taxes but often impose higher rates of progression.

We cannot propose rigorous interpretations of the findings (yet). However, we suggest various theoretical interpretations that need to be explored more rigorously in future work. One interpretation – that might be in line with our findings – is that more decentralized cantons tax more strongly according to the benefits principle of taxation. Another interpretation might suggest that cantonal governments could use the rate of progression strategically and compensate the flatter de facto tax rates that emerge due to some income sorting at the municipality level.

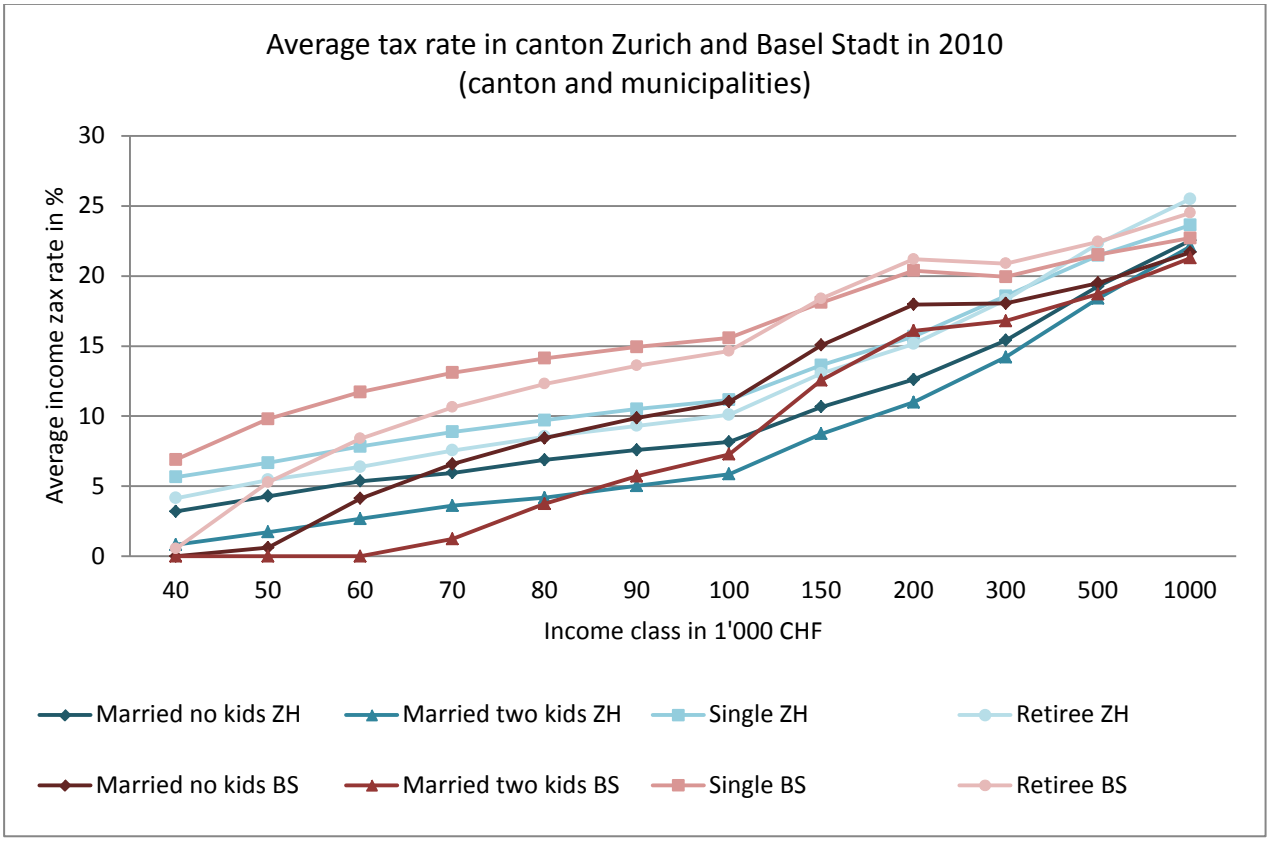
APPENDIX

Graph A1: Mean Income Tax Rate per Income Class and Household Type



Graph A1 presents the average income tax rate for every income class as well as household type.

Graph A2: Mean Income Tax Rate per Income Class and Household Type in the Canton of Zurich (most decentralized) and the Canton of Basel Stadt (least decentralized)



Graph A2 illustrates income tax schedules of the most decentralized canton of Zurich and the most centralized canton of Basel Stadt.

Table A1: The Data

Variable	Sample mean (Standard deviation)	Min - Max	Description	Source
Average tax rate (of all income classes)	12.04 (2.24)	3.374 – 19.49	Average tax rate on a natural person's annual income. Income classes: CHF 20'000 – 1'000'000	Swiss Federal Tax Administration
Average tax rate (of selected income classes)	10.88 (2.55)	3.14 – 19.97	Average tax rate on a natural person's annual income. Income classes: CHF 40'000 – 200'000	
Average tax on income class CHF 40'000	5.20 (2.27)	1.13 – 13.89	Average tax rate on a natural person's annual income. Income class: CHF 40'000	
Average tax on income class CHF 50'000	6.92 (2.43)	1.56 – 15-91	Average tax rate on a natural person's annual income. Income class: CHF 50'000	
Average tax on income class CHF 60'000	8.41 (2.54)	2.16 – 17.53	Average tax rate on a natural person's annual income. Income class: CHF 60'000	
Average tax on income class CHF 70'000	9.68 (2.62)	2.54 – 18.65	Average tax rate on a natural person's annual income. Income class: CHF 70'000	
Average tax on income class CHF 80'000	10.74 (2.70)	2.86 – 19.80	Average tax rate on a natural person's annual income. Income class: CHF 80'000	Swiss Federal Tax Administration
Average tax on income class CHF 90'000	10.78 (2.12)	3.19 – 17.20	Average tax rate on a natural person's annual income. Income class: CHF 90'000	
Average tax on income class CHF 100'000	12.49 (2.80)	3.51 – 22.11	Average tax rate on a natural person's annual income. Income class: CHF 100'000	
Average tax on income class CHF 150'000	15.54 (2.91)	4.31 – 25.64	Average tax rate on a natural person's annual income. Income class: CHF 150'000	
Average tax on income class CHF 200'000	17.56 (2.98)	4.82 – 26.81	Average tax rate on a natural person's annual income. Income class: CHF 200'000	
Decentralization	0.46 (0.081)	0.017 – 0.612	Ratio of municipal expenditures to total of municipal and cantonal expenditures	Swiss Federal Finance Administration
Mandatory budget referendum	0.55 (0.498)	0 – 1	Dummy for mandatory budget referendum	Cantonal constitutions
Average income	56'169.08 (21'666.23)	9'095 – 1'003'789	Mean income, according to federal tax return statistics (regular cases)	Swiss Federal Tax Administration
No. of taxpayers	1'164.562 (4'993.107)	5 – 195'121	Number of communal taxpayers	Swiss Federal Tax Administration
Income gini	.329 (0.067)	0.083 – 0.91	Gini coefficient of municipal net incomes according to federal tax return statistics (regular cases)	Swiss Federal Tax Administration

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Table 1: Impact of fiscal decentralization on *average* local and cantonal tax rates in Switzerland

VARIABLES	(1) Average tax rate 40'000 – 200'000	(2) Average tax rate 20'000 – 1'000'000
Ln(decentralization)	-0.057***	-0.053***
	(0.017)	(0.014)
Ln(no. of taxpayers)	-0.146***	-0.141***
	(0.025)	(0.020)
Ln(mean income)	-0.268***	-0.224***
	(0.044)	(0.043)
Income gini	0.108	0.072
	(0.097)	(0.079)
Mandatory budget referendum	-0.028***	-0.017***
	(0.005)	(0.004)
Municipal fixed effects	yes	yes
Year fixed effects	yes	yes
Observations	16,831	16,831
Number of municipalities	2,610	2,610
R-squared	0.675	0.626

Notes: Standard errors robust to clustering at municipal level.
Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table 2: Impact of fiscal decentralization on *average* local and cantonal tax rates in Switzerland, per household type

	(1)	(2)	(3)	(4)
	Average tax rate 40'000 – 200'000			
VARIABLES	Singles	Married	Married 2 kids	Retired
Ln(decentralization)	-0.061***	-0.134***	-0.177***	0.097***
	(0.014)	(0.017)	(0.020)	(0.029)
Ln(no. of taxpayers)	-0.137***	-0.135***	-0.173***	-0.143***
	(0.020)	(0.024)	(0.032)	(0.039)
Ln(mean income)	-0.183***	-0.188***	-0.294***	-0.449***
	(0.045)	(0.046)	(0.054)	(0.054)
Income gini	-0.088	0.028	0.066	0.462***
	(0.080)	(0.095)	(0.130)	(0.147)
Mandatory budget	0.034***	-0.022***	-0.076***	-0.088***
referendum	(0.004)	(0.005)	(0.007)	(0.008)
Municipal fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	16,831	16,831	16,831	16,831
Number of municipalities	2,610	2,610	2,610	2,610
R-squared	0.630	0.778	0.823	0.197

Notes: Standard errors robust to clustering at municipal level.
Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Graph 1: The influence of fiscal decentralization on income tax rates per income class and household type