

Distributional Effects of Fiscal Federalism: Empirical Evidence from Switzerland

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ABSTRACT

Fiscal federalism is an important instrument to provide local public goods that match local preferences best. Furthermore, the induced fiscal competition should lead to a more efficient allocation of public funds. From a politico-economic perspective fiscal decentralization helps to restrict the government to exploit the tax base. However, standard theory suggests strong distributional effects of decentralized income redistribution that lead to a collapse of traditional welfare systems. Therefore centralized redistribution is proposed. Harmonization however, undermines the positive, efficiency enhancing effects of fiscal federalism. We suggest that the separation of the decision to set the ‘level’ of taxation from the decision to fix the rate of progression should prevent a collapse of the welfare system without abandoning the beneficial effects of fiscal competition. We conduct an empirical investigation at the Swiss local level, which features this separation of decision making power between the canton and its municipalities, and estimate the influence of varying degrees of decentralization on the income tax rates of different income classes and household types. Our empirical results confirm our considerations and indicate that in a more decentralized setting income redistribution via progressive income taxation not only persists, but the rate of progression even seems to increase with a higher degree of decentralization.

1. Introduction

The effects of fiscal federalism have been studied extensively. While some praise the influence of decentralization and tax competition to foster a more efficient allocation of public funds and moreover, to constrain government from overtaxing its citizens (e.g. Oates 1972, 1985, 1999, Brennan and Buchanan 1977, 1980), others claim disastrous effects from tax competition (e.g. Sinn 1997, 2003, Zodrow and Mieszkowski 1986). Basically, the benefits of fiscal federalism are seen in the positive forces of competition and the limitation of the government to exploit the tax base. Following the pessimistic view, decentralization and tax competition lead to a ‘race to the bottom’ of social standards, resulting in the inability of federal states to adhere to the achievements of modern welfare states. Redistribution from the rich to the poor should not be possible, because the mobile factors capital and labor can evade taxation through migration to ‘tax havens’. Therefore, the mobility of the tax base will result in the underprovision of public goods.

Recent empirical evidence on fiscal federalism suggests a negative influence on the size of government but finds no evidence for a ‘race to the bottom’ (e.g. Feld, Kirchgässner and Schaltegger 2003 for a review of the literature and empirical evidence for the case of Switzerland). But the discussion remains intense and in many points ambiguous. Most empirical studies look at the overall effects of fiscal federalism or tax competition on e.g. general public spending, the level of public debt or taxation. In this contribution we try to analyze the *distributional effects* of fiscal federalism on taxation. In the recent empirical literature this issue has not been analyzed prominently. Standard theory predicts non-progressive income taxation for decentralized systems. We suggest the separation of the decision-making power to set 1) the ‘level’ of taxation and 2) the rate of progression to different government levels. This mechanism could prevent a ‘race to the bottom’ but preserve the positive effects of fiscal competition. Such a separation of decision-making power can be observed in Switzerland. We investigate a dataset of 730 Swiss municipalities and try to isolate the effects of different degrees of local autonomy on local and cantonal tax rates. In line with recent findings for Switzerland (Feld, Kirchgässner and Schaltegger 2003) we find generally lower tax rates in areas with a higher degree of local autonomy. When looking at the distributional effects we find that areas with a higher degree of local autonomy feature even *more* progressive taxes. This finding contrasts standard theory and provides evidence that decentralized redistribution can be made sustainable.

The next section provides a short overview of the theoretical effects of federalism and stretches out the main arguments how it affects the distribution of the tax burden across different income classes.

Section 3 presents the data set and section 4 summarizes the empirical results of the different estimations. Concluding remarks follow in section 5.

2. Distributional Effects of Fiscal Federalism

2.1. A very brief guide through the main arguments and findings on fiscal federalism

Rising shares of government on total economic activity and increasing present or future taxation have led to a vast discussion on the optimal size of government and the efficient allocation of public funds. 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). Furthermore, Oates (1972) 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. 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 liquor control at the U.S. state and county level and confirm that more heterogeneous preferences lead to more decentralized decision making.

From a politico-economic point of view Brennan and Buchanan (1977, 1980) emphasize the government in the role of a revenue maximizing monopoly (Leviathan) where 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 government levy their own taxes people may migrate to jurisdictions with lower tax burden and therefore, restricting government from overtaxing its citizens. Oates (1985) discusses the work of Brennan and Buchanan and analyzes in a cross-country approach with 43 countries the hypothesis that – ceteris paribus – a higher degree of decentralization results in a lower size of government.

In the following years the empirical literature on federalism and decentralization has grown rapidly. Both theoretical approaches on the effects of fiscal federalism anticipate smaller and more efficient governments. Latest empirical evidence from cross-country investigations (e.g. Jin and Zou 2002 and Rodden 2003) as well as from the U.S. (e.g. Shadbegian 1999) and the Swiss (e.g. Kirchgässner 2002

and Feld, Kirchgässner and Schaltegger 2003) cases suggest negative effects of different aspects of federalism and decentralization on taxation and public expenditures.¹

However, distributional concerns are a key aspect in the discussion of the consequences of fiscal federalism. The theoretical literature suggests that with increasing tax competition and sufficient mobility of the taxpayers, decentralized redistribution policies will not be sustainable. The poor will migrate to high redistributive jurisdictions, while the rich will migrate to jurisdictions with low redistribution. This will cause a situation with inefficiently low redistribution. The former high redistributive jurisdictions cannot afford to adhere to their extensive welfare systems and will therefore reduce redistribution (e.g. Oates 1972, Brown and Oates 1987 and Sinn 1990). To conclude, in a decentralized welfare system with mobile individuals it will be increasingly difficult to tax the high-income individuals and due to an increasing inflow of poor individuals into jurisdictions with high redistribution standards the decentralized redistribution system will collapse.² Feld (2000) addresses the main condition for a collapse of a decentralized redistributions system. He estimates the migration decision of taxpayers conditional on the redistributive policy of a jurisdiction. He uses data from the Swiss cantonal and local level because Switzerland enjoys a highly decentralized system with a high degree of tax competition. Due to this special institutional setting Feld states that “[...] [i]f fiscal competition were to lead to a collapse of the welfare state, it should become obvious in Switzerland” (Feld 2000: 126). He finds that residential decisions of high-income individuals are driven to some extent by tax incentives although this has not lead to a collapse of the welfare system (Feld 2000: 152). Further evidence emphasizing the mobility of high-income individuals is reported in a very recent analysis of residential decisions due to tax incentives for the metropolitan area of Basel in Switzerland (Schmidheiny 2004).

Redistribution policies can be introduced with two different instruments. The first instrument is public welfare spending directed to the poor. As argued above, the theory would suggest that such spending is not sustainable because the poor will migrate to the jurisdiction with the high redistribution spending.³ This will undermine the ability of a jurisdiction to finance its welfare spending. The second instrument is progressive taxation. Again the theory suggests that a mobile tax base renders income redistribution with progressive taxes impossible, because tax competition induces strong incentives to lower the tax

¹ For a survey of the literature on fiscal federalism see e.g. Oates (1999) and Inman and Rubinfeld (1997), for a discussion of the empirical literature see e.g. Feld, Kirchgässner and Schaltegger (2003)

² For a short overview of alternative theoretical approaches see Feld (2000)

³ A survey of theoretical and empirical evidence is provided by e.g. Brueckner (2000)

rates for the rich. However, for both effects the empirical evidence is scarce. In a very recent paper Feld, Fischer and Kirchgässner (2004) look at the influence of several fiscal institutions on income redistribution in Switzerland. Their main finding is that more popular participation rights – say a higher degree of direct democracy – lead to a lower total amount of redistribution. However, when they look at pre- and post-tax distribution, they find that if the pre-tax income distribution is more unequal, cantons with a higher degree of direct democracy redistribute more income. This indicates that income redistribution is more targeted where people have a higher stake in the decision making process. More interestingly in the context of this paper, they also estimate the influence of decentralization and tax competition on income redistribution. They find some evidence for higher income redistribution in cantons with more intense tax competition. In addition Feld (2000) reports that despite the strong tax competition decentralized income redistribution at the Swiss local level even increased during the period from 1977 to 1992. These findings contrast the theoretical considerations that tax competition makes redistribution impossible, but the evidence is not overwhelming. When it comes specifically to welfare expenditures Feld, Fischer and Kirchgässner (2004) cannot find a significant impact of decentralization and tax competition on welfare spending. We conclude, that for the case of welfare spending as an instrument of income redistribution we cannot find the expected collapse of the welfare system. We are not aware of empirical evidence of the impact of fiscal federalism on the second instrument – progressive taxation. In this paper we will thus, focus on the ability of jurisdictions to levy progressive income taxes. Following the above-mentioned arguments, in a decentralized tax system with mobile taxpayers progressive income taxation should not be sustainable. Thus, we expect to observe – *ceteris paribus* – constant or even regressive income tax rates.

2.2. The separation of fiscal decisions: An institutional feature to prevent the collapse of a decentralized welfare system?

Although, the theoretical consequences of fiscal federalism on decentralized redistribution appear obvious, the general empirical evidence, though scarce, does not seem to be overwhelmingly in support of the theory. One reason why we might generally not observe this ‘race to the bottom’ is that decentralized systems may react to the ‘threats’ of a collapsing welfare system. The theory does not include possible adjustments. In general the literature suggests that redistribution should be done on the central level (Musgrave 1971 and Oates 1972). However, there are other mechanisms that could potentially prevent the system from collapsing. One possibility is the decomposition of the two

important decisions when setting up the tax scheme. We suggest the separation of the decision making power to set 1) the ‘level’ of taxation and 2) the rate of progression – the main redistributive instrument on the tax side – to different government levels.

A decentralized federal system typically consists of at least two different levels of government. The decomposition of the two mentioned decisions could prevent a ‘race to the bottom’ without giving up the benefits of decentralization. For the lower levels of government that are exposed to heavy tax competition the implementation of progressive – redistributive – income tax rates has public good characteristics. However, this is not (or to a much lesser extent) true for the higher levels of government with much lower tax competition. In the spirit of Musgrave (1971) and Oates (1972) the decision making power to set the rate of progression should thus be shifted upwards to a government level with a lower extent of tax competition, where the different income classes can agree on a certain amount of redistribution. There is evidence that high-income individuals have incentives to agree upon some level of redistribution. Be it for insurance reasons for themselves or their children to cover for privately uninsurable risks or just to ‘buy’ social peace. Moreover, Pommerehne and Schneider (1985) show empirically that voters from low and middle-income classes do not necessarily exploit the high-income classes. However, the ‘level’ of taxation should be set by the lower level jurisdiction with a high degree of tax competition. Tax competition will force these jurisdictions to levy an amount of income taxes that matches local preferences. If the ‘level’ of income taxes is lower than in surrounding jurisdictions, mobile taxpayers are equally attracted, irrespective of their income class.⁴ This simple mechanism could allow decentralization, while preserving progressive tax rates. Nevertheless, there are some important aspects to consider. First, the lower level jurisdictions need to depend to a large extent on the revenues from the progressive tax. If they have other main sources of income, they will try to circumvent the progressive income taxes and substitute for another, less redistributive instrument to generate income. Second, tax competition between the upper level jurisdictions needs to be less intensive than between the lower level jurisdictions. Typically, the mobility costs are much lower within a jurisdiction compared to the mobility costs across jurisdictions. Existing empirical evidence supports the hypothesis of lower degrees of tax competition at higher levels of government (e.g. Feld 2000).

⁴ A counterargument (work in progress from Roland Hodler and Kurt Schmidheiny) is that when 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 will induce an asymmetric reaction to taxation of rich and poor households and could still lead to segregation.

To conclude, we argue that redistributive policies do not need to be introduced by the central government level. Decentralized redistribution – in particular progressive taxation – can potentially be made sustainable and the negative effects of centralization can be avoided. We provide a simple mechanism that mitigates the negative effects from tax competition and suggest that the decision making power to set the rate of progression and the ‘level’ of taxation should be separated. For a lower level jurisdiction facing heavy tax competition income redistribution has public good characteristics. This is not so much true for higher level jurisdictions, where tax competition is much less intense and the mobility of taxpayers is generally lower. The upper level jurisdiction is thus better able to redistribute a certain amount of income than the lower level jurisdictions. Therefore, the upper level jurisdiction with a lower intensity of tax competition must be responsible for the rate of progression, while the lower level jurisdictions decide on the level of taxation in their boundaries. However, two potential caveats must be considered. First, tax competition must be less intense on the upper level jurisdiction. Second, the lower level jurisdictions must depend on the revenues from the progressive tax.

As argued above, this contribution will only focus on taxation as an instrument of income redistribution. Subsequently we will test the following hypotheses:

- 1) Following the general theoretical implications by Oates (1972) and the politico-economic arguments by Brennan and Buchanan (1977, 1980) fiscal federalism leads to smaller governments and lower tax burden. We generally expect to observe lower tax burden for jurisdictions with a higher degree of decentralization.

Hypothesis 1: Jurisdictions with a higher degree of decentralization enjoy lower average income tax rates.

- 2) Taking distributional aspects into account, the traditional arguments suggest that income redistribution via progressive tax rates cannot be achieved in a decentralized system. We should therefore expect *constant or even regressive income tax rates*. A somewhat ‘milder’ hypothesis is that we should observe lower rates of progression for jurisdictions with more decentralization relative to more centralized ones. Thus,

*Hypothesis 2a: Jurisdictions with a higher degree of decentralization feature **lower rates of progression** relative to centralized jurisdictions.*

However, we argued that there are mechanisms that prevent from such a ‘race to the bottom’ and suggest that a shift of the decision making power to set the rate of progression to the upper level jurisdiction diminishes the negative effects of decentralization. Thus, the alternative hypothesis to *Hypothesis 2a* is:

*Hypothesis 2b: Jurisdictions with a higher degree of decentralization **do not feature lower rates of progression** relative to centralized jurisdictions.*

3. Swiss Local Tax Competition and the relevant Data

3.1. Fiscal Federalism in Switzerland

To test the three hypotheses we will focus on a cross-section analysis at the Swiss cantonal (similar to U.S. state) and local level. Switzerland is an almost ideal case to test the effects of fiscal federalism. Switzerland is a federal state and has, similar to the U.S. a much decentralized political structure. The 26 cantons as well as most of the roughly 3000 local municipalities enjoy a high degree of autonomy and take a wide range of political decisions independently. Therefore, the institutional design differs strongly across the 26 cantons. Swiss citizens generally enjoy a high degree of political participation rights via instruments of direct democracy such as voter initiatives and several forms of referenda. However, not all cantons feature the same participation rights (for details see e.g. Stutzer 1999, Frey and Stutzer 2000, 2001 and Feld and Matsusaka 2003). The same holds for local autonomy. 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.⁵

| <i>In billion CHF</i> | <i>Revenue 1999</i> | <i>Expenditure 1999</i> |
|-----------------------|---------------------|-------------------------|
| Confederation | 43.0 | 46.3 |
| Cantons | 58.5 | 57.8 |
| Communes ¹ | 40.5 | 39.7 |
| Total ² | 117.8 | 119.4 |

¹ Estimates for some

² Without double accounting

Source: Swiss Federal Statistical Office

Table 1: Public revenues and expenditures on different government levels in Switzerland

⁵ For an overview of Swiss institutions see the detailed study by Trechsel and Serduelt (1999)

To give the reader an idea about the extent of fiscal decentralization Table 1 presents the public revenues and expenditures for the different government levels. The municipalities share almost the same amount of revenues and expenditures as the central government (confederation). The cantons and the municipalities raise their own taxes and fees to finance cantonal and local expenditures. As can be seen from Table 1 the different levels primarily finance their needs with their own taxes and user charges. The cantons as well as the municipalities rely heavily on direct taxes (around 95% of total tax revenue) whereas the federal government relies much more on indirect taxes (around 60% of total federal tax revenue) such as the VAT. The cantons and the municipalities levy the main part of the direct income taxes, although the federal government also raises its own (very progressive) income tax. The extent of the total income tax burden (including cantonal, communal and church taxes) varies considerably across the cantons. When we compare the personal income and property tax burden across the cantons measured by a weighted index with an average of 100, the canton of Zug features an income tax burden of 56.9 whereas the canton of Jura struggles with a value of 127.1 in 1999 (Swiss Federal Statistical Office).

On the expenditure side the system is also very much decentralized. Though, the welfare system “[...] is much more a hybrid between centralization and decentralization than the tax system” (Feld 2000: 131). Retirement provisions for example are mostly centralized. The system contains of 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.⁶

Because of the much decentralized structure, local tax competition is very intense, while spending competition is much less important (Feld 2000). But the special advantage of the Swiss case is that the cantons decide autonomously on their tax scheme. They set the rate of progression as well as the level of cantonal income taxation. In contrast, the municipalities can only levy a surcharge on the cantonal income taxes. This is exactly the mechanism that we presented in chapter 2.2., where the higher level government holds the decision making power over the rate of progression and the lower level decides autonomously on the ‘level’ of taxation. This feature allows us to directly test *Hypotheses 2a* and *2b*. However, as reported in section 2 there are some potential caveats to take into account. First of all tax competition should be less intense at the upper level jurisdiction – in our case the cantonal level. In line with these findings “[...] migration between the Swiss cantons does not appear to be considerable

⁶ For a brief but more detailed discussion of the Swiss tax and social system see e.g. Feld (2000)

[...]” (Feld 2000: 152). He reports higher degrees of tax competition at the communal relative to the cantonal level. 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. Secondly, as reported above the local and cantonal governments rely heavily on income taxes. This makes it more difficult for the local governments to circumvent the progressive income tax.

3.2. The Data

a) The independent variable

As a consequence of the extensive decentralization of Switzerland, financial data at the community level is not easily comparable across cantons. The problem is even more serious for smaller communities, which form an important part of our sample. There is, for instance, no standardized dataset on the fiscal performance of municipalities. Data on local public debts is only available for bigger cities, but not for most other municipalities. Data concerning public spending are mostly not comparable between the municipalities of different cantons. Therefore, our empirical analysis will not take the spending side into account and focuses on taxation for which there is a dataset from the Swiss Federal Tax Administration. This dataset provides data on the income tax rate for 730 Swiss municipalities (out of a total of 2880 municipalities), but is only available for the period between 1999 and 2003. As we do not observe any significant variation in the institutional design in this period, we conduct a cross-section analysis for the year 1999. The tax rate includes the taxes of the canton, the community, and the local official church communities (which have the power to tax) on a natural person’s annual income. The dataset contains 16 income brackets between CHF 20’000 and 1’000’000 and 3 household types: “single, employed wage earner”, “married, sole wage earner” and “married, sole wage earner with 2 children”.⁷ 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 communal spending and taxation (see Eichenberger 1994 and Schaltegger 2001), we analyze the total cantonal and communal taxes.

b) Fiscal federalism

⁷ Appendix A contains a table (Table A1) with the mean income tax rate and the standard deviation for each income class and household type as well as a graphic presentation (Graph A1) of the mean income tax rate per income class and household type.

To describe the degree of federalism in a specific canton we introduce an index proposed by Ladner (1994), which captures the extent of local autonomy for each canton as reported by the local chief administrators in a systematic survey. The local chief administrators of 1856 municipalities were asked to describe the perceived extent of local autonomy on a scale between 1 and 10. A score of 1 indicates ‘no autonomy at all’ and 10 ‘very high’ local autonomy. This index is widely used to measure local autonomy and to proxy fiscal federalism in Switzerland (e.g. Frey and Stutzer 2000, 2001, Torgler 2004). The advantage of such a measure is that it captures the de facto institutional constraints of a municipality. It reflects the federal structure of a canton; that is the division of competences between the canton and its municipalities (Frey and Stutzer 2000). This index can directly be interpreted as a measure of decentralization. More local autonomy means that more public goods are provided at the local level, which is what decentralization stands for. Other measures like e.g. ratios of total cantonal and local expenditures to municipal expenditures are endogenous to the institutional framework and many other factors. Following *Hypothesis 1* we expect to observe lower average income tax rates in cantons with more decentralization. In our empirical approach we expect to find a negative coefficient of local autonomy regressed on the average tax rate in a specific municipality. If the proposed separation of decision-making power prevents a ‘race to the bottom’, we assume that *Hypothesis 2b* cannot be rejected. We should therefore not observe stronger benefits from tax competition for the higher income categories compared to the lower ones. We will estimate the impact of decentralization on 14 different income categories between CHF 30’000 and 1’000’000 annual income for 3 alternative household types (“single, employed wage earner”, “married, sole wage earner”, “married, sole wage earner with 2 children”). If *Hypothesis 2b* holds, we should (at least) find the same effects of decentralization for rich and poor households.

b) Control variables

From a politico-economic perspective, other political and institutional features must be considered. Therefore, we include different indicators for direct democratic instruments in our model. Direct democracy at the local level is captured with a dummy variable for town meeting (1) or parliamentary democracy (0). To specify the magnitude of direct democracy at the cantonal level we use the standard indicator proposed by Stutzer (1999) and Frey and Stutzer (2000, 2001), which includes all relevant aspects of the extent of direct democratic instruments available to the citizens. According to the recent literature, we expect direct democratic instruments to have a negative influence on the tax rate. Another important factor at the local level in Switzerland is the extent of institutional competition.

Municipalities with town meeting feature a special form of institutionalized competition between the local government and an independent political unit, the local finance commission (FC). In some cantons the finance commission is a normal auditor that audits the accounts ex post, while in other cantons these finance commissions can evaluate every single government proposal ex ante to the decision by the citizens and can directly make amendments to the government proposal or even promote an alternative solution. The latter institutional framework induces competition between the government and the local finance commission to promote policies closer to citizen's preferences. Schelker and Eichenberger (2003, 2004) report significantly lower taxes in jurisdictions with strong institutional competition between the government and the local finance commission. To control for institutional competition we include the index proposed by Schelker and Eichenberger (2003) and expect to observe a negative effect in the extent of institutional competition on the aggregate income tax rate.

To control for specific community characteristics, which influence the tax level, we include a set of standard controls such as the communal financial power, the average population size, the cantonal unemployment rate, the fraction of foreign communal population, the surface of the municipality (ha), its edificial, industrial, agricultural, and mountainous fraction, the demographic structure, and a dummy for language affiliation (German 1, else 0). Data concerning the communal financial power is not systematically available. Therefore, we use the communal tax revenue from the direct federal income tax as a proxy. The revenue from the direct federal income tax is appropriate because the tax rates are equal across all cantons. Sometimes it is assumed that the population size affects public finance in a non-linear way. Thus, we additionally introduce the quadratic term of the population size in the equation. It is often argued that fiscal preferences differ among cantons. However, there is no reliable data on fiscal preferences available. But as it is plausible that conservative fiscal preferences are positively correlated with the willingness to participate in the political process, we include voter turnout in national votes per canton during the legislative period between 1995 and 1999 as a control variable. However, in accordance to the "common pool" problem, one could also argue that the inhabitants of jurisdictions with a high general tax level have especially strong incentives to vote for redistribution politics on the national level. Bear in mind that this argument assumes inverse causality. Thus, there is no unambiguous hypothesis on the expected sign of this variable.

We anticipate a negative sign for the communal financial power variable. For population size we have no clear-cut expectations, as there are arguments in favor of both economies as well as diseconomies of

scale. The unemployment rate can be expected to exhibit a positive impact on the tax rate as unemployment is connected with high local welfare costs. Increasing community surface as well as the mountainous fraction result in higher infrastructural cost and, thus, in increasing tax rates. Furthermore, we expect the edificial and the industrial fraction to have a negative and the agricultural fraction to have a positive influence on the local tax burden. Concerning the demographical structure, we anticipate the working population to have a negative and the non-working population to have a positive impact on tax rates. We have no expectations for the variable measuring the fraction of the foreign communal population. (A summary of the data can be found in Appendix A, Table A2)

4. Empirical Results

In this chapter we test the two main hypotheses stated in chapter 2 and present the empirical results. The dataset as well as the empirical strategy is the same for both hypotheses. To investigate the general effect of fiscal federalism (*Hypothesis 1*) we use the overall average cantonal and communal income tax rate. To assess the distributional effects (*Hypotheses 2a/2b*) we estimate the influence of fiscal federalism on every single income class and household type separately.

4.1. General effects of fiscal federalism (*Hypothesis 1*)

Hypothesis 1 evaluates the general effects of fiscal federalism on *average* cantonal and local tax rates. Following the literature we expect lower income tax rates in more decentralized jurisdictions. We test this hypothesis in a cross-section analysis of 730 municipalities in Switzerland.

a. Base regression

Within the cantons municipalities face similar constraints, thus, the standard errors may be correlated within groups (cantons).⁸ Therefore, we correct the standard errors by clustering according to the 26 cantons. Without clustering we may encounter a downward bias of the standard errors. Dealing with similar problems, Frey and Stutzer (2000) and Feld and Matsusaka (2003) use similar estimation methods to produce robust standard errors. Both report much larger standard errors with clustering than with uncorrected or White corrected standard errors. To account for the possibility of non-random

⁸ For more details on the problems of correlation within groups, see e.g. Moulton (1986)

sampling, we estimate a weighted least squares (WLS) model. To get approximately unbiased estimates we introduce weights equal to the inverse probability of a municipality being sampled.⁹

| Variable | (1) WLS | | (2) 2SLS ^{a)} | |
|----------------------------|---|---------|---|---------|
| | Standard errors adjusted to clustering in 26 cantons | | Standard errors adjusted to clustering in 26 cantons | |
| | Coefficient | t-value | Coefficient | t-value |
| 1) Institutional variables | | | | |
| Federalism | -1.298*** | -7.51 | -2.071*** | -3.65 |
| Local direct democracy | 0.945*** | 4.24 | 1.050*** | 3.21 |
| Cantonal direct democracy | -0.108 | -1.03 | 0.087 | 0.46 |
| Institutional competition | -0.477*** | -5.44 | -0.503*** | -4.98 |
| 2) Control variables | | | | |
| Financial Power | -8.120 E-4*** | -4.64 | -6.985 E-4*** | -4.16 |
| Voter turnout | 1.531** | 2.26 | 1.272 | 0.96 |
| Population | 1.020 E-5 | 1.63 | 0.976 E-5 | 1.43 |
| Square of population | -3.470 E-11* | -1.90 | -3.210 E-11 | -1.60 |
| Foreigner | -0.284 | -0.51 | 0.275 | 0.40 |
| Unemployment | -0.176 | -1.30 | -0.163 | -0.90 |
| Communal surface | 5.600 E-6 | 0.50 | 2.940 E-5 | 1.07 |
| Edificial fraction | -0.592 | -1.65 | -1.537** | -2.32 |
| Industrial fraction | -0.114 | -0.07 | -0.247 | -0.14 |
| Agricultural fraction | 0.810 | 1.65 | 0.527 | 0.80 |
| Mountainous fraction | 1.410* | 1.84 | 0.943 | 1.05 |
| Demography 0-24 | 5.210** | 2.20 | 5.178** | 2.30 |
| Demography 65+ | 7.142*** | 4.18 | 7.227*** | 4.75 |
| Observations | 730 | | 730 | |
| R ² | 0.747 | | 0.683 | |

Notes: Dependent Variable: Average aggregated tax rate including cantonal, local, and church taxes on a natural person's annual income, containing 9 income classes between 40 and 200 thousand CHF and 3 household types: "single, employed wage earner", "married, sole wage earner" and "married, sole wage earner with 2 children". Weight: Inverse probability of being sampled. a) Federalism instrumented; Instruments: All regressands (without Federalism) including a variable describing the cultural background (language) and a dummy for financial referendum. Significance level: * 0.05<p<0.1, ** 0.01<p<0.05, *** p<0.01.

Source: Own calculations

Table 2: Impact of fiscal federalism on *average* local and cantonal tax rates in Switzerland

Due to omitted variable and simultaneity concerns we instrumented our fiscal federalism variable with two instrumental variables and run two stage least squares (2SLS) regressions (e.g. Angrist and Krueger 2001). The first instrumental variable is the cultural background described by the language spoken by a majority in a municipality. We distinguish between a German and a Latin (French/Italian) cultural affiliation. It is common for empirical research conducted in Switzerland to include a language

⁹ It might be possible, that the probability for a municipality to be included in the sample depends also on its size. Therefore, we also calculated size adjusted sampling weights. Our results are not sensitive to these changes. In the following discussion we will use the more traditional and more conservative sampling weights.

dummy to control for different cultural affiliations. Furthermore, our strategy is closely related to cross-country research where language and colonial origin are often used to instrument institutional features (e.g. Persson and Tabellini 2004). Rueben (1995) suggests using direct democratic rights to instrument balanced budget rules. This procedure has been widely used (e.g. Knight 2000) and Schaltegger (2002) adopts this strategy for Switzerland to instrument cantonal budget rules. We will use a similar approach to instrument our federalism variable. Therefore, the second instrument will be a democracy variable suggested by Pommerehne and Weck-Hannemann (1996) which is a dummy variable that reflects if the citizens dispose of a facultative financial referendum on the cantonal level. We can introduce this variable despite the fact that we already control for direct democratic instruments on the cantonal level with another index first proposed by Stutzer (1999). The correlation between these two variables is very low and not significant. This is not surprising because the Stutzer index includes the full range of initiative and referendum possibilities as well as signature requirements. Furthermore, the dummy variable proposed by Pommerehne and Weck-Hannemann (1996) as well as the language variable has no explanatory power for our dependent variable. Although they are significantly correlated with our federalism variable in the first stage regression, following Staiger and Stock (1997) we might encounter problems of weak instruments and the results must be interpreted carefully. In the 2SLS estimation in Table 2 the tax decreasing effect is confirmed, but we observe an increase in our main explanatory variable. As the institutions have been in place for quite a long time and the results do not differ a lot, endogeneity might not be a big concern, however, stronger instruments would be desirable. Therefore, we will mainly focus on the efficient and more conservative OLS estimates.

b. Fiscal federalism

Our estimates presented in Table 2 confirm the expected theoretical effects and are in line with general empirical findings for Switzerland (e.g. Feld, Kirchgässner and Schaltegger 2003). Federalism has a strong negative and significant influence on the tax rate. For every unit of increasing local autonomy, we estimate an average reduction of the tax rate of roughly 1.3 percentage points. Considering a range of the local autonomy variable from 3.2 to 6.1 we observe a potential effect of 3.7 percentage points. Taking into account that the average tax rate amounts to around 11 percent, the potential impact is about 33 percent of individual tax relief. Thus, fiscal federalism proves to be an important factor in public finance issues.

c. Institutional control variables

Local direct democracy in the form of town meetings exhibits, against our prediction, a positive impact on the tax rate. The coefficient is statistically significant, and its influence is with 0.9 quite high. This phenomenon could be explained with two alternative arguments: Firstly, from a traditional perspective it could be argued that self-government implies high transaction costs and is, therefore, an inefficient way to organize local governance. This argument becomes more probable the larger the municipality grows. From a second, less traditional perspective it could be argued that town meetings boost the willingness of the citizens to redistribute income and to finance projects that strongly benefit minorities. In town meetings, citizens can visually identify each other, which is a precondition for empathy and altruism to arise as has been experimentally shown by Bohnet (1997) and Bohnet and Frey (1999). It is, moreover, plausible that log rolling and, thus, the expression of preference intensity becomes easier in town meetings as voting is not anonymous. This would make it possible to adopt potentially Pareto-superior projects which otherwise could not be adopted. We are not aware of empirical research on town meetings that could help to clarify these issues. Cantonal direct democratic instruments do not have significant effects on the aggregated communal and cantonal tax rate. However, institutional competition exercises a highly significant negative impact on the aggregated cantonal and communal tax rates. A one-point increase of the institutional competition variable implies an average reduction of the tax rate of roughly 0.5 percentage points. Since the institutional competition variable ranges from 0 to 4 a potential difference of 2 percentage points result. Considering the average tax rate amounts to around 11 percent, the potential effect on the individual tax rate is about 18 percent.

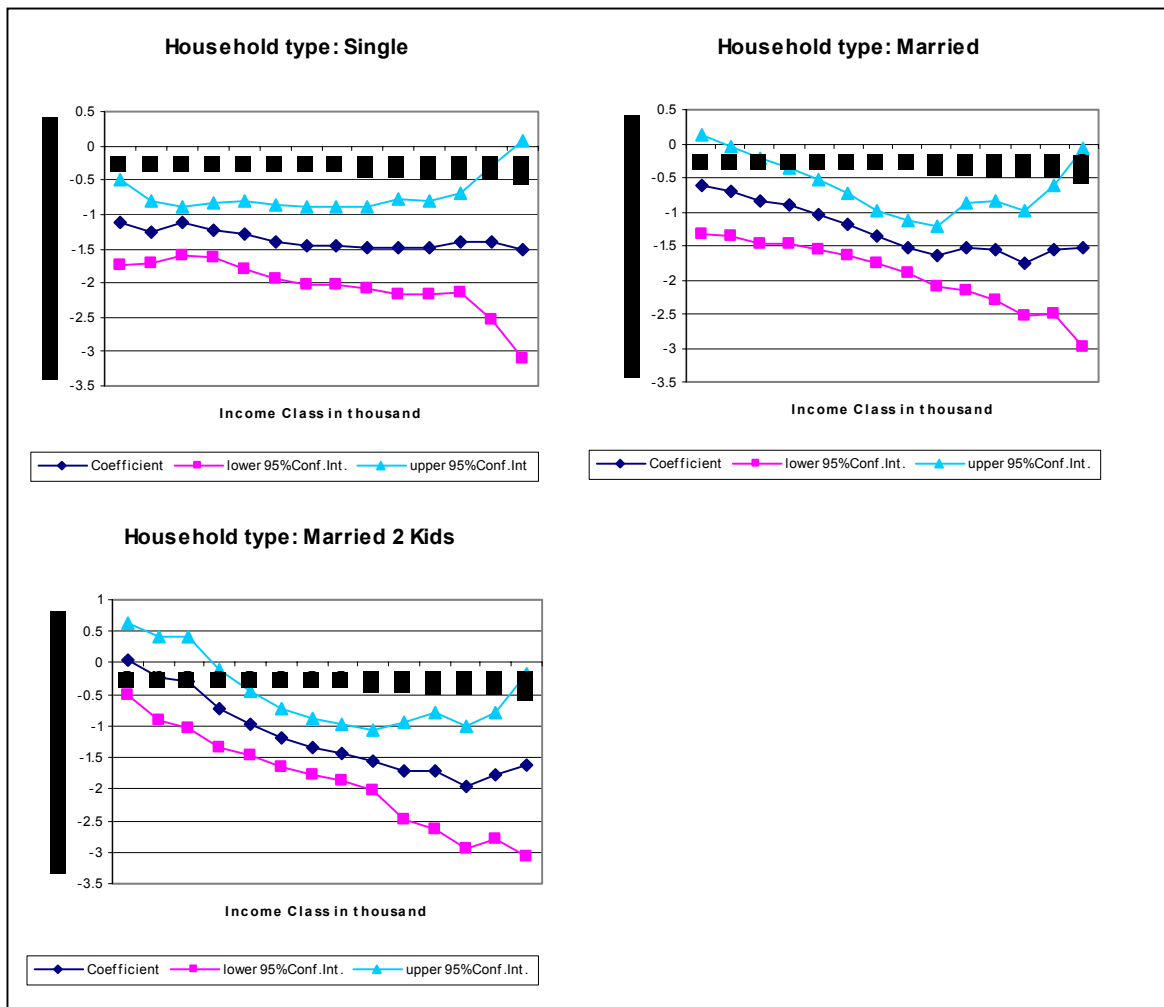
d. Other control variables

We detect a statistically significant impact for five other variables: financial power, voter turnout, square of population, mountainous fraction, and demography 0-24 and demography 65+. All other variables are statistically not significantly different from zero. The influence of the communal financial power confirms our expectations and is statistically significant at the 1 percent level. An increase of the communal financial power by CHF 1000 implies an average reduction of the tax rate of around 0.80 percentage points. The statistically significant, positive correlation between voter turnout in national referenda and the tax rate can probably be explained with the “common pool” argument introduced above. However, this argument assumes inverse causality. In addition to the insignificant population variable, the significant negative coefficient of the squared term of the same variable reinforces the speculation of possible existing economies of scale in the production of public goods. Although the

variables are only roughly at the margin statistically significant, the mountainous fraction indicates that municipalities in the mountains suffer on average from higher infrastructural costs and therefore, from higher tax rates, whereas the consequences of a large agricultural sector can be seen in the positive coefficient of the agricultural variable. The fraction of the young (0-24) as well as the fraction of the old population (65+) exercises a positive influence on the local tax rates. The last two variables to mention are the fraction of the foreign communal population and the unemployment rate. However, they are both statistically not significantly different from zero.

4.2. Distributional effects of fiscal federalism (*Hypotheses 2a/2b*)

We follow the previously adopted empirical strategy and use the same data for all the right hand side variables. Our independent variable is still the cantonal and communal income tax rate but we estimate the effects of fiscal federalism for each income class and household type separately. This allows us to identify the effect of fiscal federalism on every single income class and household type.



Graph 1: The influence of fiscal federalism on income tax rates for three household types (for readability: x-Axis: ‘Income Classes between CHF 30’000 and 1 million annual income’, y-Axis: ‘Effects of federalism on tax rates’ – denomination of x-Axis analogous to Graph 2)

Graph 1 presents the estimation results for the fiscal federalism variable for all 14 income classes and 3 household types and includes the point estimates of the federalism variable and the 95% confidence interval. All other control variables are included in the estimation but omitted in the presentation. These estimations do not alter the general findings for any control variable. The confidence intervals for the lowest and the highest income classes tend to be larger and in some case insignificant. Basically, we observe for every income class as well as for every household type a negative coefficient, if this is not the case the estimated coefficient is typically statistically not significant at the 5% level. This result implies that more or less all income and household classes benefit from a more decentralized organization.

However, the trends cannot be interpreted yet. We need to look at the relative effect for every income class. Therefore, we compute the mean income tax rate for each income class and every household type¹⁰ and calculate the ratio between the coefficient and the mean income tax rate. This gives us the relative impact (in percent) of a one-point increase of our federalism variable on the respective income tax rate.¹¹

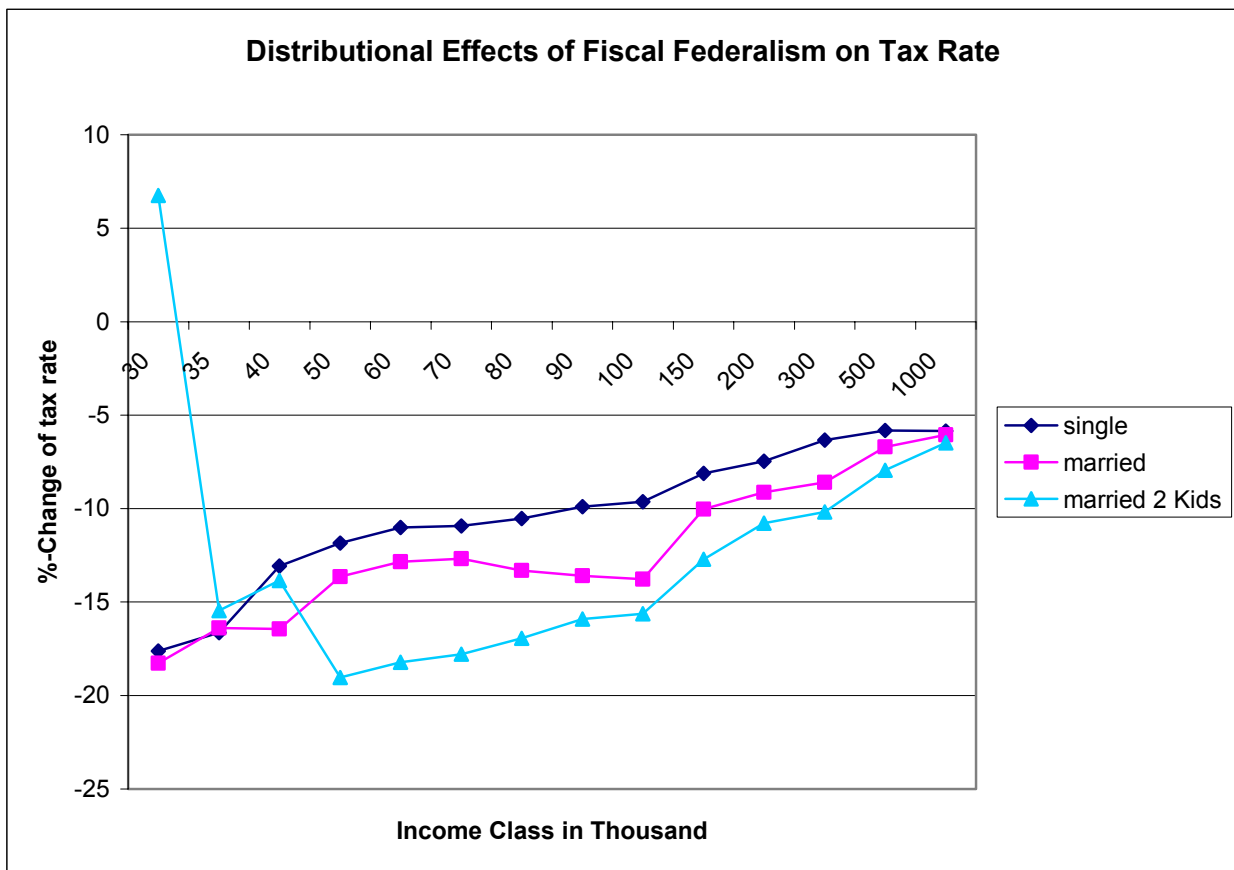
Following *Hypothesis 2a* we should expect to observe significantly larger negative effects for an increase in decentralization for rich households compared to the poorer ones. In such a case decentralization would lead to less redistribution and eventually to a collapse of the welfare system.

Hypothesis 2b suggests no such advantage for the rich relative to the poor. Therefore, we should observe the same or even smaller effects for the high income classes.

Graph 2 presents the relative impact of fiscal federalism for each income class and household type.

¹⁰ The data can be found in Appendix A, Table A1

¹¹ Another, more straight forward approach would be to estimate logs, which would allow the direct interpretation of the coefficients.



Graph 2: Distributional effects of fiscal federalism for three household types

Surprisingly, we do not only observe no statistical difference between the rich and the poor (requirement to reject *Hypothesis 2a* and minimum requirement for *Hypothesis 2b* to hold), but we observe much stronger effects for the lower incomes compared to the higher income classes. The lowest ‘single’ income class of CHF 30’000 annual income for example benefits from an average 17.6 percent lower income tax rate for every one-point increase of local autonomy. In contrast, a one-point increase of local autonomy means ‘only’ a 5.8 percent tax reduction for the highest ‘single’ income class of CHF 1 million annual income. Generally the negative impact of decentralization is highest for the lowest income classes and then decreases with growing household income. This indicates more progressive taxation in jurisdictions with a higher degree of local autonomy. Our results show that the benefits are especially high for married couples and particularly when they have children. Note that the coefficients for the income classes between CHF 30 and 40 thousand of the household type “married, 2 kids” are not statistically significant (Graph 1). As soon as we observe significant estimates the effects follow the same patterns as for the single and the married households. In general the impact remains beneficial for all income classes. This pattern indicates that in more decentralized jurisdictions – ceteris

paribus – the poor benefit, relatively to the rich, more from lower tax rates. These results reject the traditional *Hypothesis 2a* and confirm *Hypothesis 2b*.

To be precise on the interpretation of the results, we need to consider that all cantons decide on the rate of progression and the municipalities can only decide on the ‘level’ of taxation. In other words, we only observe different degrees of decentralization but our sample does not include systems with decentralized decision-making power on the rate of progression on the municipality level. Therefore, we cannot directly test the counterfactual (no decomposition of decision making power) to our tax system. The correct interpretation is that we cannot observe a ‘race to the bottom’ in a system that separates the decision making power to set the ‘level’ of taxation from the rate of progression. In contrary we observe more progressive effects in jurisdictions with a more decentralized system.

This finding is somehow surprising and even more interesting. One possible explanation could be that in equilibrium citizens may have some demand for redistribution. If due to heavy competition redistribution cannot be achieved on the lower levels of government, citizens agree on more redistribution on upper levels of government. Therefore, we could observe a systematic shift of redistribution activity from lower levels of government up to higher levels. There is some anecdotal evidence that people agree on redistribution in referenda and initiatives in Switzerland. Several parts of the Swiss social security system such as the pay-as-you-go-system (the so-called AHV), which has a highly redistributive impact, had to be approved by voters in several referenda. Moreover, an initiative to abolish the highly progressive direct federal income tax had to be withdrawn, because it would not have had a chance to be approved by the voters.¹² Another, but related explanation stems from the fact that a higher degree of local autonomy not only means more tax competition but at the same time also more responsibilities at the local level. Municipalities in decentralized cantons provide in general a broader scope of public goods than in more centralized areas, where the canton provides some of these goods. To provide a larger scope of public goods locally, while facing heavy tax competition it could be reasonable for the communities to collectively agree on higher rates of progression on the upper level of government. But this argument depends much on how fierce tax competition is and on how the relevant interest groups are distributed. To clarify these issues much more research is needed.

Further research will also try to address some data shortcomings. We will try to control for potential other variables like some measures of the quantity as well as quality of local public goods. This might be important because fiscal competition could also induce changes in the provision of public goods.

¹² For more details see e.g. Feld (2000)

Furthermore, some variables containing information about the ideological orientation of a jurisdiction are in preparation and data of the local income distribution became just recently available for some years. As migration flows are a key factor in the arguments, it would be interesting to directly try to evaluate these effects. Unfortunately, the data on migration flows are extremely rare and only available for some special areas (e.g. Schmidheiny 2004). Following the arguments made by Feldstein and Wrobel (1998), another approach to assess income redistribution could include wages and the adjustment mechanisms that follow state interventions.

5. Conclusion

Fiscal federalism is an important instrument to provide local public goods that match local preferences best. Furthermore, the induced fiscal competition should lead to a more efficient allocation of public funds. From a politico-economic perspective fiscal decentralization helps to restrict the government to exploit the tax base. However, standard theory suggests strong distributional effects of decentralized redistribution. Different redistribution policies should not be sustainable in the presence of mobile taxpayers. When citizens are mobile we would expect to observe that rich individuals will migrate to areas with low taxes and the poor are expected to move in jurisdictions with a higher amount of welfare spending. This will cause segregation and will undermine redistributive policies. To prevent such a ‘race to the bottom’ the centralization of redistribution policies is normally suggested. This harmonization however, undermines the positive, efficiency enhancing effects of fiscal federalism. We discuss a simple mechanism that could prevent a collapse of the welfare system without abandoning the benefits of fiscal federalism. We suggest that the decomposition of two important decisions on the tax scheme could prevent the negative distributional effects; namely the separation of the decision to set the ‘level’ of taxation from the decision to fix the rate of progression – the main instrument of redistribution when it comes to taxation. The higher level of government should decide on the rate of progression, in other words on the amount of redistribution, while the lower levels of government compete over the ‘level’ of income taxation. This approach depends on two crucial assumptions: 1) Fiscal competition on the higher level of government must be considerably weaker than on the lower levels. Namely the migration costs on the upper level government, which decides on the rate of progression, must be significantly higher. If not, we will still encounter heavy competition between the different upper level jurisdictions and redistribution will be undermined. 2) The lower level jurisdictions need to rely heavily on the progressive tax rates. If they have less progressive alternatives to generate tax income, they would try to substitute this instrument by a less progressive one. For the

case of Switzerland existing literature suggest that these two preconditions should be met in general. Our empirical analysis at the Swiss local level, which features this specific separation of decision-making power, shows that income redistribution via progressive income taxation persists in jurisdictions with a higher degree of decentralization. Progressive income taxation not only persists in a more decentralized setting, but the rate of progression even seems to increase with a higher degree of decentralization. We suggest that an existing demand for redistribution may cause a shift of redistribution activities from the highly contested lower level jurisdictions up to the less contested level of jurisdictions. But much more research needs to be done to understand the precise mechanism.

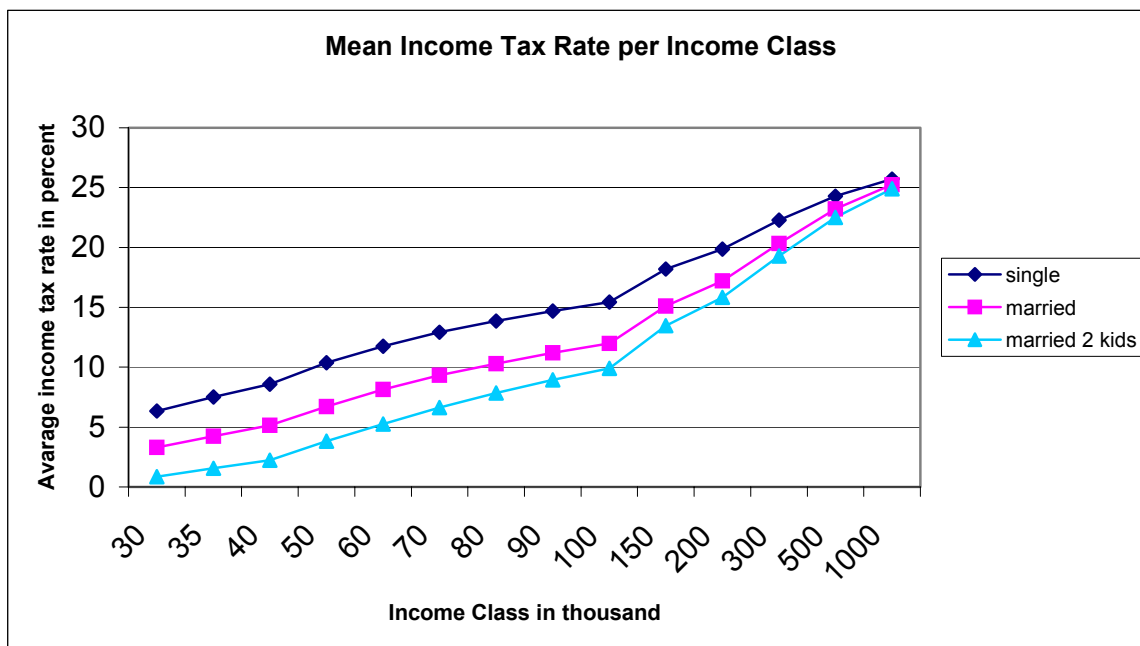
Appendix A

Table A1 contains the mean and standard deviation of 14 income classes between CHF 30'000 and CHF 1 million annual income for the 3 household types 'single', 'married' and 'married, 2 Kids'.

| Household income in CHF 1000 | Single | | Married | | Married 2 Kids | |
|---------------------------------|--------|-----------|---------|-----------|----------------|-----------|
| | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
| 30 | 6.336 | 1.400 | 3.299 | 1.478 | 0.845 | 0.714 |
| 35 | 7.503 | 1.405 | 4.232 | 1.449 | 1.572 | 0.908 |
| 40 | 8.591 | 1.487 | 5.150 | 1.489 | 2.224 | 1.212 |
| 50 | 10.361 | 1.749 | 6.699 | 1.463 | 3.833 | 1.372 |
| 60 | 11.755 | 1.905 | 8.139 | 1.618 | 5.257 | 1.424 |
| 70 | 12.919 | 2.001 | 9.325 | 1.751 | 6.642 | 1.538 |
| 80 | 13.847 | 2.085 | 10.287 | 1.846 | 7.841 | 1.696 |
| 90 | 14.686 | 2.148 | 11.197 | 1.947 | 8.941 | 1.803 |
| 100 | 15.430 | 2.239 | 11.993 | 2.031 | 9.898 | 1.896 |
| 150 | 18.188 | 2.504 | 15.102 | 2.268 | 13.462 | 2.238 |
| 200 | 19.854 | 2.579 | 17.212 | 2.421 | 15.833 | 2.408 |
| 300 | 22.283 | 2.793 | 20.340 | 2.713 | 19.294 | 2.709 |
| 500 | 24.286 | 3.114 | 23.215 | 3.016 | 22.524 | 2.949 |
| 1000 | 25.712 | 3.531 | 25.231 | 3.480 | 24.912 | 3.428 |

Table A1: Mean Income Tax Rate and standard deviation of per Income Class and Household Type

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



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

Table A2 summarizes the data used in our empirical investigation:

| Variable | Min - Max | Sample mean (Standard deviation) | Description | Source |
|---------------------------|------------------|-------------------------------------|--|--|
| Average tax rate | 5.46 - 14.59 | 10.92 (1.73) | Average tax rate on a natural person's annual income. Income classes: CHF 40 - 200 thousand | Swiss Federal Tax Administration |
| Federalism | 3.2 - 6.1 | 4.86 (0.61) | Fiscal Federalism: Extent of decentralization measured by the reported extent of local autonomy | Ladner (1994) |
| Local direct democracy | 0 / 1 | 0.70 (0.46) | Dummy for local direct democracy: town meeting (1); Parliament (0). | Own representation |
| Cantonal direct democracy | 1.75 - 5.69 | 3.95 (1.12) | Cantonal direct democracy: Extent of direct democratic instruments available to the citizens | Frey/Stutzer (2000), Frey/Stutzer (2001) |
| Institutional Competition | 0 - 4 | 1.28 (1.52) | Index capturing institutional design of independent competitor (FC) and measuring intensity of competition | Schelker/Eichenberger (2003) |
| Financial power | 158.92 - 6980.96 | 831.32 (646.17) | Communal financial power: Approximated by the communal revenue from the direct federal income tax | Swiss Federal Statistical Office |
| Population | 1138 - 336822 | 7635.49 (17413.60) | Size of communal population | Swiss Federal Statistical Office |
| Foreigner | 0.01 - 0.56 | 0.18 (0.09) | Fraction of foreign communal population | Swiss Federal Statistical Office |
| Unemployment | 0.5 - 5.1 | 2.55 (0.97) | Cantonal unemployment rate | Swiss Federal Statistical Office |
| Communal surface | 59 - 28225 | 1927.23 (2925.72) | Communal surface in hectares | Swiss Federal Statistical Office |
| Edifical fraction | 0.00 - 0.72 | 0.11 (0.10) | Edifical fraction of communal surface | Swiss Federal Statistical Office |
| Industrial fraction | 0.00 - 0.21 | 0.02 (0.02) | Industrial fraction of communal surface | Swiss Federal Statistical Office |
| Agricultural fraction | 0.00 - 0.81 | 0.40 (0.19) | Agricultural fraction of communal surface | Swiss Federal Statistical Office |
| Mountainous fraction | 0.00 - 0.43 | 0.04 (0.08) | Mountainous fraction of communal surface | Swiss Federal Statistical Office |
| Demography 0-24 | 0.21 - 0.47 | 0.33 (0.04) | Fraction of 0 - 24 years of age on total communal population | Swiss Federal Statistical Office |
| Demography 65+ | 0.03 - 0.27 | 0.13 (0.04) | Fraction of 65+ years of age on total communal population | Swiss Federal Statistical Office |
| Voter turnout | 0.82 - 1.60 | 0.99 (0.11) | Voter turnout per canton on national level: legislative period 1995-1999 | Longchamp (1999) |
| Language | 0 / 1 | 0.76 (0.43) | Language: German (1); else (0) | Own representation |
| Financial Referendum | 0 / 1 | 0.57 (0.50) | Dummy for financial referendum: Referendum available (1), else (0) | Pommerehne/Weck-Hannemann (1996) |

Table A2: The Data

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