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RETHINKING PUBLIC AUDITING INSTITUTIONS: EMPIRICAL EVIDENCE FROM SWISS MUNICIPALITIES

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CENTRE DE RECERCA EN FEDERALISME FISCAL I ECONOMIA REGIONAL

RETHINKING PUBLIC AUDITING INSTITUTIONS: EMPIRICAL EVIDENCE FROM SWISS MUNICIPALITIES[a]

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ABSTRACT: In the economic literature various political institutions designed to control the government have been analyzed. However, an important institution has been neglected so far: independent auditing institutions with an extended mandate to analyze the budget draft and individual policy proposals. We argue that auditors with an extended mandate improve transparency and provide essential information on the impact of policy proposals on common pool resources. This leads to less wasteful spending and a more efficient allocation of public resources. We empirically analyze the policy impact of local auditors with an extended audit mandate in Switzerland. Auditors, who can evaluate and criticize policy proposals ex ante to policy decisions, significantly reduce the general tax burden and public expenditures. We find similar results with different datasets. These results are robust to various changes in the econometric specification.

Keywords: Auditor, audit court, special interests, political economics, public finance.
JEL Codes: D70, H10.

RESUMEN: En la literatura económica se han analizado varias instituciones políticas diseñadas para controlar el gobierno. Sin embargo, una importante institución se ha ignorado hasta ahora: las instituciones auditoras independientes con poder ampliado para analizar el proyecto presupuestario y propuestas políticas individuales. En este trabajo se argumenta que los auditores con un poder ampliado mejoran la transparencia y proporcionan información esencial sobre el impacto de las propuestas de política económica en los recursos comunes compartidos. Esto comporta una mejor utilización del gasto y una más eficiente asignación de los recursos públicos. En este papel se analiza empíricamente el impacto, en las políticas, de los auditores locales con un poder ampliado para auditar en Suiza. Los auditores, quienes pueden evaluar y criticar las propuestas de política económica ex ante a las decisiones políticas, reducen significativamente el gravamen general de los impuestos y el gasto público. En este trabajo se obtienen resultados similares con bases de datos diferentes. Estos resultados son robustos ante diferentes cambios en la especificación econométrica.

Palabras clave: Auditor, tribunal de cuentas, intereses especiales, economía política, hacienda pública.
Códigos JEL: D70, H10.

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1. Introduction

In mature democracies fundamental rules such as the separation of powers and regular elections have been established. They nevertheless suffer from the asymmetric influence of special interest groups, pork barrel politics, and the regular overuse of common pool resources. One of the fundamental problems is the collective action problem and the asymmetry between interest groups to articulate and provide information about their preferences. Thus, special interests are often able to obtain rents at the expense of the general public. Even though various institutional mechanisms have been discussed to mitigate these problems, an important institution has been neglected so far: *independent public auditors with an ex ante audit mandate*.

Traditional auditors typically analyze the financial statements provided by the government and evaluate the use of public funds. All developed democracies feature some form of supreme auditing institution. Usually, these audit offices are fairly large: the German Bundesrechnungshof and its associated offices employ more than 1400 individuals and the US Government Accountability Office (GAO) has a budget of roughly half a billion USD. These audit institutions are widely seen as being an important instrument to hold government officials accountable. However, they usually only targeted at bookkeeping procedures and evaluations of policy implementation, that is, after decisions have been made in the political process. Therefore, these *ex post* audits often come too late, because decisions have already been made and the budget or specific policies have been implemented. In contrast to what is audited in these ex post audits, most budgetary 'tricks' are adopted *ex ante* to decisions and are, hence, not subject to an auditor's evaluation.

We argue that the audit mandate of public auditing institutions has an important impact on policy outcome. In addition to the standard ex post audit of the accounts and the performance of policy programs, auditors should analyze the fundamentals of the budget draft and evaluate individual policy proposals. The additional information provided by such a powerful auditing institution strengthens common pool interests, improves transparency, and reduces the overuse of common pool resources.

We test our hypotheses by analyzing a unique institutional setting in Switzerland where some local auditing institutions are actively involved during the policy making process. They cannot only evaluate programs ex post to the implementation, but also evaluate policy proposals ex ante to the political decision and report their findings to the public. Some institutions are even allowed to make counterproposals, which are then voted on by the citizens. We construct a measure capturing the relevant aspects of the design of local auditing institution and provide

empirical evidence highlighting the importance of such powerful auditors. We estimate their influence on fiscal variables such as public expenditures and taxes. We consistently find that more powerful auditors significantly reduce taxes and expenditures.

In Section 2 we provide the main arguments to extend audit competences beyond traditional ex post audits to include substantial ex ante audits. We then discuss some details of the institutional design for such a new type of auditing institution and formulate testable hypotheses. Section 3 introduces the test case in Switzerland and provides details on the institutional design of local auditors and the codification of the index capturing the auditor mandate. The presentation of the datasets and a discussion of the empirical identification strategy including our various approaches to deal with potential endogeneity follow in Section 4. In Section 5 we present our empirical results. Section 6 summarizes and concludes.

2. Theoretical Considerations

2.1. Extending the Audit Mandate: From Ex Post to Ex Ante Audits

Public auditing institutions aim at reducing the agency problem between citizens and the government by reviewing financial information. Such independent review of financial statements is important because disclosure requirements of financial information are only effective if the information provided is accurate and timely (see Schelker 2007). Standard public auditing institutions analyze financial statements and evaluate government performance in order to improve transparency and reduce information asymmetries between citizens and their government. From this perspective an important line of research related to our question focuses on the impact of budgetary transparency on fiscal outcomes (e.g. von Hagen 1992, Alesina and Perotti 1996, Ferejohn 1999, Milesi-Ferretti 2004, and Alt and Lassen 2006).

Traditional auditing institutions typically conduct *ex post* audits of the financial statements and evaluate bookkeeping procedures for accuracy and accordance with accounting rules and regulations. Some also conduct *ex post* evaluations of programs and policy implementation, i.e. performance audits. Recent contributions analyzing the impact of independent *ex post* financial audits on waste and corruption (e.g. Olken 2007, Ferraz and Finan 2005), and the influence of *ex post* performance audits on various measures of government performance (Schelker 2007) suggest that these audits have favorable effects on the workings of government. However, ex post audits have the great disadvantage that they cannot evaluate the allocation of public funds,

since the audits are conducted after the decisions in the policy process have been made and after the resources have been spent. Consequently, the traditional perspective on auditors is confined to the ex post control of government agents and does not address a major problem in the policymaking process, which is the asymmetric influence of organized special interests.

Special interests are able to inform policymakers about their preferred policies, while at the same time broad-based interests cannot articulate in the policy process. Large groups can typically not overcome the free-rider problem and are hence, not or only weakly organized (Olson 1965, and e.g. Lohmann 1998). Therefore, efficiency-oriented common pool interests (e.g. taxpayers) are underrepresented in the policymaking process. One of the direct implications is that special interest groups tend to formulate policies that do not internalize the full cost because the benefits of these policies target a narrow group while the cost are spread over all of society. Hence, policies that benefit specific groups but are financed out of the common pool tend to be sub-optimally large.[1] At the same time such policy proposals are not critically evaluated if only the unorganized common pool interest is directly affected.

This asymmetry manifests in the entire budget process. There is ample evidence that the fundamental information underlying the budgetary draft (e.g. revenue, growth, or inflation forecasts) can be biased (e.g. Alesina and Perotti 1996, Milesi-Ferretti 2004, Wallack 2007). Similarly, the corner stones of individual policy projects are easily influenced. Examples are cost and revenue estimates, the forecasts of future demand for, and the necessary capacity of public infrastructure such as highways, railways, and tunnels, depreciation rates, maintenance costs, etc. Hence, the reported details of individual policy propositions might not accurately reflect the necessity of the project and its actual impact on common pool resources. All this fundamental information is prone to bias and, at the same time, individual voters and policymakers have no or only weak incentives to invest in careful analyses of the budget and new proposals.

Independent auditors could fill this gap by auditing and evaluating the fundamental economic assumptions and financial implications underlying the budget draft and individual policy projects. The freely accessible information from such *ex ante* audits could substantially reduce

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[1] The structure of the argument is similar to the ones made by Weingast, Shepsle and Johnson (1981) and von Hagen and Harden (1995). Von Hagen and Harden (1995) argue that the beneficiaries of a certain policy do not internalize the full cost of such policies because they are financed out of the common pool. The authors specifically focus on the difference between spending ministers targeting their spending towards a specific constituency, and the Minister of Finance, who is assumed to give more weight to the collective interest of the government. Hence, spending ministers tend to favor higher than optimal government spending.

the information asymmetry, and improve transparency and the quality of information relevant for policy decisions.

So far we assumed that the auditing institution actually reveal essential and accurate information. Obviously, we need to ask why auditors are not captured by and do not collude with special interests. In this section we briefly outline some mechanisms that help keeping the auditor independent and committed to his task.

First, auditors need to have a clearly defined mission to assess the budget and policy propositions from a financial perspective and to transmit the audit results to the principal. A clearly defined mission makes it easier to observe and evaluate an auditor's performance (for a general discussion see e.g. Dewatripont, Jewitt and Tirole 1999).

Secondly, auditors should not have voting rights or any authority to introduce sanctions nor co-decision rights. This prevents auditors from directly engaging in log-rolling and restricts their influence in the decision-making process to consulting, more specifically the production of information. Hence, auditors are, compared to traditional policymakers, less attractive targets for lobbyists and the opportunities to extract rents from the office are much smaller.

Thirdly, auditors have to be given incentives to cater to broad-based interests. The direct election of public officials enhances their accountability to the voters (Frey 1994, Besley and Coate 2003, and more generally Persson, Roland and Tabellini 1997). This is especially important since auditors with an extended ex ante audit mandate might be in conflict with interests of members of the legislative and the executive. Therefore, auditors may not be appointed by the agents it ought to supervise, but directly by the principal, the citizens and taxpayers of the entire jurisdiction who collectively have an interest in sound financial analysis.[2] The separate election of auditors and policymakers makes it possible for voters to unbundle their special interests from the more general common pool interests they share with other taxpayers. If auditors are directly elected electoral rules must be considered. In order that auditors pursue broad-based interests and focus on allocative efficiency rather than on specific interests and redistribution they have to be elected in majority votes in a single jurisdiction-wide

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[2] For a more detailed discussion of the relevant literature and empirical evidence for the case of regular auditing institutions see Schelker (2007). The empirical analysis of the selection mechanisms of US State Auditors suggests that auditors with more substantial (ex post) audit competences should be directly elected rather than appointed. In our setting auditors are endowed with an even broader set of tasks and competences including ex ante audits, which makes direct election even more important. For a general discussions of whether public officials should be appointed or elected see e.g. Ferejohn (1999), Besley and Coate (2003), and Maskin and Tirole (2004).

district. Auditors elected in a single jurisdiction-wide district must seek support from all over the jurisdiction, which ensures broad-based interest representation.[3]

2.2.   Hypotheses

Based on our previous discussions we can formulate hypotheses. If auditors have a stronger audit mandate including the evaluation of the budget draft and individual policy projects, the quality of the information underlying the budget draft as well as information on the financial and fiscal impact of proposed policies will be revealed. This reduces the information asymmetry between special interests and broad-based common pool interests fostering the overuse of common pool resources.

Hypothesis 1:

> A more extensive audit mandate including a full set of ex ante audit competences should (cet. par.) reduce general expenditures and taxes.

In a regression framework we estimate the following general specification and expect the estimated effect of auditors (β) to result in a negative coefficient.

$$y = \alpha + \beta * auditor + \boldsymbol{\delta} * \boldsymbol{I} + \boldsymbol{\lambda} * \boldsymbol{X} + \varepsilon, \tag{1}$$

where y is a variable reflecting fiscal outcome such as e.g. government expenditures, or taxes, and *auditor* is a variable capturing the auditor mandate and involvement in the policy process. Furthermore, $\boldsymbol{\delta}$ and $\boldsymbol{\lambda}$ are parameter vectors, $\boldsymbol{I}$ is a matrix reflecting additional institutional features influencing the decision-making process, $\boldsymbol{X}$ is a matrix including important cross-section characteristics, and ε is the error term.

Our theoretical arguments make it possible to derive a differential hypothesis. This is especially important since this helps corroborating our theoretical considerations and attenuate possible concerns relating to endogeneity.

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[3] More on electoral rules and district size see e.g. Baqir (2002), Milesi-Ferretti, Perotti and Rostagno (2002), or Persson and Tabellini (2004).

Since free-rider and collective action problems become more pronounced with increasing group size, we expect the organization problem of common pool interests to be more pronounced in larger relative to smaller jurisdictions. This leads us to formulate our next hypothesis.

Hypothesis 2:

> The influence of an extensive audit mandate should (cet. par.) be stronger in larger relative to smaller jurisdictions.

Thus, we estimate a specification including an interaction term between the population size of a jurisdiction and the auditor variable. We expect both β and γ to be negative.

$$y = \alpha + \beta * auditor + \gamma * (population\ size * auditor) + \pmb{\delta} * \pmb{I} + \pmb{\lambda} * \pmb{X} + \varepsilon \qquad (2)$$

We test these hypotheses empirically with data at the Swiss local level, where in some jurisdictions auditors have substantial ex ante audit mandates.

3.   Auditors in Switzerland

3.1.   The Swiss research laboratory

Switzerland and the United States share some important institutional characteristics that make them well suited for empirical research for at least two reasons: 1) Both exhibit highly decentralized government structures, with different government levels enjoying a high degree of autonomy. The Swiss federal structure consists of 3 hierarchical government layers: the federal government (the Confederation), the 26 Cantons (the States) and the 2880 municipalities, which all enjoy a high degree of autonomy and independently take a wide range of political decisions (Ladner 1994, Feld, Kirchgässner and Schaltegger 2003). Therefore, we observe considerable variation in the institutional design across jurisdictions. 2) A further important element of the US and (even more pronounced) the Swiss government structures is that citizens enjoy various direct democratic participation rights such as different forms of referenda and initiatives. Note that not all cantons feature the same participation rights (Stutzer 1999 and Feld and Matsusaka 2003). These direct democratic rights are an important characteristic because they allow the evolution of institutions that more effectively control representatives. In contrast, policymakers themselves have typically no incentives to implement institutions that effectively restrict their

own scope of action. The decentralized structure makes policy and institutional experiments in a common (e.g. national) framework possible, while direct democratic rights enhance the probability for creating new institutions, but at the same time provides an effective mechanism to abort failed experiments. These and other institutional features make the Swiss case an attractive laboratory to conduct empirical research. Of course, cross-country research often features much more institutional variation. However, the common institutional framework substantially reduces the problem of unobserved heterogeneity, and thus, diminishes omitted variable bias (see also Besley and Case 2003).

The municipal revenue and expenditure shares almost equal the shares of the federal government. All the three government 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 major part of direct income taxes, although the federal government also raises its own (highly progressive) income tax. The extent of the total income tax burden (including cantonal, municipal, and church taxes) varies considerably across cantons.

3.2.   Local auditors in Switzerland

The Swiss institutional setting makes it possible to study the impact of auditors with an extended audit mandate. Independent local auditors, the so called local finance commissions, exist in all municipalities with town meeting.[4] Note that more than 50 percent of the total Swiss population lives in such municipalities. In this setting citizens elect the government as well as an audit body, the finance commission. In the town meeting the government presents its policy proposals for the following period, while the auditors may analyze the government proposals and may be permitted to provide information and present counterproposal.

The cantonal legislation on municipalities defines the basic institutional design of these auditors, but still leaves the municipalities some autonomy in the de facto design. However,

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[4] We only consider communities with town meetings, because only in this institutional setting is the auditor really independent. In parliamentary systems the finance commission is an ordinary legislative committee (e.g. Weingast and Marshall 1988 or Shepsle and Weingast 1994), an exception being some larger Swiss cities. In e.g. Zug and Olten (both featuring parliaments) the finance commission is an independent and directly elected body. However, these units only conduct the ex post audit of the accounts, similar to regular audit courts and cannot conduct any ex ante audits.

while the intra-cantonal differences are very small, the inter-cantonal variation is large.[5] In some cantons the auditors can only audit the accounts and similar to an audit court, criticize the government at the end of a fiscal year (ex post). In other cantons, however, auditors are involved in the actual policy making process and have encompassing ex ante audit competences as well as proposal and amendment rights. In addition to the standard ex post audit of the accounts, they can ex ante evaluate the budget proposal, individual investment projects, as well as the income tax rate and all other sources of income. To transmit the resulting information from the auditing process, auditors compile a report with the results of their analysis, announce their recommendation whether to support or to oppose the government proposal, and some are even allowed to advance amendments and alternative proposals. Thereafter, citizens choose in a majority vote between the status quo and the different proposals and delegate the policy implementation to the government.

All local auditors are directly elected by the citizens in a jurisdiction wide district. The office has a clear mandate that is specified by local and cantonal laws and regulations, and it requires specific audit skills. Hence, we often find auditing or accounting professionals in the audit office. Compared to a mandate in an executive position, the audit mandate is less time consuming, and professional auditing know how can be transferred from the private sector to political office quite easily. Auditors are usually not career politicians, serve only as auditor, and do not subsequently run for an executive office. Local auditors have neither voting rights nor the power to implement their own proposals and, hence, they do not exercise any direct influence on the political outcome. These features are important in order to keep the audit office independent from other political offices.

It is essential to identify whether local auditors tend to be captured by special interests or not. From our many discussions with municipal auditors and experts from cantonal authorities responsible for monitoring the municipalities and from our survey evidence of the canton of Zurich, we are confident that auditor independence is strong and the selection of individuals in the finance commissions is different from regular political offices.[6] The available evidence

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[5] Even though cantons frequently leave some autonomy in the de facto design to the municipalities, they often provide some general (non-binding) guidelines on how to organize the local auditing commission. Therefore, we observe extensive homogeneity across municipalities in a canton. However, one canton, the Canton of Zurich, shows at least some variation across municipalities. We have conducted a systematic survey of all municipal auditors in that canton. Descriptive statistics and some initial results from this dataset (Megert 2006), point in the same direction as the empirical evidence provided in the subsequent sections.

[6] For an overview of some more systematic evidence on the Canton of Zurich, see Megert (2006) who conducted a survey of local auditors in the Canton of Zurich. The Canton of Zurich is a good example, because most finance commissions are involved in the policy process and they are endowed with substantial ex ante audit rights. A brief summary of the relevant insights can be found in Schelker (2007).

points towards a different selection of the members of the local finance commissions. While financial expertise is important for members in the local audit offices, the traditionally strong local interest groups such as farmers and local business representatives are relatively underrepresented in municipal finance commissions.

3.3. 'Quantifying' auditor influence: The finance commission index

To measure the scope of the audit mandate we constructed an index that captures the institutional design of the local finance commission for the 26 cantons. The intra-cantonal design is relatively homogenous, whereas the inter-cantonal variation is important. In order to identify the *de facto* design, we first analyzed the (de jure) cantonal legislation on municipalities; then we investigated whether the municipalities made de facto use of the opportunities offered by cantonal law (see Schelker 2002 and Schelker and Eichenberger 2003). In summary, auditors may have the following competences and proposal rights:

1. Audit competences
   - Ex post audit of the accounts
   - Ex post audit of individual projects
   - Ex ante audit and evaluation of the budget proposal
   - Ex ante audit and evaluation of individual projects
2. Proposal rights (directly to the citizens)
   - Recommendation with respect to the government proposition (acceptance/rejection)
   - Right to advance alternative propositions

The audit competences define the item to be audited and at what moment the audit takes place (before or after implementation). The "Ex post audit of the accounts" is the regular audit procedure in which the auditor examines the reliability of the accounts and their compliance with general accounting standards. In the "Ex post audit of individual projects" the auditor analyzes individual projects by evaluating the effectiveness of its implementation and identifying any misuse of public funds. In the "Ex ante audit and evaluation of budget proposal" the auditor evaluates the budget proposal's compliance with accounting standards and evaluates the soundness of the budget proposal and if it is appropriate to the financial situation of the jurisdiction. In the "Ex ante audit and evaluation of individual projects" the commission evaluates individual investment projects before they are adopted and implemented. In order to effectively bring the extracted information into the political process, auditors may have recommendation and amendment rights.

We code each aspect with 1 (available) or 0 (not available) and aggregate them to the "finance commission index". We exclude "Ex post audit of the accounts" and "Recommendation with respect to the government proposition (acceptance/rejection)" from our index because all auditors feature these competences (for details see Table A1 of the Appendix, or Eichenberger, Schelker 2007).

4.   Data and Empirical Strategy

As a consequence of the extensive decentralization of Switzerland, the cantons are responsible for the collection of most of the data of interest to us. Unfortunately, not all cantons use the same criteria, rules, and definitions when assembling the data. Therefore, comparable data is frequently only available as an aggregate of cantonal and municipal data at the cantonal but not at the municipal level. It is important to note, that not all cantons grant their municipalities the same fiscal autonomy and the division of duties and responsibilities between cantons and their municipalities are not necessarily similar. Therefore, e.g. low municipal spending might just reflect heavily restricted competences and not particularly efficient governance. Hence, there is a substitution effect among municipal and cantonal spending and taxation (see Eichenberger 1994, Schaltegger 2001). This makes it necessary to analyze data including both government levels simultaneously.

Since not all desirable information is available at the municipal level, we analyze two different datasets each including cantonal and local level data, but one aggregated at the municipal, and one aggregated at the cantonal level. Focusing on the municipal dataset we can test Hypothesis 1 by estimating the influence of local auditors on income tax rates. We also disaggregate the auditor index and analyze the impact of the various sub-indices. Furthermore, we evaluate whether auditors with an extended mandate have a greater impact in larger municipalities in which the collective action problem should be more pronounced (Hypothesis 2). The dataset containing information aggregated at the cantonal level enables us to analyze the impact of auditors on additional dependent variables such as taxes, expenditures, revenues, and deficits (Hypothesis 1).

4.1.   Municipal data

Our empirical analysis at the local level focuses on data for the aggregated cantonal and local income tax rate of a natural person, for which there is a dataset from the Swiss Federal Tax

Administration. This dataset provides information on tax rates for the 730 largest Swiss municipalities. Since the dataset is only available for a few years and we do not observe any significant variation in the design of the audit institution in this period, we conduct a cross-section analysis for the year 1999.

Dependent variable: Tax rates

The tax rate includes 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. 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". We calculate the average tax rates across all income brackets between CHF 40'000 and 200'000 annual income and across the three household types. Estimations with the complete dataset controlling for the different income and household classes produce largely the same results.

Explanatory variables

The finance commission index capturing important aspects of the institutional design of local audit institutions varies considerably across cantons, but the intra-cantonal design is fairly homogenous. The variable enters the dataset as the *auditor variable* and varies between 0 and 4.

Other institutional features such as the extent of local and cantonal direct democratic rights or the degree of decentralization are important for studies on Switzerland. Therefore, we include different indicators for direct democratic instruments and fiscal decentralization in our empirical models. Direct democracy at the local level is captured by 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.[7] As a robustness test we also use a sub-index focusing only on the availability of a financial referendum, and we use another indicator proposed by Pommerehne and Weck-Hannemann (1996) measuring whether the population can decide on the tax rate and the budget.

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[7] Christoph Schaltegger, University of St. Gallen, provided the index for various other years not included in Frey and Stutzer (2000, 2001).

To map the degree of fiscal decentralization 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' degree of local autonomy. This index is widely used to measure local autonomy and to proxy fiscal decentralization in Switzerland (e.g. Frey and Stutzer 2000, 2001, and 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, i.e. the division of competences between the canton and its municipalities (Frey and Stutzer 2000). Other measures such as the ratio of municipal expenditures to total cantonal and local expenditures tend to be endogenous to the institutional framework and many other factors. However, as this ratio is one of the standard approaches for cross-country research and is also used in Switzerland (e.g. Schaltegger 2001 and Feld, Kirchgässner and Schaltegger 2003), we include it as an alternative measure.

To control for community specific characteristics, which impact on public expenditures and taxes, we include a broad set of standard control variables such as the average municipal income, the population size, its demographic structure, the unemployment rate, the fraction of foreign population. Furthermore, we also include topographic factors such as the surface of the municipality, its edificial, industrial, agricultural, and mountainous fraction, level of education, political preferences as measured by party support in federal elections, and a dummy for language affiliation (German 1, else 0). The cultural background reflected by the language affiliation serves as a proxy measure for fiscal preferences. Pujol and Weber (2001) and Funk and Gathmann (2005) show that there is a systematic relationship between cultural affiliation and fiscal preferences.

To control for effects due to some specific income distribution (e.g. Meltzer and Richard 1981) it would be useful to have data on the mean and median income or gini-coefficients (pre- and after-tax). This data is, however, only available for the fiscal year 1995/1996 (Ecoplan 2004). Even though the time periods do not perfectly match, we will use the data as a further robustness check.

Of course, it would also be interesting to control for other political variables, such as the composition of the government and government fractionalization, which have been found to be relevant in explaining fiscal policy in cross-country as well as in US cross-state regressions. However, for the Swiss local level, data on the composition of the governments is neither available nor would it be very informative. Since most members of Swiss local governments are

elected on a personal basis in majority votes they are often not members of an established political party. Moreover, it is difficult to compare political parties across cantons as even the cantonal sections of parties with nationwide activities largely differ between cantons, as is, e.g., evidenced in the fact that they often advance opposing recommendations for nationwide referenda. Therefore, we do not include measures for the political position as well as the composition of the government to our estimates. However, we include average party support in national elections per municipality for the main national parties. Furthermore, we also try to control for local public goods provision. However, there is only sufficiently good data on the availability of public transportation.[8]

4.2.   Cantonal data

At the cantonal level we assemble a dataset for the period between 1990 and 2000. Unfortunately, we were not able to obtain reliable information about the *de facto* design of local audit institutions further back in time.

Dependent variable: Tax burden and government expenditures

Reliable data exists for the aggregate of the local and cantonal tax burden as well as public expenditures, revenues, and deficits for each canton. The aggregated tax burden on natural persons is an index constructed by the Swiss Federal Statistical Office and includes the taxes levied by the canton, the municipality, and the local official church communities on a natural person's annual income. The data on aggregated local and cantonal per capita public expenditures and revenues include the cantonal government expenditures (revenues) and the aggregated government expenditures (revenues) from all municipalities in the same canton over a budgetary period and are provided by the Swiss Federal Tax Administration. Unfortunately, these data also include federal grants, which are used to finance federal and trans-regional infrastructure projects. These vertical transfers appear in cantonal expenditures even though they are heavily co-financed by the federal government. In this respect the Canton of Uri is an outlier because a large share of its budget consists of such infrastructure projects. Thus, in our expenditure regressions we eliminate the observations from the Canton of Uri. The data on public deficits is simply the yearly difference between revenues and expenditures.

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[8] In order to evaluate the effect of institutions on fiscal variables, controlling for public goods provision is important. It is obviously a very challenging task to find good proxies for public goods provision and hence, most empirical studies do not even attempt to deal with this problem. We are aware that the proxies we use in the entire study are not perfect. However, we consider testing the robustness of our results with these imperfect measures to be an improvement.

Explanatory variables

We already discussed the institutional variables we use to analyze municipal data. Most of these variables can directly be used for our analysis at the cantonal level. However, the dummy variable for local direct democracy must be refined. In this dataset at the cantonal level we use the fraction of the cantonal population living in municipalities with town meetings. Furthermore, our auditor measure must also be adapted. Because powerful independent auditors only exist in municipalities with town meetings, we weight the finance commission index with the prevalence of town meetings in each canton.

We include a standard set of control variables mostly identical to the covariates discussed for the municipal dataset. However, we have some additional variables reflecting various aspects of public goods provision. The dataset contains data about primary and secondary school enrollment, class size, traffic infrastructure, medical doctors per capita, pharmacies per capita, rental prices, conviction rate, prison sentences per capita, and fines per capita etc. Unfortunately, we could not identify better proxies because e.g. school performance measures etc. are not systematically available in Switzerland.

As a further step to reduce omitted variable bias, we include direct measures of fiscal preferences. Fiscal preferences might be important when analyzing fiscal institutions. They could be the driving force in establishing institutions and simultaneously also directly shaping the policy outcome. Not including such a measure could result in serious endogeneity problems, where the effect of institutions cannot be separated from fiscal preferences. It is only recently that Funk and Gathmann (2005) calculated measures of fiscal preferences by analyzing initiatives and referenda at the national level. Using factor analysis and a broad set of direct democratic policy decisions, they identify three factors that reflect different fiscal preference dimensions. They show that the influence of direct democracy is substantially reduced if fiscal preferences are taken into account.

For more information on the most important variables see the details and descriptive statistics in Tables A2 and A3 of the Appendix.

4.3. Empirical strategy

The *municipal* cross-section data provide information to test whether auditors with an extended audit mandate have an influence on tax rates (Hypothesis 1) and if this impact varies conditional on the size of a community (Hypothesis 2). We estimate the effects using ordinary least squares

(OLS) and weighted least squares (WLS) estimators and adjust standard errors for clustering. Within the cantons municipalities face similar constraints and the standard errors may be correlated within cantons. Therefore, we correct the standard errors by clustering according to the 26 cantons (Moulton 1986). Without clustering we may encounter downward bias of the standard errors. To account for the possibility of non-random sampling, we estimate WLS models. To obtain approximately unbiased estimates we include sampling weights equal to the inverse of the probability of a municipality being included in the sample.[9]

The *cantonal* dataset assembles data between 1990 and 2000. Since we do not observe any significant variation of our institutional variables over time, we cannot control for time-invariant unobserved heterogeneity in a fixed effects (FE) framework. Thus, we estimate random effects (RE) models, which assume cross-section error components to be uncorrelated with the explanatory variables. We also estimate our data panel with a pooled OLS model, which is the standard method applied by most studies facing time invariant institutions. We consider the RE estimator to be our first reference and report langrangian multiplier tests.[10] We further check the robustness of our results by estimating every year in a single cross-section and we present results for the first and last year of our panel.[11]

Obviously, there are serious concerns about the causal impact of auditors on fiscal variables. Our estimates could suffer from reverse causality, simultaneity, and omitted variable bias. Effective institutions are not necessarily exogenously given. Given the time persistence of our institutional variables, reverse causation seems not to be a great concern. However, simultaneity and omitted variable bias need to be addressed more carefully and we follow several strategies. First, as already mentioned we introduce a measure of fiscal preferences proposed by Funk and Gathmann (2005). If the audit institution is only the result of specific fiscal preferences, which at the same time also shapes political outcomes, then we could not make inference about the influence of local auditors. The inclusion of a fiscal preference measure in our empirical model should clarify this point. Secondly, we test a differential hypothesis (Hypotheses 2) which makes it less plausible that an unobserved factor drives the results so subtly. Thirdly, we present

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[9] It might be possible that the probability of a municipality being included in the sample depends as well on its population size. Therefore, we also calculated population size adjusted sampling weights. Our results are widely unaffected. In the following discussion we will use the more common and also more conservative sampling weights.

[10] Besley and Case (2003) also discuss this problem and they present their results for the impact of voter initiatives (that do not vary significantly over time) on taxes and expenditures. They use OLS, RE, and regressions on state means. They report fairly large differences of the estimated coefficients when applying these methods, especially when analyzing government expenditures.

[11] Cross-section results for the entire period can be found in Schelker (2007).

an instrumental variable (IV) approach and run two stage least squares (2SLS) regressions (e.g. Wooldridge 2002) in a separate paragraph.

5. Empirical results

5.1. Hypothesis 1 – Municipal data

Hypothesis 1 suggests a negative impact of stronger audit mandates including ex ante audits on tax rates. Column 1 of Table 1 contains a simple OLS regression with standard errors adjusted for clustering. In this basic regression model we include the auditor variable, other institutional variables, local income, and the population measure. Column 2 presents the same basic regression estimated using a WLS model in which we control for potential selection bias by introducing sampling weights. Columns 3 to 7 add groups of control variables to the basic regression model in column 2. We first add the language variable as a proxy for fiscal preferences, and then include socio-demographic, topographic and economic variables, public goods and political proxies, and finally we estimate all covariates simultaneously.

[Table 1 about here]

The econometric results in Table 1 confirm the expected theoretical effects of Hypothesis 1. The *auditor* variable exercises a highly significant negative impact on the aggregated cantonal and municipal tax rates. A one point increase of the auditor variable implies an average reduction of the income tax rate of roughly 0.45 percentage points. The results from the basic regressions are not sensitive to the inclusion of additional explanatory variables. The estimated coefficient remains stable and highly statistically significant. Since the auditor variable ranges from 0 to 4 a maximum potential reduction of roughly 1.8 percentage points is possible. Taking into account that the average tax rate amounts to roughly 11 percent, the potential effect of the auditor design on the individual tax rate is about 16-17 percent lower taxes if auditors are fully integrated during the policy process. Consequently, the effect of audit institutions is not only statistically significant, but also economically highly relevant.

Local direct democracy in the form of town meetings exhibits a positive impact on tax rates. The coefficient is statistically significant, and its influence is with 1.1 fairly high. Ranging from 0 to 1 the potential effect is roughly 10 percent higher taxes. However, the potential effect of local direct democracy is still much smaller than the potential effect of the auditor variable.

Cantonal direct democratic instruments do not significantly affect tax rates. The results also hold for alternative measures of direct democracy such as the sub-index reflecting the right to a financial referendum by Frey and Stutzer (2000) or the measure proposed by Pommerehne and Weck-Hannemann (1996). In line with the standard literature, *fiscal decentralization* exhibits a large negative and significant influence on tax rates. For every unit of increasing local autonomy, we estimate an average tax rate reduction of roughly 1.2 percentage points. Considering that the variable ranges from 3.2 to 6.1 we observe a potential effect of 3.5 percentage points, or up to 30 percent lower tax rates, which makes fiscal decentralization highly relevant. We provide a brief discussion and some interpretation of the overall effects of institutional variables at the end of the empirical section.

Local income has a strong negative impact on the tax rate, while the *population* measure does not reach statistical significance. Furthermore, our results are robust to the inclusion of a fiscal preferences proxy measure (*language*), which indicates that the influence of auditors is not endogenous to fiscal preferences (column 3). The additional socio-demographic variables basically confirm the expected results; however, their impact is frequently not statistically different from zero. The fraction of the population not included in the production process (*old* and *young*) both exhibit a tax increasing effect. Including further control variables such as the *population density*, the *mountainous*, *agricultural* and *industrial area*, or the *fraction of votes for the social democrats* (which could also be interpreted as a proxy measure for fiscal preferences), or the fraction of the population using *public transportation* to commute to work (public goods proxy) do not affect our results of the influence of local auditors on taxes. We also tested whether some specific income distribution affects our results and included the mean to median income ratio, even though the data is only available for the fiscal year 1995/1996. Our results are robust to the inclusion of all these measures.

Subsequently we only present the results of our main variables of interest and do not discuss the effect of control variables as long as the effects are similar to previous results. We restrict our discussion to additional or 'surprising' results.

Disaggregating the auditor variable

In order to better understand the influence of the different parts of the auditor variable we disaggregate the auditor index into its main elements. Following our theoretical discussion the difference between ex post and ex ante auditing mandates seems most important. Totally disaggregating the index is not suitable because the sub-indices are not entirely independent from each other. For example it would not make sense to endow the auditor with proposal rights

during the policy process without endowing it with at least some audit rights ex ante to policy decisions. Furthermore, it is also true that if an auditor can evaluate individual policy projects, it is also endowed with the right to analyze the budget proposal. Thus, the ex ante measures of our index are not entirely independent from each other. Therefore, we will mainly disaggregate the index into an ex post (dummy) and an ex ante (scale 0-2) variable.

In Table 2 we present the results when disaggregating the auditor index and estimate the different components separately.

[Table 2 about here]

We find a significantly negative influence of *ex post audits* in all estimated specifications. This indicates that analyzing individual projects after implementation has beneficial effects. The result is also consistent with general findings evaluating US auditing institutions (Schelker 2007). The influence is not only statistically significant but also economically relevant. The estimated coefficient decreases when including the ex ante audit variable. Otherwise, the estimates are robust to the inclusion of additional explanatory variables and changes in the specification, such as simple OLS estimation or the inclusion of different sampling weights.

The influence of *ex ante audits* also exhibits a statistically significant and robust negative influence. The coefficient of the ex ante variable also decreases in size when including the ex post audit variable. Since the measure adds two dummy variables (budget proposals and individual project audits) and hence ranges from 0 to 2, the potential effect results in around 9 percent lower tax rates (columns 5 and 6), which is similar in magnitude to the potential impact of ex post audits (varying between 0 and 1).

Our estimates of the *ex ante* indicator including the *proposal rights* variable yield significant negative coefficients (columns 7 and 8). The measure ranges from 0 to 3 and exhibits a potential impact of a roughly 9 percent tax reduction. We find that the influence of proposal rights is weakest and does not have a significant effect on its own (estimates not reported). This is not entirely surprising because all finance commissions have to submit a report to the citizens. We observed that if auditors do not have a formal right to advance counterproposals, often a citizen close to a member of the finance commission proposes amendments. Furthermore, if the reports contain all relevant information and are easy accessible, the transaction costs for individual citizens to make proposals and amendments based on the audit report should be relatively low. The magnitude of the combined effect of the ex post and the ex ante measures is, with roughly

1.8 percentage points (16 percent) lower tax rates, similar to the estimates including the auditor index entirely.

If we include all four measures (individual projects ex post, budget proposals ex ante, individual projects ex ante, and proposal rights) separately we only find significant effects for the ex post measure (not reported). All other measures do not reach statistical significance, but the coefficients are very close to the ones presented in Table 2. This finding is not at all surprising because there is only one ex post variable, whereas there are three ex ante variables characterizing the activity during the policy process, which are correlated. An *F*-test of joint significance of all auditor sub-indices indicates a significant influence of this set of variables.

Unfortunately, when using the dataset at the cantonal level, some of the sub-indices do not feature sufficient variation to estimate reasonable effects. Furthermore, the cantonal data would also require the indices to be weighted with the prevalence of town meetings (see previous discussion).

5.2.   Hypothesis 1 – Cantonal data

Table 3 and Table 4 present the estimates on taxes and expenditures for the dataset at the cantonal level. Since the data are aggregated at the cantonal level and we face a much smaller data sample that contains only the 26 cantons over several years, we cannot expect to find results that are as clear as at the local level. Our tables present simple cross-section estimates for the first and last year of the sample period, report the pooled OLS results for our basic variables, and then present the estimated coefficients using random effects (RE) models with and without time effects.

a)   Taxes

Focusing on the *tax data* we see from Table 3 that the estimated *auditor* coefficient is significant in all different regression models. The coefficient is fairly stable around a value of about -9 and remains statistically significant even for the cross-section estimates with only 26 observations (columns 1 and 2). When comparing a canton with municipalities featuring the weakest form of auditors with one featuring the most powerful audit institution, the potential effect on taxes is roughly 25 percent tax relief (16-17 percent in local dataset).

[Table 3 about here]

These results hold also for the other yearly cross-section estimates, for which only the years 1995 and 1996 do not reach statistical significance. The pooled OLS estimates (columns 3 and 4) yield significant effects even with standard errors adjusted for clustering. Estimates without clustered standard errors produce much smaller standard errors. The coefficients reported in columns 5 to 7 estimating RE models produce largely the same results. In column 6 we report the results for one of the three fiscal preference measures (factor 1). This measure reflects conservative-liberal dimensions (Funk and Gathmann 2005: 20) and is the only measure having a significant influence in at least some regressions.[12] Including the other measures does not impact on our main findings either. The additional variables – which we also included separately (not reported) – are socio-demographic variables (unemployment, share of young and elderly population, share of foreigners), structural variables (population density, topographic conditions, fraction of industrial area), and variables reflecting public goods provision (class size in primary school, rental prices, convictions per capita, and total road length). When including these measures (column 7), the estimated auditor coefficient remains statistically significant, and the effect remains large if all variables are included simultaneously. Note that the estimates remain largely robust to the inclusion of proxy variables for public goods provision. Furthermore, year fixed effects do not alter our results.

b) Expenditures

When analyzing *expenditure* data (Table 4) we find additional evidence for our theoretical predictions that powerful *auditors* significantly reduce total public expenditures. We find statistically significant estimates for almost all different estimation procedures and specifications. However, compared to our previous estimates on taxation, the estimated coefficients are more affected by variations in model specifications. Even though the effects mostly reach statistical significance, the coefficients vary in size. As can be seen from Table 4, the estimated auditor coefficient varies between -511 and -1086. The interpretation of the coefficient is straightforward: A one point increase in the auditor variable reduces expenditures between 500 to 1000 CHF per capita, which results in a potential effect of around 13 to 26 percent lower expenditures.[13]

[Table 4 about here]

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[12] Factor 1: conservative-liberal attitudes, Factor 2: attitudes favorable to redistribution, Factor 3: attitudes favorable to regulation. For details see Funk and Gathmann (2005).

[13] We also estimated the effects using log specifications. The estimates are very similar and available upon request.

Column 6 shows the results including a measure for fiscal preferences (Factor 3). We use the third factor (preference for state regulation) because it is the only factor that is statistically significant in at least some specifications. The other factors do not exhibit a significant influence and do not change the results. In some RE specifications including larger subgroups of additional control variables, the estimated auditor coefficient does not reach conventional levels of statistical significance, but it reaches again values between -500 and -900. It is not surprising that the data aggregated at the cantonal level are more sensitive to the inclusion of many different variables at the same time. The number of cantons is constraining and the yearly observations cannot be considered completely independent. In this light the results are even more striking that we always find a large negative, and in nearly all cases statistically significant, impact of auditors on government expenditures.

Summing up, as suggested by Hypothesis 1, more powerful auditors significantly reduce taxes and expenditures. The effects are not only statistically significant, but they are also large and economically highly relevant. The effect of direct democracy does not seem to be robust and remains inconclusive. The estimates concerning decentralization are negative and largely in line with the literature and other studies for Switzerland. According to our expectations income affects expenditures and taxes, whereas the population measure does not impact on our data.[14]

5.3.   Hypothesis 2 – Municipal data

According to hypothesis 2 larger municipalities face a more pronounced control and collective action problem than smaller municipalities. In smaller towns citizens might be better able to overcome the free-rider problem. Thus, the broader interests are better 'organized' and the asymmetry between general and special interests is smaller. Furthermore, in smaller towns it should be easier to monitor the government, because their problems and policies are less complex, and social ties might induce public officials not to deviate too much since they could suffer social punishment. Therefore, the control and the collective action problem should be more pronounced in larger municipalities. Hence, the impact of auditors with an extended mandate should be higher in such municipalities. We test this hypothesis by estimating an interaction term of our auditor variable with the population size.

[Table 5 about here]

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[14] We also estimated log specifications, which did not change our findings. However, the squared term of our population measure sometimes had a small positive significant impact.

The results in Table 5 report empirical support for this hypothesis. In most specifications the *interaction term* of the *auditor* with the *population* variable has a statistically significant negative influence on tax rates. The estimates are robust to variations in model specifications and to the inclusion of additional controls. The estimated effect of the auditor variable by itself remains almost unaffected. Also the estimates of the other variables are robust to the inclusion of the interaction term. The result suggests that auditors with an extensive audit mandate are especially beneficial in large municipalities with a more pronounced control and collective action problem.

5.4. Causality issues

Causality is obviously a crucial issue. Our theoretical considerations suggest a causal relationship going from auditors to policy outcomes. However, one might come up with arguments suggesting reverse causation or that a third unobserved factor determines both aspects simultaneously. Certainly, institutions do evolve over time and insofar, they are partly endogenous.

In our case, it is difficult to argue for reverse causality, because the institutional design of audit institutions was fairly stable over time. The second argument of simultaneity is more important for fiscal institutions. It is often argued that fiscal institutions are shaped by certain fiscal preferences that simultaneously determine policy outcome and institutional design. As already mentioned we address this issue by including a measure for fiscal preferences and we did not find evidence challenging our results. Furthermore, we discussed a differential hypothesis derived from our theory. This makes it less plausible that an unobserved factor is driving both institutions and outcomes simultaneously in such a subtle way. Even less convincing is the argument of reverse causality. However, we also try to address the problem of causality econometrically by estimating instrumental variables.

Typically, it is very difficult to find valid instruments for institutions. Cross-country research has established various cultural, geographic, and historical variables such as language, colonial origin, legal origins, distance from the equator, or settler mortality as instruments (see e.g. Persson and Tabellini 2004, Djankov, La Porta, Lopez-de-Silanes and Shleifer 2003, Acemoglu, Johnson and Robinson 2001, Acemoglu and Johnson 2005). In US cross-state research topographical features such as natural boundaries (e.g. streams) have been used to estimate the influence of school competition on public school productivity and student achievements (Hoxby 2000). Following these approaches we consider measures reflecting culture (language) and

topographic circumstances and briefly discuss how these characteristics might shape the evolution of institutions.

Drawing on these studies we test geographical and topographical instrumental variables. We use cantonal size, topographic conditions, and the number of neighboring cantons as instrumental variables. We suggest that institutions are correlated with features such as cantonal size and topography. One mechanism is that effective institutions are more difficult to establish in large jurisdictions. This could be due to a high dispersion of citizens, which makes communication and coordination difficult, or alternatively due to a large number of citizens also making it difficult to become organized. A similar argument can be made for cantonal topographical characteristics. Difficult topographic circumstances may influence the evolution of institutions at the cantonal level. To proxy topographic characteristics in the municipal dataset we use the mountainous fraction of a municipality and in the cantonal dataset we use the topography indicator. Furthermore, having more neighboring jurisdictions might imply that citizens have more opportunities to learn and, therefore, effective institutions might spread more rapidly. For most specifications the instrumental variables seem to be strong and the value of an *F*-test of joint-significance mostly lies above the critical value of 10 (Staiger and Stock 1997).

Of course, we test the exclusion restriction of our instruments conducting *J*-tests of over-identifying restrictions. Topography can only be included in the tax regressions, since with expenditures it is an important regressor in the second stage itself. We use the cantonal size, and the number of neighboring cantons, and where possible topography as instrumental variables. However, even for the two first instruments the exclusion restriction is not satisfied in all specifications (Table 6, columns 4 and 5). Table 6 presents the results for our 2SLS estimates.

[Table 6 about here]

We again find significant effects for our *instrumented auditor variable* on both tax variables at the local and cantonal level. The estimated coefficients tend to be higher compared to the previous estimates. While the model including the full set of controls exhibits significant estimates, the basic regression on taxes aggregated at the cantonal level does not quite reach conventional levels of statistical significance. The variation of our results for government expenditures is again higher. When including additional control variables we mostly find significant effects, but our results are in some specification sensitive to the inclusion of time-invariant controls. Note that our instrumental variables do not perform extremely well. In the reported *J*-test of over-identifying restrictions, the exclusion restriction is not always met. In

two reported specifications (columns 4 and 5) we cannot reject the null hypothesis that our instruments are uncorrelated with the error term.

Summing up, the identification problem has been discussed from various perspectives. First, in light of the long persistence of these institutions reverse causality is very unlikely. Secondly, including fiscal preferences – one of the main sources of potential simultaneity – did not affect our results. Thirdly, our differential hypothesis (Hypotheses 2) derived from our theoretical arguments and tested empirically make it hard to argue in favor of endogeneity. Fourthly, our IV regressions also suggest a negative impact of auditors on taxes and expenditures. However, note that our instrumental variables do not always meet statistical requirements.

5.5.   Further evidence and discussion

In this subsection we discuss further evidence on the influence of auditors on additional dependent variables such as total government revenues and deficits. We also take a look at migration. If good institutions are perceived as such, one might expect to find migration into these jurisdictions. We also address a critical issue that has been brought up in discussions. A major concern is that auditors just cater to the rich, who have a preference for low taxes.

[Table 7 about here]

Government revenues

We first present the estimation results on some additional public finance variables. Government revenues are available as aggregated data at the cantonal level. We use this data to further evaluate the robustness of our results. We have found ample evidence that auditors with an extended audit mandate have a negative impact on tax rates and we should expect the same pattern to be true in the case of general government revenues.

Columns 1 and 2 of Table 7 provide further evidence for the robustness of these results. Government revenues are negatively and significantly affected by increasing auditor involvement. We use the same model specifications as for the expenditure regressions, because the revenue data again include federal grants, which lead us to eliminate the outlier Canton of Uri. Including the same set of additional controls does not alter the results. An increase of the auditor variable by 1 point implies a reduction of around 900 CHF per capita in government revenues. When moving from the weakest to the strongest form of auditor, the potential effect corresponds to a roughly 23 percent reduction of revenues.

It is not surprising that the influence of the other institutional variables is similar to the estimates on taxation. Both direct democracy measures do not have a statistically significant influence on revenues, whereas the degree of decentralization in the form of local autonomy features a strong significant impact in some model specifications. From the standard control variables the income variable and the topography variable have a positive and significant impact on revenues. These results are in line with our earlier findings and existing empirical literature for Switzerland.

Deficits

In the empirical public finance literature it is often assumed that effective institutions reduce deficits. With respect to auditors we do not have a clear theoretical prediction, since auditors should primarily affect the size of government. To complement the picture we nevertheless report some results. Consistently, Table 7, columns 3 and 4 do not show a clear picture and do not enable us to draw final conclusions. The effect is sometimes statistically significant, however, the results are not particularly robust to changes in model specifications.

Migration

If 'good' institutions, in the sense that they empower citizens, are attractive, we would expect other citizens to migrate to jurisdictions featuring such institutions. This argument draws on Tiebout's 'voting by feet' hypothesis, which suggests that citizens migrate to jurisdictions with the best cost-benefit ratio. A first glance at the empirical results (Table 7, columns 5 and 6) suggests that an institutional arrangement with powerful auditors has attracted citizens during the 1990's. The dependent variable is the change in the population due to migration (not birth or death) between 1990 and 2000. An increase of one point of the auditor variable implies an increase of 1.5 percent of the local population due to immigration. Cantonal direct democracy and income also seem to have an influence. Note that such an argument does not necessarily require some form of disequilibrium or reduced mobility of the citizens. As Switzerland had a high population growth and the impact of auditors is more pronounced in municipalities with a larger population, the relative advantages of municipalities with strong auditors have increased. Thus, strong auditors might induce migration even in equilibrium.

Are auditors just an instrument of the rich to keep taxes low?

One concern could be that auditors just cater to the rich who prefer lower taxes. From the limited data we have, we do not find indications that this is actually the case. Keeping in mind

that auditors can only consult citizens about the potential impact of policy proposals, they cannot decide themselves on public policy.

If we first focus on the selection of the members in the local audit office in the Canton of Zurich (for which we conducted a systematic survey) it does not seem that the rich are over-proportionally elected to the audit office. It seems that often personal qualifications are the driving factor. If secondly, our estimates controlling for the provision of at least some public goods are valid, we find no indication that public goods provision is worse in jurisdictions with a stronger form of auditor. If auditors nevertheless cater specifically to the rich, we might expect a more unequal income distribution. More specifically, we should expect to find indications that jurisdictions with strong auditors favoring the rich should (ceteris paribus) redistribute less from rich to poor. Hence, we should find a systematic difference in the income distributions between jurisdictions with weak and strong auditors. The available data contains information about the after-tax gini-coefficients calculated for the fiscal year 1995/1996. We find a statistically significant *negative* effect of increasing values of the auditor variable on the after-tax gini-coefficient (Table 7, columns 7 and 8). This result implies that auditors are unlikely to particularly represent the interests of the rich. However, note that a strict test would require comparing pre- and after-tax gini-coefficients. Unfortunately, we do not have such detailed data.

5.6.   Empirical evidence: The big picture

When looking at the big picture the basic effects of extending the audit mandate seems to be well established. Table 8 summarizes the results including other institutional variables.

[Table 8 about here]

We generally find that *auditors with an extended mandate* significantly reduce taxes, expenditures, and revenues. The effect on deficits seems to be weakly negative. Our estimates analyzing migration patterns also indicate that auditors with a stronger mandate tend to attract more people. The results on income distribution point toward some beneficial effects, but we abstain from a strong interpretation of these results due to some data limitations.

At first glance the evidence on local and cantonal direct democracy seems to be inconsistent with the emerging literature on direct democracy, which tends to find negative effects of direct democracy on public finance variables. However, most of the earlier studies did not focus on the influence of direct democracy on the tax burden but rather on expenditures, deficits, and debt, and did not estimate the cantonal and local level simultaneously. However, when taking a closer

look at the broad picture, we find some interesting patterns that nicely fits the available evidence. Focusing on the extent of *local direct democracy* fiscal balance seems to be of major importance. We find that town meeting democracies have a negative effect on public expenditures and revenues, but a positive effect on taxes and a weak negative effect on deficits. It indicates that if citizens directly choose among policy alternatives they tend to spend less money, which is consistent with Public Choice theories suggesting a leviathan government (e.g. Brennan and Buchanan 1977) and with available empirical evidence for Switzerland. However, even though expenditures and revenues are lower in municipalities with town meetings, taxes tend to be significantly higher than in municipalities featuring a parliament. This could indicate that citizens in town meeting democracies are more willing to pay taxes in the present rather than to either shift the burden to future periods or via capitalization to property owners (Stadelmann and Eichenberger 2008). This is consistent with the relatively lower fiscal deficits, but the estimates are mostly only marginally significant. Migration and income distribution do not seem to be affected. The empirical evidence on the influence of *cantonal direct democracy* is weaker and not entirely conclusive. We cannot find a direct effect of cantonal direct democracy on the tax burden. However, it seems that revenues and expenditures are decreasing with more available direct democratic rights, which would be in line with most empirical evidence (e.g. Feld and Kirchgässner 2001, Feld and Matsusaka 2003). The estimates on the influence of direct democracy on public deficits tend to be positive, which is also in line with the empirical evidence for Switzerland (Feld and Kirchgässner 2001). Funk and Gathmann (2005) use cantonal expenditures and revenues as well as aggregated cantonal and local level expenditures and revenues. When only focusing on the cantonal data, they can replicate earlier findings (e.g. Feld and Matsusaka 2003). But as soon as they focus on expenditure data at the local level only, they find positive effects, and they cannot find any effect if using (similar to our analysis) aggregated data from the local and cantonal level. Our estimates on income distribution do not provide clear results, whereas the migration estimates indicate a negative effect.

The estimates for the influence of *fiscal decentralization* point towards lower government expenditures, revenues, and taxes, which is consistent with the available empirical evidence for Switzerland (e.g. Feld, Kirchgässner and Schaltegger 2003). The estimates indicate that fiscal decentralization mainly affects government size but less deficits, income distribution, or migration.

Furthermore, Torgler (2004) drawing on our early work on auditors empirically analyzes their impact on tax moral. The basic argument is that citizens are more willing to contribute to the local public good if they can better control the agent and if public goods provision is more

effectively tailored to the preferences of the citizens. Using our auditor index he finds that more powerful auditors enhance tax moral. However, in contrast to the estimates on expenditures and taxes the effect is not robust to the inclusion of the extent of direct democratic instruments available to the citizens.

6.   Summary and conclusion

Public auditing institutions are generally considered important, but so far the analysis has not taken into account the potential influence of auditors beyond the traditional scope of controlling the executive and the bureaucracy ex post to policy decisions. We argue that auditors can play a much more important role during the policy making process in which their ex ante evaluation of the budget draft and individual projects improve transparency and reduce the influence of special interest groups that extract rents at the expense of unorganized general interests.

In the empirical section we analyze the impact of auditors on fiscal variables, such as taxes and expenditures as well as on several other measures. We follow our theoretical hypotheses that predict lower taxes and expenditures if auditors have an extended audit mandate including ex ante audits of the budget draft and individual policy proposals. Furthermore, we have established that auditors should be more effective in large municipalities in which control and collective action problems are more pronounced. We discover support for both theoretical hypotheses. We find a large negative, economically, and statistically significant influence on taxes and expenditures. Furthermore, auditors have a stronger impact in larger than in smaller municipalities and they do not seem to have an influence on the already organized business interests. This is exactly what we would expect from our channel through which auditors have an influence on policy decisions. They provide information that is not produced during the policymaking process due to the collective action problem of large groups such as broad-based common pool interests. We find robust results for different degrees of data aggregation as well as for changes in the empirical specifications. To establish causal relations we follow three different strategies. Firstly, we proxy our main source of potential endogeneity with new measures of fiscal preferences. Secondly, we test a differential hypothesis in which the main channels of endogeneity look rather implausible. Thirdly, we estimate instrumental variables and find similar results in most specifications. However, as in many other studies it proofs to be very difficult to find valid instruments. These three different approaches basically confirm our previous results and indicate a robust relationship in which more powerful auditors reduce taxes and public expenditures. We conclude that audit institutions should be evaluated from a

different perspective that takes into account their potential to reduce the asymmetric influence
of special interests during the policymaking process.

Appendix

Table A1: Construction of the auditor variables (finance commission index)

Canton	Budget proposal ex ante	Individual projects ex post	Individual projects ex ante	Alternative propositions	Auditor (Finance commission index)	Prevalence of town meeting [a]	Auditor variable for cantonal data
Argovia	1	1	0	1	3	0.78	2.34
Appenzell OR	0	1	0	0	1	0.71	0.71
Appenzell IR	0	1	0	0	1	1.00	1.00
Basle-Country	1	1	0	1	3	0.70	2.10
Basle-Town	-	-	-	-	-	0.00	0.00
Berne	0	0	0	0	0	0.55	0.00
Fribourg	1	1	1	1	4	0.63	2.52
Geneva	-	-	-	-	-	0.00	0.00
Glarus	0	1	0	0	1	1.00	1.00
Grisons	1	1	1	0	3	0.58	1.74
Jura	0	0	0	0	0	0.67	0.00
Lucerne	1	1	0	0	2	0.61	1.22
Neuchâtel	-	-	-	-	-	0.00	0.00
Nidwalden	1	1	1	0	3	1.00	3.00
Obwalden	0	0	0	0	0	1.00	0.00
Schaffhausen	0	1	0	0	1	0.25	0.25
Schwyz	1	1	1	0	3	1.00	3.00
Solothurn	0	1	0	0	1	0.93	0.93
St. Gall	0	1	0	0	1	0.79	0.79
Thurgovia	0	0	0	0	0	0.79	0.00
Ticino	1	0	1	1	3	0.04	0.12
Uri	1	1	0	0	2	1.00	2.00
Vaud	1	0	1	1	3	0.11	0.33
Valais	0	0	0	0	0	0.84	0.00
Zug	1	1	0	0	2	0.77	1.54
Zurich	1	1	1	1	4	0.51	2.04

a) share of population living in municipalities with town meetings

Source: Schelker and Eichenberger (2003)

Table A2: Description of municipal data for the year 1999

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
Auditor	0 - 4	1.28 (1.52)	Index capturing institutional design of the local auditor (Finance Commission Index)	Schelker/Eichenberger (2003)
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, 2001)
Decentralization	3.2 - 6.1	4.86 (0.61)	Decentralization: Extent of local autonomy	Ladner (1994)
Income	0.842 - 75.020	25.111 (7.346)	Average municipal real income per capita in 1000 CHF (federal direct income tax statistics: Reineinkommen der nat. Person)	Swiss Federal Statistical Office
Population	1138 - 336822	7635.49 (17413.60)	Size of municipal population	Swiss Federal Statistical Office
Population density	0.15 - 108.99	7.93 (10.24)	Population density (population per km^2)	Swiss Federal Statistical Office
Foreigner	0.01 - 0.56	0.18 (0.09)	Fraction of foreign municipal population	Swiss Federal Statistical Office
Unemployment	0.5 - 5.1	2.55 (0.97)	Cantonal unemployment rate	Swiss Federal Statistical Office
Industrial area	0.00 - 0.21	0.02 (0.02)	Industrial fraction of municipal surface	Swiss Federal Statistical Office
Agricultural fraction	0.00 - 0.81	0.40 (0.19)	Agricultural fraction of municipal surface	Swiss Federal Statistical Office
Mountainous fraction	0.00 - 0.43	0.04 (0.08)	Mountainous fraction of municipal surface	Swiss Federal Statistical Office
Demography (young)	0.21 - 0.47	0.33 (0.04)	Fraction of the young population (0-24) in a canton	Swiss Federal Statistical Office
Demography (old)	0.03 - 0.27	0.13 (0.04)	Fraction of the old population (65+) in a canton	Swiss Federal Statistical Office
Social Democrats	0 - 93.32	21.20 (10.49)	Share of votes for social democratic party in 1999 national elections	Swiss Federal Statistical Office
Language	0 / 1	0.76 (0.43)	Language: German (1); else (0)	Own representation

Table A3: Description of cantonal data for the period 1990 – 2000

Variable	Min. – Max.	Sample mean (Standard deviation)	Description	Source
Tax (natural persons)	54.8 - 155.8	103.03 (19.70)	Average cantonal and municipal tax burden on a natural person's annual income (measured by an index with yearly mean 100)	Swiss Federal Statistical Office
Tax (legal entities)	56.3 - 148.5	103.59 (18.41)	Average cantonal and municipal tax burden on legal persons' annual revenue (measured by an index with yearly mean 100)	Swiss Federal Statistical Office
Expenditures	7983.1 - 19738.2	11652.60 (2535.77)	Aggregated local and cantonal government expenditures per capita (in real terms)	Swiss Federal Finance Administration
Revenues	7621.8 - 20895.3	11276.40 (2372.69)	Aggregated local and cantonal government revenues per capita (in real terms)	Swiss Federal Finance Administration
Deficits	-2608.2 - 3046.2	375.25 (644.51)	Aggregated local and cantonal government deficits per capita (in real terms)	Swiss Federal Finance Administration
Auditor	0 - 3	1.02 (1.01)	Index capturing institutional design of the local audit office: Product of Finance Commission Index and prevalence of town meetings per canton	Schelker (2002), Schelker/Eichenberger (2003)
Local direct democracy	0 - 1	0.63 (0.34)	Fraction of population per canton living in municipality with town meeting	Schelker/Eichenberger (2003)
Cantonal direct democracy	1.50 - 5.83	4.28 (1.20)	Cantonal direct democracy: Extent of direct democratic instruments available to the citizens	Frey/Stutzer (2000, 2001), Schaltegger
Decentralization	3.2 - 6.1	4.99 (0.77)	Decentralization: Extent of local autonomy	Ladner (1994)
Income	28959.9 - 84605	44064.20 (9996.11)	Cantonal real income per capita	Swiss Federal Statistical Office
Population	13573 - 1211647	270004.2 (277656.2)	Size of cantonal population	Swiss Federal Statistical Office
Population density	0.24 - 53.25	4.39 (9.96)	Cantonal population density (population per km^2)	Swiss Federal Statistical Office
Unemployment	0 - 7.8	2.29 (1.96)	Cantonal unemployment rate	Swiss Federal Statistical Office
Young	0.145 - 0.283	0.225 (0.025)	Fraction of the young population (0-18) in a canton	Swiss Federal Statistical Office
Old	0.112 - 0.215	0.151 (0.020)	Fraction of the old population (65+) in a canton	Swiss Federal Statistical Office
Foreigner	0.061 - 0.380	0.166 (0.65)	Share of cantonal foreign population	Swiss Federal Statistical Office
Topography	0.00 - 37.57	3.85 (8.20)	Index of topographical conditions as measured by the index which is used for the new national fiscal equalization scheme (the "topographischer Lastenausgleichsindex des NFA"); increasing values denote more difficult conditions	Swiss Federal Finance Administration

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Table 1: Hypothesis 1 – Auditors and Taxation (municipal data)

	1	2	3	4	5	6	7
	Hypothesis 1: Municipal dataset, OLS and WLS estimates						
	OLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax
Auditor	-0.604 (0.078)***	-0.483 (0.114)***	-0.493 (0.100)***	-0.441 (0.091)***	-0.492 (0.101)***	-0.461 (0.112)***	-0.435 (0.087)***
Local Direct Democracy	1.261 (0.248)***	1.349 (0.227)***	1.237 (0.251)***	0.954 (0.271)***	1.202 (0.198)***	1.360 (0.222)***	0.993 (0.271)***
Cantonal Direct Democracy	0.058 (0.106)	0.016 (0.133)	-0.064 (0.142)	-0.092 (0.132)	0.047 (0.121)	-0.020 (0.117)	-0.073 (0.123)
Decentralization	-1.213 (0.241)***	-1.150 (0.160)***	-1.165 (0.157)***	-1.247 (0.190)***	-1.179 (0.180)***	-1.156 (0.193)***	-1.167 (0.204)***
Income	-0.080 (0.012)***	-0.096 (0.015)***	-0.097 (0.015)***	-0.066 (0.025)**	-0.087 (0.014)***	-0.095 (0.018)***	-0.065 (0.023)***
Population	1.59E-6 (3.63E-6)	4.01E-6 (3.97E-6)	2.97E-6 (3.53E-6)	5.69E-6 (4.05E-6)	8.11E-6 (4.96E-6)	2.94E-6 (2.89E-6)	2.92E-6 (3.48E-6)
Language	-	-	0.382 (0.274)	-	-	-	-0.185 (0.284)
Young	-	-	-	5.523 (3.749)	-	-	6.412 (3.352)*
Aged	-	-	-	5.851 (1.594)***	-	-	8.254 (1.786)***
Unemployment	-	-	-	-0.180 (0.165)	-	-	-0.130 (0.147)
Higher education	-	-	-	-0.018 (0.019)	-	-	-0.028 (0.014)*
Foreigner	-	-	-	-1.472 (0.629)**	-	-	-1.167 (0.715)
Population-density	-	-	-	-	-0.008 (0.006)	-	-0.005 (0.006)
Mountain	-	-	-	-	1.908 (1.299)	-	0.786 (0.906)
Agriculture	-	-	-	-	1.083 (0.648)	-	0.898 (0.436)*
Industry	-	-	-	-	0.904 (1.048)	-	0.725 (1.181)
Public transport usage	-	-	-	-	-	-0.001 (0.013)	0.026 (0.012)**
Social democrats	-	-	-	-	-	0.015 (0.009)	0.012 (0.009)
Observations	732	732	732	724	730	722	718
R^2	0.712	0.664	0.670	0.714	0.687	0.679	0.738

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. Dependent Variable: Average aggregated tax rate including cantonal, local, and church taxes on a natural person's annual income, containing 9 income classes between CHF 40 and 200 thousand and 3 classes describing household characteristics: "single, employed wage earner", "married, sole wage earner", and "married, sole wage earner with 2 children". Constant term not reported. Weight: Inverse probability of being included in sample. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$. Source: Own calculations

Table 2: Hypothesis 1 – Disaggregating the auditor index (municipal data)

	1	2	3	4	5	6	7	8
	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax	WLS Tax
Ex post audit	-1.548 (0.264)***	-1.404 (0.238)***	-	-	-1.003 (0.279)***	-0.781 (0.358)**	-1.080 (0.270)***	-0.940 (0.317)***
Ex ante audits	-	-	-0.807 (0.200)***	-0.757 (0.164)***	-0.440 (0.216)*	-0.479 (0.221)**	-	-
Ex ante + proposal	-	-	-	-	-	-	-0.282 (0.161)**	-0.273 (0.145)**
Local Direct Democracy	1.369 (0.251)***	1.041 (0.296)***	1.219 (0.231)***	0.870 (0.261)***	1.424 (0.248)***	1.045 (0.291)***	1.427 (0.253)***	1.069 (0.294)***
Cant. Direct Democracy	0.139 (0.142)	0.066 (0.137)	-0.088 (0.116)	-0.203 (0.109)*	0.065 (0.144)	-0.054 (0.128)	0.093 (0.138)	0.005 (0.118)
Decentralization	-1.205 (0.172)***	-1.249 (0.208)***	-1.010 (0.182)***	-1.045 (0.215)***	-1.141 (0.160)***	-1.164 (0.197)***	-1.194 (0.152)***	-1.220 (0.192)***
Income	-0.110 (0.011)***	-0.074 (0.022)***	-0.102 (0.013)***	-0.069 (0.021)***	-0.102 (0.013)***	-0.067 (0.021)***	-0.099 (0.015)***	-0.066 (0.023)***
Population	3.74E-6 (3.92E-6)	3.52E-6 (3.26E-6)	4.39E-6 (4.08E-6)	3.28E-6 (3.43E-6)	3.84E-6 (3.88E-6)	3.33E-6 (3.42E-6)	3.77E-6 (3.88E-6)	3.13E-6 (3.47E-6)
Add. controls	-	included	-	included	-	included	-	included
Obs.	732	718	732	718	732	718	732	718
R^2	0.660	0.733	0.652	0.738	0.677	0.751	0.674	0.744

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. *Dependent Variable*: Average aggregated tax rate including cantonal, local, and church taxes on a natural person's annual income, containing 9 income classes between CHF 40 and 200 thousand and 3 classes describing household characteristics: "single, employed wage earner", "married, sole wage earner", and "married, sole wage earner with 2 children". *Additional controls*: population density, demography (aged, young), language, unemployment, tertiary education, share of foreigners, mountainous area, agricultural area, industrial area, public transportation, party support for social democrats. Constant term not reported. Weight: Inverse probability of being sampled. Significance level: * $0.05 < p < 0.1$, ** $0.01 < p < 0.05$, *** $p < 0.01$. Source: Own calculations

Table 3: Hypothesis 1 – Auditors and Taxation (cantonal dataset)

	1	2	3	4	5	6	7
	... Cantonal Data: Tax regressions 1990 – 2000						
Period	1990	2000	1990-2000	1990-2000	1990-2000	1990-2000	1990-2000
Estimation Method	OLS	OLS	Pooled OLS	Pooled OLS	RE	RE	RE
Auditor	-9.074 (4.407)**	-10.475 (4.051)**	-9.241 (3.667)**	-9.229 (3.749)**	-11.358 (3.693)***	-10.359 (3.216)***	-7.003 (3.463)**
Local Direct Democracy	12.445 (17.469)	-2.524 (12.865)	3.547 (10.939)	3.620 (11.460)	8.191 (9.229)	11.544 (8.598)	-2.258 (13.972)
Cantonal Direct Democracy	0.924 (5.203)	1.983 (4.176)	0.399 (4.121)	0.351 (4.217)	1.666 (3.625)	3.751 (4.254)	-0.247 (3.344)
Decentralization	-9.457 (4.761)*	-6.089 (3.705)	-7.165 (2.918)**	-7.128 (2.967)**	-10.231 (3.215)***	-6.195 (3.290)*	-6.758 (3.409)**
Income	-0.92E-3 (0.47E-3)*	-0.57E-3 (0.34E-3)	-0.79E-3 (0.32E-3)**	-0.79E-3 (0.33E-3)**	-0.38E-3 (0.27E-3)	-0.38E-3 (0.27E-3)	-0.36E-3 (0.23E-3)
Population	-4.35E-6 (8.04E-6)	5.62E-6 (6.95E-6)	-2.85E-6 (5.79E-6)	-2.80E-6 (5.89E-6)	-3.90E-6 (5.46E-6)	3.16E-6 (6.81E-6)	-15.40E-6 (15.50E-6)
Fiscal Prefs. Factor 1	-	-	-	-	-	-76.430 (40.519)*	-
Additional Controls	-	-	-	-	-	-	Included
Year effects	-	-	-	included	-	-	-
Observations	26	26	286	286	286	275	286
R^2	0.504	0.634	0.566	0.571	0.534	0.565	0.706
LM Breusch-Pagan	-	-	-	-	726.25***	630.17***	293.10***

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. Additional control variables: unemployment, demography (young, aged), topography, population density, fraction of industrial area, total roads, rental prices, class size primary school, convictions per capita. Constant term not reported. Significance level: * $0.05 < p < 0.1$, ** $0.01 < p < 0.05$, *** $p < 0.01$. Source: Own calculations

Table 4: Hypothesis 1 – Auditors and Expenditures (cantonal dataset)

	1	2	3	4	5	6	7
	Cantonal Data: Expenditure regressions 1990 – 2000						
Period	1990	2000	1990-2000	1990-2000	1990-2000	1990-2000	1990-2000
Estimation Method	OLS	OLS	Pooled OLS	Pooled OLS	RE	RE	RE
Auditor	-1036.70 (345.09)***	-1086.78 (447.61)**	-1041.05 (320.91)***	-1043.44 (333.21)***	-584.05 (322.43)*	-511.53 (308.86)*	-907.272 (247.05)***
Local Direct Democracy	-1662.05 (1440.66)	-2138.94 (1329.52)	-2869.15 (1298.70)**	-2907.28 (1328.25)**	-2594.29 (1745.39)	-2387.71 (1352.42)*	-1643.28 (1148.01)
Cantonal Direct Democracy	-221.89 (370.08)	224.41 (480.66)	218.47 (361.82)	239.13 (371.38)	-580.64 (311.59)*	-688.86 (320.32)**	-255.07 (228.90)
Decentralization	-988.99 (598.71)	-1387.37 (575.10)**	-1143.44 (507.76)**	-1156.28 (524.62)**	-71.85 (540.37)	-224.29 (486.54)	-719.75 (380.69)*
Income	0.157 (0.061)**	0.137 (0.037)***	0.136 (0.030)***	0.136 (0.033)***	0.060 (0.010)***	0.061 (0.010)***	0.041 (0.014)***
Population	-0.59E-3 (1.58E-3)	0.16E-3 (0.91E-3)	0.02E-3 (0.94E-3)	0.02E-3 (0.96E-3)	1.27E-3 (1.03E-3)	0.47E-3 (1.25E-3)	1.62E-3 (1.14E-3)
Topography	106.95 (27.57)***	148.27 (33.55)***	109.98 (25.20)***	110.45 (25.63)***	57.16 (38.02)	51.57 (21.26)**	95.45 (25.99)***
Fiscal Prefs. Factor 3	-	-	-	-	-	4012.28 (2146.99)*	-
Additional Controls	-	-	-	-	-	-	included
Year effects	-	-	-	included	-	-	-
Observations	26	26	286	286	286	275	286
R^2	0.763	0.804	0.725	0.739	0.603	0.717	0.846
LM Breusch-Pagan	-	-	-	-	904.52***	820.12***	469.30***

Notes: Robust standard errors reported in parentheses, adjusted to clustering in panel estimates. Additional control variables: unemployment, demography (young, aged), topography, population density, fraction of industrial area, total roads, rental prices, class size primary school, convictions per capita, Uri dummy. Constant term not reported. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$. Source: Own calculations

Table 5: Hypothesis 2 – Auditors' influence in large vs. small jurisdictions (municipal data)

	1	2	3	4	5
Hypothesis 2: Municipal dataset, OLS and WLS estimates with interaction term					
	OLS Tax	OLS Tax	WLS Tax	WLS Tax	WLS Tax
Auditor	-0.604 (0.078)***	-0.498 (0.094)***	-0.483 (0.114)***	-0.377 (0.133)***	-0.327 (0.098)***
Interaction term: Auditor*Population	-	-2.10E-5 (1.34E-5)	-	-2.42E-5 (1.21E-5)*	-2.52E-5 (1.18E-5)**
Local Direct Democracy	1.261 (0.248)***	1.285 (0.244)***	1.349 (0.227)***	1.366 (0.226)***	1.039 (0.271)***
Cantonal Direct Democracy	0.058 (0.106)	0.049 (0.104)	0.016 (0.133)	0.023 (0.127)	-0.064 (0.113)
Decentralization	-1.213 (0.241)***	-1.215 (0.236)***	-1.150 (0.160)***	-1.168 (0.158)***	-1.176 (0.199)***
Income	-0.080 (0.012)***	-0.077 (0.011)***	-0.096 (0.015)***	-0.091 (0.013)***	-0.061 (0.021)***
Population	1.59E-6 (3.63E-6)	2.47E-6 (3.95E-6)	4.01E-6 (3.97E-6)	4.97E-6 (4.19E-6)	3.19E-6 (3.61E-6)**
Additional controls	-	-	-	-	included
Observations	732	732	732	732	718
R^2	0.712	0.717	0.664	0.670	0.744

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. Additional controls: Population squared, demography (aged, young), unemployment, tertiary education, share of foreigners, mountainous area, agricultural area, industrial area, public transportation, party support for social democrats. Weight: Inverse probability of being included in sample. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$. Source: Own calculations

Table 6: Causality – 2SLS regressions with municipal and cantonal dataset

	Causality: 2SLS regressions					
	1	2	3	4	5	6
	Second stage regression					
Dependent Var.	Taxes (municipal data) 1999		Taxes (cantonal data) 1990 – 2000		Expenditures (cantonal data) 1990 – 2000	
Auditor	-1.116 (0.309)***	-1.361 (0.654)**	-9.615 (5.701)	-12.520 (5.766)**	-580.503 (1054.62)	-2505.35 (1453.32)*
Local Direct Democracy	2.002 (0.612)***	2.154 (1.275)	4.206 (14.882)	10.798 (14.593)	-3648.886 (2005.76)*	-1266.657 (2034.70)
Cant. Direct Democracy	0.257 (0.227)	0.536 (0.448)	0.457 (3.642)	2.078 (3.644)	116.547 (411.50)	799.264 (623.41)
Decentralization	-1.412 (0.311)***	-1.530 (0.387)***	-7.340 (3.977)*	-11.347 (4.453)**	-864.235 (772.08)	-1682.382 (762.28)**
Income	-0.036 (0.025)	-0.72E-3 (0.05)	-0.77E-3 (0.34E-3)**	-0.37E-3 (0.35E-3)	0.114 (0.060)*	0.160 (0.053)***
Population	4.83E-7 (3.44E-6)	-5.36E-7 (5.09E-6)	-2.72E-6 (4.71E-6)	-13.00E-6 (16.4E-6)	-0.17E-3 (0.89E-3)	6.2E-3 (2.14E-3)***
Topography	-	-	-	-	97.092 (34.64)***	134.902 (49.28)**
Additional Controls	-	included	-	Included	-	included
Observations	730	718	286	286	286	286
R^2	0.614	0.551	0.565	0.610	0.707	0.677
Instruments:	First stage regression					
Nbr. of neighbors	0.050 (0.022)**	0.079 (0.026)***	0.192 (0.035)***	0.218 (0.037)***	0.174 (0.042)***	0.198 (0.041)***
Cantonal size (km^2)	-2.13E-4 (2.83E-5)***	-1.82E-4 (2.93E-5)***	-3.49E-4 (0.68E-4)***	-4.07E-4 (1.03E-4)***	-3.39E-4 (0.73E-4)***	-4.27E-4 (1.08E-4)***
Topography	-1.056 (0.468)**	0.824 (0.651)	0.083 (0.012)***	0.087 (0.017)***	-	-
F-Test	27.16	14.25	20.42	15.46	12.62	13.52
J-Test (p-value)	0.685 (0.71)	3.197 (0.20)	2.704 (0.26)	36.271 (0.00)***	24.253 (0.00)***	1.616 (0.20)

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. *Additional controls municipal data*: unemployment, demography (aged, young), tertiary education, public transportation. *Additional controls cantonal data*: unemployment, demography (young, aged), total roads, class size primary school, convictions per capita, Uri dummy (included in all expenditure regressions). Constant term not reported. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$. Source: Own calculations

Table 7: Additional evidence: Revenue, Deficits, Migration, Income distribution

Additional Evidence: Revenue, Deficits, Migration and Income distribution								
	1	2	3	4	5	6	7	8
	Revenues (1990 – 2000) Cantonal data		Deficits (1990 – 2000) Cantonal data		Migration (1999) Local data		Income GINI (1999) Local data	
	RE	RE	RE	RE	WLS	WLS	WLS	WLS
Auditor	-801.90 (378.63)**	-923.68 (267.40)***	-16.70 (65.37)	-128.44 (73.64)*	1.619 (0.175)***	1.732 (0.199)***	-9.95E-3 (5.67E-3)*	-9.09E-3 (3.53E-3)**
Local Direct Democracy	-587.96 (1589.95)	-1913.53 (1145.13)*	-713.18 (391.97)*	-547.84 (446.38)	0.421 (0.651)	-0.305 (0.934)	-1.33E-3 (0.017)	0.017 (0.015)
Cant. Direct Democracy	-803.76 (465.43)*	-409.54 (300.58)	51.90 (107.23)	327.82 (117.41)***	-1.571 (0.228)***	-1.125 (0.349)***	-9.25E-3 (6.80E-3)	-1.12E-3 (7.55E-3)
Decentrali-zation	-278.58 (584.04)	-958.44 (444.50)**	-2.72 (136.41)	65.36 (100.39)	-0.564 (0.794)	0.091 (0.677)	9.22E-3 (0.164)	0.011 (0.013)
Income	0.13 (0.015)***	0.06 (0.019)***	-0.021 (0.013)	-0.077 (0.013)	0.117 (0.043)**	-0.167 (0.095)*	3.44E-3 (0.84E-3)***	1.11E-3 (0.87E-3)
Population	1.62E-3 (1.21E-3)	2.33E-3 (1.63E-3)	0.11E-3 (0.19E-3)	0.54E-3 (0.50E-3)	-2.70E-5 (1.43E-5)*	1.13E-5 (1.06E-5)	0.98E-7 (1.87E-7)	1.30E-7 (1.34E-7)
Topography	79.05 (42.02)*	127.08 (17.64)***	-	-	-	-	-	-
Additional Controls	-	included	-	Included	-	Included	-	included
Obs.	286	286	286	286	728	718	732	718
R^2	0.574	0.815	0.064	0.364	0.125	0.283	0.263	0.512
LM Breusch-Pagan	671.82***	273.87***	12.48***	5.88**	-	-	-	-

Notes: Standard errors reported in parentheses, adjusted to clustering in 26 cantons. *Additional controls cantonal data*: unemployment, demography (young, aged), population density, industrial area, total roads, class size primary school, convictions per capita, rental prices, Uri dummy (in the revenue regressions). *Additional controls municipal data*: Population squared, demography (aged, young), unemployment, tertiary education, share of foreigners, mountainous area, agricultural area, industrial area, public transportation, party support for social democrats. Constant term not reported. Weight: Inverse probability of being included in sample. Significance level: * $0.05<p<0.1$, ** $0.01<p<0.05$, *** $p<0.01$. Source: Own calculations

Table 8: Empirical evidence – The big picture

	Taxes	Expenditures	Revenues	Deficits	Income GINI	Immigration
Auditor	↓	↓	↓	(↓)	↓	↑
Local direct democracy	↑	(↓)	(↓)	(↓)	→	→
Cantonal direct democracy	→	(↓)	↓	↑	(↓)	↓
Decentralization	↓	↓	↓	→	→	→

Notes: ↓: consistently estimated negative and (mostly) significant effect; ↑: consistently estimated positive and (mostly) significant effect; →: inconsistent and insignificant effect; (): mostly consistent effect, but often not or only marginally significant. Source: Own representation

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