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Are preferences for fiscal discipline endogenous? *

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Abstract. Differences in voters' fiscal preferences are examined taking advantage of the exceptional Swiss institutional setting. Empirical evidence suggests that preferences are determined by strictly cultural patterns (cultural area measured by language). Thus, fiscal preferences can be considered as being largely exogenous. This implies that, except for special cases, it is not possible to find simple proxy variables for fiscal preferences. An *ad hoc* index of fiscal preferences ought to be built up when the introduction of this variable is required for comprehensive explanatory models of fiscal discipline or for other related studies.

1. What is the relationship between preferences and fiscal performance?

Extensive empirical evidence tends to confirm the impact of fiscal institutions and rules on fiscal performance (see, for reviews of the literature, Alesina and Perotti, 1995; Persson and Tabellini, 1999; von Hagen, 1998; or Imbeau, 2000). Recently an increasing number of authors have asked themselves whether or not a usually omitted variable may play a role in explaining fiscal discipline, that is, fiscal preferences. Peltzman (1992) was among the first authors to deal with this issue. Poterba clearly raises the issue and identifies the potential implications. "Voters in some jurisdictions may be less inclined to borrow to support current State outlays or to use deficits to shift the burden of paying for current State programs to the future. If these voters are also more likely to support the legislative or constitutional limits on deficit finance, then the observed link between fiscal rules and fiscal policy could be spurious" (Poterba, 1996: 399).

Not all economists are convinced that preferences can play a role in accounting better for budgetary outcomes. For instance, Bayoumi and Eichen-

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green (1995). Stein, Talvi and Grisanti (1998). Alesina and Perotti (1997) and von Hagen and Harden (1994) consider that budgetary institutions can be threatened as exogenous variables, uncorrelated with social preferences. Preferences have been taken into account by other authors in several ways. Holtz-Eakin (1988) and Poterba (1995) use government party affiliation as proxy, while Bohn and Inman (1996) and Alesina and Bayoumi (1996) fix the fiscal conservatism of certain collectivities as they are "commonly agreed". Bohn and Inman (1996) go a step further by using citizens' declared conservatism in polls. These variables follow the predicted correlation with deficits and debt but are not determining.

2. Fiscal preferences and fiscal performance in Swiss cantons

Dafflon and Pujol (2001) built up an index of fiscal conservatism taking advantage of the unique Swiss institutional setting. The analysis in the present paper is based on the index of fiscal conservatism proposed in the mentioned paper. Some key elements of the Swiss political system are to be summarily outlined before we describe how the measure for fiscal preferences was devised and what empirical results were obtained.

Switzerland is a Confederation founded in 1291 by the pact established by three cantons: Uri, Schwytz and Unterwalden. Other cantons have been incorporated into the Confederation since then. The last three cantons joined the confederation in 1815. Switzerland is formed today by 26 cantons. The Confederation of independent states became a Confederate state in 1848 following the establishment of a central government. The federal Assembly is made up of two chambers with similar powers. The National Council (*Conseil national*) is formed by 200 representatives elected by the people in federal voting, while the Council of states (*Conseil des Etats*) is formed by 46 members, each canton choosing 2 and the 6 half-cantons choosing 1. The federal government is formed by 7 ministers (*Conseiller fédéral*). Since 1959, the federal government has been ruled by members of the four main parliamentary parties (the so called "magic formula"). Swiss government acts as a college, as decisions are formed by the Federal Council as a sole authority (art. 103 Const.). Each year, one of the federal ministers also assumes the function of Head of the State (*Président de la Confédération*) as a *primus inter pares*. This post has basically only a representative function.

There are three layers of government: the federal government, the 26 cantons and some 3,000 local governments (*communes*). Article 3 of the Constitution determines that the cantons are sovereign as far as the federal Constitution permits. The cantons exert all the rights that are not explicitly delegated to the federal power. The cantons are responsible for more than

40% of total public spending in Switzerland. Each canton has its own parliament and enjoys legal autonomy in the creation and fixation of cantonal taxes and expenditures. There are no federal rules restraining the level of cantonal budget imbalances.

The Swiss political system is based on semi-direct democracy. All the modifications to the federal constitution and all the decrees enacted by the federal government without constitutional ground (*Arrêtés fédéraux urgents*) have to be accepted by a double majority of people and cantons. Also, membership of international organizations is submitted to the same procedure. These are the mandatory referendums. The facultative referendum refers to federal laws, federal decrees with constitutional basis and the adoption of international treaties, when at least 50,000 citizens sign asking for such a referendum inside a 90-day period from the publication of the federal decision. A third way to call a referendum is constitutional initiative. This occurs when at least 100,000 signatures are obtained asking for a modification in the federal Constitution. To adopt the constitutional initiative a double majority is needed. The federal parliament can present a counter-draft to be voted on at the same time as the constitutional initiative. Cantonal and local level referendums follow analogous procedures (Schoenenberger and Zarin-Nejadan, 1996; Grisel, 1987; and Rohr, 1987).

Between 1848 and the end of 2000 there have been 487 federal referendums submitted to the Swiss citizens. 210 of them were mandatory referendums; 153 were accepted and 57 refused. There have been 139 polls concerning facultative referendums, 70 of them being accepted, and 69 refused. 138 issues were voted on as constitutional initiatives. Just 12 of these referendums were accepted, while the remaining 126 were refused (C2D, 2001).

Dafflon and Pujol (2001) select federal referendums with fiscal content as a way to capture the degree of fiscal conservatism of each of the 26 cantons (the second political layer in Switzerland). As federal objects submitted to referendum are chosen, they reflect the level of acceptance/refusal of people of each canton for the very same issue. This constitutes the main advantage of the index, which cannot be achieved when using the responses of people to cantonal referendums on budgetary affairs: it is impossible to find issues that are strictly comparable. A similar heterogeneity of results hindering comparison appears if the variable chosen is the votes cast by the representatives in each cantonal parliament about cantonal budgetary issues. By contrast, at the federal level, each single person decides on the same issue all across Swiss territory, ignoring the decision made by the other cantons at the time of vote.

A conservative fiscal or budgetary behavior reflects in Dafflon and Pujol's understanding the adherence to the principle of a balanced budget. This meas-

ure aims to reflect thus voters' attitudes towards the acceptance of deficits. Voters' preferences concerning fiscal conservatism are identified according to the following pattern:

a) The aggregate choice of a given canton is considered more fiscally conservative than that from another canton if it presents a *higher rate of acceptance* of the following measures:

- The introduction of a new tax or raising existing ones;
- The suppression of an existing grant or other public expenditures;
- The adoption of rules to control expenditure growth, deficit limits, or fiscal adjustment programs.

b) The aggregate choice of a given canton is considered more fiscally conservative than that from another canton if it has a *lower rate of acceptance* of the following measures:

- Tax reduction;
- The adoption of new expenditures or public policies when this measure is not explicitly accompanied by an introduction of new taxes or the increasing of existing ones.

We exclude the issues submitted to referendum that propose at the same time new expenditures accompanied by new sources of revenues to finance them. The referendums on this kind of subject reflect a preference on individual policy and the size of the public sector rather than an expression of the degree of fiscal conservatism.

Each poll between February 1979 and September 1998 is analyzed, selecting those that fit the criteria, that is 75 different polls. During this period, a total of 156 issues have been submitted to federal referendum.

A wide range of subjects fall into this selection, as shown in Table 1.

We include a Table A2 in the appendix containing the essential information about each one of the polls selected: the identification number of the referendum, the date, the issue, the budgetary consequence of the referendum, its legal form.

The percentage of yes/no votes of each canton is normed, giving the value 50 to the Swiss mean. This transformation gives the same weight to each one of the 75 polls, independently of the mean degree of acceptance for each one. Importantly, the norming introduced maintains the difference of intensity of vote within a given poll and among all voting. The aggregate value of relative fiscal preferences of each canton is computed simply by the arithmetic mean of the 75 single values obtained by each canton.[1] Figure 1 below shows the

Table 1. Fiscal issues submitted to referendum between 1979 and 1998

Conservative voting		Number of referendum
More taxes	General	297, 308, 312, 371, 398, 399,
	Transportation	316, 317, 343, 351, 405, 406, 407, 442
	Finance	302, 331, 389,
	Specific	303, 312, 324, 332, 401
Less expenditures	Army	346, 393, 427
	Social security	325, 373, 397, 422
Less grants	Agriculture	**304, 333, 413, 428, 446**
	Education	**326, 328**
	Social security	**327, 437**
	Transportation	**429**
	Economy	**436**
Fiscal adjustment		400, 421, 439
Non conservative voting		Number of referendum
Less taxes		384
More expenditures	Social security	305, 323, 350, 352, 415, 416, 423, 444
	Culture, education	339, 340, 410
	Transportation	347, 368, 370, 382
	Housing	342
	Environment, energy	294, 313, 349, 367, 377, 381
	Administration	386, 387, 431
More grants	Economy	**335**
	Agriculture	**341, 356, 363, 418, 430**
	Culture	**425**

Source. Dafflon and Pujol (2001)

index of fiscal preferences of the 26 Swiss cantons for the period 1979 to 1998.

The interpretation of the aggregate index of fiscal conservatism, presented in the Graph 1, is analogous to the score given for a single poll. If a canton is systematically above the Swiss mean degree of acceptance of fiscal measures submitted to referendum between 1979 and 1998, it will have a final score greater than 50, and lower than 50 if the opposite were the case.

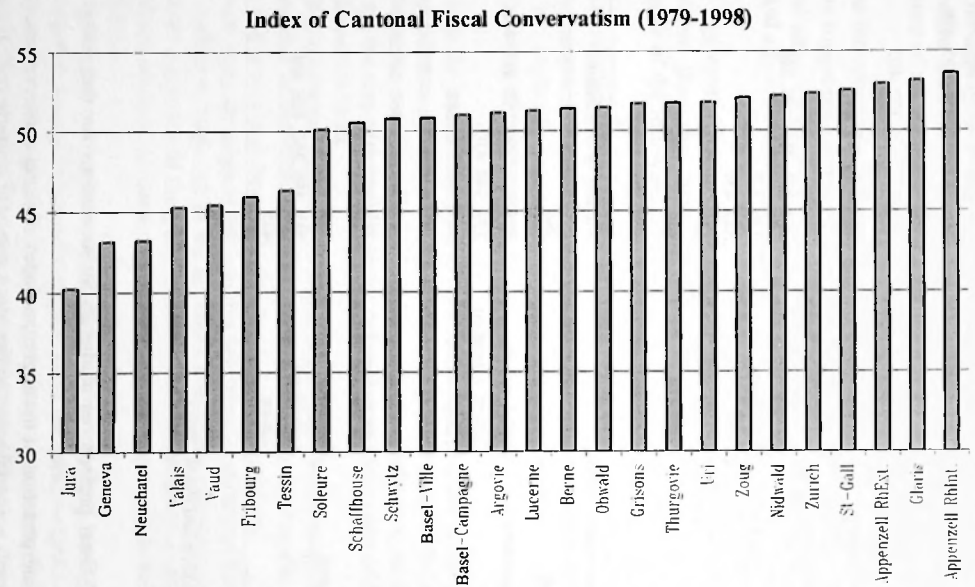

Figure 1. Source: Dafflon and Pujol (2001)

Even if this measure can be considered a fairly accurate marker for budgetary preferences, some unavoidable shortcomings were identified by the authors.

- The measure of cantonal fiscal preferences is obtained by analyzing federal referendums. This is logically a source of limitations. First of all, the final evaluation of the index depends on the objects submitted to vote. Some of them belong typically to the federal sphere of authority that is not shared by the cantons. Conversely, other issues that play a significant role in cantonal budgets are almost ignored at federal level.
- The economic, social or demographic characteristics of each canton may influence the response for specific domains. If, among the objects selected for the compilation of the index, specific political issues are over-presented, they can produce a bias towards/against the true level of conservatism for a certain group of common cantons. However, if we consider that the range of 75 different objects for the main index covers a wide variety of policies, this eventual distortion ought not to be exaggerated.
- The index of fiscal conservatism is measured by the will of the people. It could be argued that an index directly linked to politicians' is preferences is a better measure, as they finally establish the budgetary choices. By choosing voters' behavior, it is implicitly assumed that politicians' choices follow voters' preferences. In fact, this hypothesis, often adopted in similar studies referring to the median voter model or other theoretical presentations, can be accepted with confidence for the Swiss case precisely because of the presence of semi-direct democracy not only at federal level but also at cantonal and local level (Pommerehne 1978 and Pommerehene and Schneider 1978).

Whatever the real extent of the caveats indicated is, the measure proposed by Dafflon and Pujol (2001) can be considered one accurate empirical measure of fiscal preferences. As important as this fact, or even more so, is that Dafflon and Pujol find that this measure of fiscal preferences, introduced with other standard variables in an explanatory model of Swiss cantonal deficits, does matter for fiscal performance. That is, the more fiscally conservative a canton is, the smaller the amount of deficits, *ceteris paribus*. The model includes a set of economic variables concerning each canton (income, economic growth, initial public debt), structural variables (public revenues coming from the federal level, distribution of public outlays between the canton and its communes, the primary sector share in the cantonal revenue and the percentage of people living in towns), political variables (party affiliation at the exec-

utive branch and number of parties in the cantonal government), budgetary variables (the presence of cantonal compulsory referendum and the presence of rules against deficits) and, finally, the measure of fiscal preferences. The cross-section analysis using WLS shows that the index of fiscal conservatism has a clear impact on cantonal deficits. An additional point of the index of fiscal conservatism supposes a decrease of 380–650 Swiss francs of debt per inhabitant. A similar model is proposed using a panel data framework. In this case the dependent variable series is the annual variation of public cantonal debt. The estimates again show that the higher the level of fiscal conservatism, the lower the extent of cantonal deficits.

3. Are preferences for fiscal discipline endogenous?

Even if empirical evidence tends to suggest that preferences really matter for fiscal discipline, a critical objection can be formulated against the robustness of this result. It could be the case that preferences are at the end of the day determined by other budgetary or economic variables that are indeed usually taken into account in the explanatory models of debt. Thus, from being an explanatory variable of deficit behavior, fiscal conservatism could become a redundant endogenous variable. The factual correlation between preferences and deficits would be then purely apparent, spurious, without any causal relationship. Contrarily, if fiscal conservatism is well determined by exogenous variables, this result would confirm the opportunity of taking into account a measure of fiscal preferences in order to better understand the fiscal performance of the different public collectivities.

The interest of our exercise does not stop just at the point of providing a test for this particular problem. Having a quantitative genuine measure of fiscal preferences enables us to analyze what the key determinants of manifested voters preferences are. The main goal here is to find if there are other cultural, ideological or political variables that are strongly correlated with fiscal preferences, in order to propose these hopefully more traditional variables as proxies for fiscal preferences in other political contexts outside the so specifically Swiss referendum framework. These two related questions will be analyzed in the following sections of the article.

4. An explanatory model for fiscal preferences

The main goal of the paper is to test whether or not fiscal preferences can really be considered an exogenous variable because they are satisfactorily explained with variables that are not linked with budgetary performance, by

using the index constructed by Dafflon and Pujol (2001) as a measure of Swiss cantonal fiscal conservatism.[2] For this reason, the explanatory model of fiscal conservatism proposed is based on ideological and cultural preferences, as this kind of variable is strictly non-economic.

Logically, one important variable under this approach is ideological preference, measured by the percentage of seats occupied by left-wing parties in the cantonal legislative body (Left-wing parties). It can be argued that there is a link between ideological preferences and fiscal preferences, even if the attitude towards deficits cannot be reduced to a monotone transformation of ideological preferences. The more leftist the voters, the less they are expected to vote as fiscal conservatives.

Four more genuine cultural variables are selected. The first one is the cultural identity of the canton, as Switzerland is a multicultural multilingual country. This is measured by the percentage of inhabitants speaking German as mother tongue (Language). As this variable reflects strong cultural values, a theoretical prediction for its relationship with fiscal preferences cannot be proposed. Only a guess can be made, following "commonly agreed opinions", as has been done elsewhere (Bohn and Inman 1996 and Alesina and Bayoumi 1996). The guess is that German-speaking cantons will behave in a way that is fiscally more rigorous than the Latin cantons (French and Italian speaking cantons).

The second cultural variable is the religious influence (Confession), again because in Switzerland several Christian confessions are present, primarily the Roman Catholic and different Protestant churches. Extrapolating certain sociological arguments, the guess is that the higher the percentage of Protestants, the higher the level of fiscal conservatism. If the classical sociological theory advanced by Max Weber concerning Protestant ethics holds, it can be expected that the stress on individual responsibility in economic and social affairs is transferred also into the social and political sphere in the mainly Protestant communities, to a greater extent than in regions with a Catholic tradition. The last step is to consider that fiscal balance is popularly viewed as a measure or reflection of political responsibility in the management of public funds, especially at the local finance level. Then, predominantly Protestant cantons should be more fiscally conservative in their voting than others.

The third cultural variable is the existence of a university (University), which is the case for 8 cantons out of 26. This variable is chosen as a proxy for the level of education, and more specifically, as a measure of the public opinion impact of universities. It can be imagined that where people are more cultivated, they are more sensitive to proposals that bring long term social benefits even at the price of present sacrifices.

The last cultural variable refers to the mountainous/rural/urban difference, a geographic fact that creates a cultural distinction that is important in Switzerland. We measure it by the percentage of people living in cities with more than 10.000 inhabitants (Cities). As rural cantons are perceived as being more conservative than the urban cantons, we should expect negative relations between Cities and the level of fiscal conservatism.

The explanatory model proposed is built from the hypothesis that voters' behavior over federal issues affecting fiscal balances depends on their preferences about deficits, and that is why we have linked it with different cultural and ideological measures of preferences. We cannot ignore nevertheless that we are working with revealed fiscal preferences, which implies that a gap can always exist between this and actual fiscal preferences. The main disturbance concerning this issue can arise because federal decisions fixed by referendum affect people living in each canton. If these decisions affect to a similar extent each canton or the average voter of each canton, there are no major difficulties to fear. The problem appears when federal referendums affect more specifically a canton or cantons sharing similar specific characteristics. This problem was mentioned when we identified a list of potential shortcomings of the Dafflon and Pujol measure of fiscal conservatism. The authors argued that this potential bias could be slight because the relatively high number of referendums taken into account tends to produce a balance of winning and losing cantonal interest issues for each canton.

Nevertheless, we cannot exclude the permanence of some bias favorable to some cantons and affecting negatively some other cantons. This systematically different voting behavior might occur in cantons which strongly benefit from federal grants. A good example is the canton of Uri which is one of the four cantons that benefits the most from federal grants. This canton is relatively conservative in political terms and the voters in Uri might easily vote against spending increases fully funded from cantonal resources but are happy to externalize budgetary outlays to the federal government. Grants are thus the main source of a potential bias.

One direct implication, if the preceding argument is taken into account, is that the prediction concerning the sign of the coefficient of the cultural variable Cities may be affected in the opposite sense. On the one hand, when taking into account just cultural preference we expected a negative relation between the level of urbanization and adherence to conservative fiscal principles. But, on the other hand, we expect a positive relation between both variables when considering the impact of federal grants on voting behavior, as rural cantons benefit from such funds to a greater extent than the urban cantons. Some characteristics of rural and mountainous cantons like the average altitude of the canton or population density are taken into account

in different (always sophisticated) formulae to distribute federal grants and funds. Then, two opposite forces interact in the relation between the index of fiscal conservatism and the variable Cities.

The three other cultural variables as well as the ideological variable "Left-wing parties" are not specially affected a priori by the influence of the federal funds received.

We propose two complementary empirical ways to neutralize or at least to limit the distorting influence of the different cantonal impact of federal referendums.

If federal grants are supposed to be the main source of potential bias, the first solution consists of recoding the fiscal preferences variable proposed by Dafflon and Pujol by excluding the referendums on grants. The difference between federal expenditures and federal grants affected by federal referendums are not always clear, as sometimes the question addressed to the citizens is ambiguous on this specific point, or because the measures proposed affect expenditures as well as federal grants. We have excluded the referendums that clearly affect federal grants and the referendums affecting agricultural issues, as they are similar to grants and clearly affect some specific rural cantons more. We call this new measure of fiscal preference "Referendums without grants". It is calculated after excluding 17 from the original 75 referendums from 1979 to 1998. The explanatory model proposed for this new measure of fiscal preferences is logically the same as was applied for the original measure. The second complementary approach consists of expurgating the original measure of fiscal discipline from the federal grant disturbance by regressing the former against the variable "Federal funds", which represents the percentage of the cantonal resources coming from federal funds. The resulting residuals for each canton are used as the true value of fiscal preferences. The first estimation is expected to absorb the cantonal voters' behavior that is explained by the importance of federal funds each canton receives. We try thereafter to explain the residuals of the first estimation by ideological and cultural indicators of preferences.

5. Empirical results

First, the original Dafflon and Pujol (2001) index of fiscal conservatism is regressed against the five ideological and cultural variables selected. Empirical results are shown in Table 2. Three techniques have been applied. The first one (column 1) consists of a multiple regression using Ordinary Least Squares (OLS). The second one (column 2) uses the Weighted Least Squares (WLS), technique which is more adapted to cross-section models, as the presence of heteroskedasticity of errors can be feared. The heterogeneity of individuals

Table 2. Regression of the Cantonal index of fiscal conservatism by OLS, WLS and TOBIT

	OLS	WLS (POPSQ)	ML (censored normal TOBIT
	Coefficient (t-Stat)	Coefficient (t-Stat)	Coefficient (z-Stat)
C	44.2628***	45.3250***	44.2628***
	(47.576)	(59.891)	(54.244)
Leftist parties	–0.0857**	–0.1127***	–0.0857***
	(–2.418)	(–3.721)	(–2.758)
Language	0.0908***	0.0774***	0.0908***
	(10.030)	(10.368)	(11.436)
Confession	0.0306**	0.0335**	0.0306**
	(2.048)	(2.490)	(2.335)
University	1.2972*	0.9866*	1.2972**
	(1.834)	(1.970)	(2.091)
Cities	0.00631	0.0236*	0.00631
	(0.461)	(1.922)	(0.526)
R^2	0.917	0.903[1]	0.917
Adjusted R^2	0.896	0.878[1]	0.896
Sum squared resid.	27.467	32.191	27.467
F-statistic	44.166***		
Log likelihood			–37.607
Error distribution			1.0279***

Notes. ***denotes an interval of confidence of al least 1%; **for 5% level; *for 10% level.

[1] Unweighted statistics provided by Eviews3.

(here the cantons) can be the source of different variability of residuals. As is the common practice, the size of the individuals is used as weight. The square root of cantonal resident inhabitants is chosen as weight, as in Feld and Kischgässner (1999) for a similar structure of data. To check for the robustness of the results we also propose TOBIT estimates (column 3), as the dependent variable can be viewed as a censored variable because it is formed by the percentage of yes/no votes for each canton for each referendum.

Empirical results show basically the same information in the three techniques proposed. A notable empirical outcome is the explanatory power of

the model, as the adjusted R^2 of the three econometric techniques oscillates between 0.878 and 0.896, a rather high value for a pure cross-section analysis with relatively few observations. This result implies that, at least in the Swiss cantonal case, fiscal preferences can be well understood just by ideological and cultural determinants. Fiscal preferences cannot be reduced thus to a mere redundancy of other economic or political influences that are normally taken into account in the explanatory models of fiscal performance. Advancing a first answer to the main question raised in the paper, we can consider that fiscal preferences are exogenous from the social and economic characteristics of the cantons. Then there is a specific place for variables measuring fiscal preferences in the explanatory models concerning public budget issues.

Moving into the analysis of the specific determinants of fiscal preferences, it appears that, as expected, cantonal political sensibility (Left-wing parties) counts for fiscal preferences: the more left-wing the canton, the lower the level of fiscal conservatism expressed in the federal referendums. Nevertheless, as we will see now, strict cultural variables play a determining role in the molding of fiscal preferences. This implies that fiscal preferences cannot be reduced to just ideological preferences. Then, even if it is not unfair to use ideological preferences as proxy for fiscal preferences, we can assert that an important amount of useful information is potentially lost by doing this.

As for the cultural determinants, the most genuine cultural variable, Language, can be seen to have a heavy influence on fiscal preferences. German-speaking cantons are systematically more fiscally conservative than the Latin cantons (French and Italian-speaking), always at a level of confidence of 1%. Note that this variable is not just a dummy, but it tallies with the actual percentage of German-speaking people in a canton, as percentages are never 0 or 100 of German-speaking cantons, and some of them are clearly bilingual (Valais, Fribourg, Neuchatel). An increase of ten perceptual points of German-speaking people in a canton implies an increase of 0.77 to 0.91 points of the index of fiscal conservatism. According to Dafflon and Pujol (2001), an increase of one perceptual point of the index of fiscal conservatism implies a decrease of public cantonal debt per inhabitant ranging between 380 and 650 Swiss francs.

Two other cultural variables present the expected positive relation to fiscal preferences. The higher the percentage of Protestant people in a canton (Confession), the more the canton is fiscally conservative. The impact of this variable is one third of that of Language, and the level of statistical significance is lower. As for the presence of a University in a canton, it provokes an increase in fiscal conservatism, as expected.

As pointed out before, the relation between the degree of urbanization (Cities) and the level of fiscal conservatism is uncertain a priori, because

Table 3. Regression of "Referendum without Grants" by OLS, WLS and TOBIT

	OLS	WLS (POPSQ)	ML (censored normal TOBIT
	Coefficient (t-Stat)	Coefficient (t-Stat)	Coefficient (z-Stat)
C	43.4930***	44.4617***	43.4930***
	(51.339)	(62.182)	(58.536)
Leftist parties	–0.0672**	–0.1060***	–0.6720**
	(–2.081)	(–3.704)	(–2.373)
Language	0.08918***	0.07843***	0.08918***
	(10.820)	(11.115)	(12.336)
Confession	0.02430*	0.03199**	0.02430**
	(1.788)	(2.515)	(2.038)
University	1.03024	0.9046*	1.03024*
	(1.600)	(1.911)	(1.824)
Cities	0.000397	0.01897	0.000397
	(0.032)	(1.634)	(0.036)
R^2	0.925	0.913[1]	0.925[1]
Adjusted R^2	0.906	0.891[1]	0.901[1]
Sum squared resid.	22.777	26.490	22.777
F-statistic	49.262***		
Log likelihood			–35.171
Error distribution			0.9360***

Notes. *** denotes an interval of confidence of al least 1%; ** for 5% level; * for 10% level.
[1] Unweighted statistics provided by Eviews3.

of the confluence of phenomena with opposite effects. The empirical results show a positive relation. This result suggests the predominance of the cantonal interest effect when voting on federal issues, compared to the influence of the supposed higher fiscal conservatism of rural areas.

This last empirical result justifies the opportunity to deal with two derived measures of fiscal preferences, as proposed in the preceding section. Table 3 and 4 present the regressions obtained using these two alternative measures of fiscal preferences. In both cases the same three econometric techniques applied in the original model have been used: OLS, WLS using the square root of cantonal population as weight and, finally, TOBIT.

Table 4. Regression of "Index of conservatism filtred from Federal Funds" by WLS and TOBIT

	OLS	WLS (POPSQ)	ML (censored normal TOBIT
	Coefficient (t-Stat)	Coefficient (t-Stat)	Coefficient (z-Stat)
Dependent variable: Fiscal conservatism			
C	49.6930***	50.4491***	49.6930***
	(26.787)	(27.749)	(27.881)
Federal funds	0.000198	–0.03425	0.000198
	(0.003)	(–0.444)	(0.003)
Dependent variable: Residuals of fiscal conservatism			
C	–5.4402***	–3.5011***	–5.4402***
	(–5.844)	(–5.287)	(–6.663)
Leftist parties	–0.08566**	–0.1332***	–0.08566***
	(–2.415)	(–5.023)	(–2.753)
Language	0.09080***	0.07505***	0.09080***
	(10.026)	(11.485)	(11.431)
Confession	0.03060**	0.03373***	0.03060***
	(2.049)	(2.863)	(2.336)
University	1.2963*	1.1609**	1.2963**
	(1.832)	(2.649)	(2.088)
Cities	0.006348	0.01881*	0.006348
	(0.464)	(1.750)	(0.529)
R^2	0.917	0.914[1]	
Adjusted R^2	0.896	0.893[1]	
Sum squared resid.	27.499	28.781	
F-statistic	44.114***		
Log likelihood			–37.621
Error distribution			1.0284***
			(7.211)

Notes. *** denotes an interval of confidence of al least 1%; ** for 5% level; * for 10% level.

[1]Unweighted statistics provided by Eviews3.

Table 3 presents the results of regressing the measure of fiscal preferences that excludes referendums on grants and agricultural issues. The empirical results show a clear decrease in the cantonal interest bias of federal voting as the coefficient of the variable "Cities" is no longer statistically significant (and almost negative in the OLS and TOBIT regressions), even though it remains in the positive territory. The explanatory power of the model is even slightly higher than that of the original model. The picture remains basically unchanged with respect to the other ideological and cultural variables. The variable "Language" continues to play a major role in the explanation of fiscal preferences.

The conclusions arising from the analysis of the empirical results shown in table 4 are essentially the same. The first part of the table shows the result of filtering the original measure of fiscal preferences proposed by Dafflon and Pujol by regressing it against the variable "Federal Funds", that is, the percentage of cantonal budget resources coming from federal funds. The direct influence of this variable seems not to be determining, as it is hardly statistically related at all to the level of fiscal conservatism manifested by each canton. The WLS regression shows the higher level of influence on this variable, in the expected sign: the higher the percentage of the cantonal budget that depends on federal sources, the less it tends to behave as fiscally conservative. As the small cantons tend to depend to a larger extent on federal funds, it is logical to see that WLS regression captures this phenomenon better than the other techniques.

The regression of the resulting residuals against the usual ideological and political variables shows that the preceding conclusions are basically not modified at all. We can just mention that the influence of the variable "Cities" remains at the same level, while the statistical significance of the other ideological and cultural variables is reinforced, especially for the case of "Left-wing parties" and "Confession".

As the variable "Language" is strongly related to fiscal preferences, being the only one at a level of confidence of 1% in all the configurations, we ran a second set of regressions, this time taking into account only "Language". The aim is to study if the nexus between fiscal preferences and language is strong enough to the point that the latter could be confidently considered a proxy of the former. Empirical results are shown in Table 5.

The table contains nine different regressions of fiscal preferences against language. The three complementary versions of fiscal preferences, that is, the original one proposed by Dafflon and Pujol, the measure excluding referendums on grants and the measure of fiscal preferences filtered from the influence of federal funds have been regressed using the three econometric

Table 5. Regression of measures of Fiscal Conservatism only against "Language" by OLS, WLS and TOBIT

	OLS	WLS (POPSQ)	ML (censored normal TOBIT
	Coefficient (t-Stat)	Coefficient (t-Stat)	Coefficient (z-Stat)
Dependent variable: Fiscal conservatism			
C	42.9776***	43.6825***	42.9776***
	(76.377)	(97.190)	(79.496)
Language	0.1011***	0.09398***	0.1011***
	(13.344)	(15.035)	(13.889)
R^2	0.881	0.873	
Adjusted R^2	0.876	0.867	
Sum squared resid.	39.288	33.460	
Log likelihood			–42.259
F-statistic	178.062***		
Dependent variable: Conservatism without grants			
C	42.3212***	42.7727***	42.3212***
	(85.074)	(101.513)	(88.552)
Language	0.09776***	0.09423***	0.09776***
	(14.597)	(16.080)	(15.193)
R^2	0.899	0.894[1]	0.899
Adjusted R^2	0.895	0.889[1]	0.890
Sum squared resid.	30.703	29.407	30.703
Log likelihood			
F-statistic	213.065***		
Dependent variable: Conservatism filtered from Federal funds			
C	–6.7205***	–5.9832***	–6.7205***
	(–11.940)	(–13.237)	(–12.428)
Language	0.1011***	0.09350***	0.1011***
	(13.334)	(14.874)	(13.885)
R^2	0.881	0.875[1]	
Adjusted R^2	0.876	0.870[1]	
Sum squared resid.	39.310	33.841	
F-statistic	177.951***		

Notes. ***denotes an interval of confidence of al least 1%;**for 5% level; *for 10% level.

[1]Unweighted statistics provided by Eviews3.

techniques proposed: OLS, WLS with the square root of cantonal population as weight and Maximum Likelihood, for a censored normal or TOBIT.

We find that the different measures of fiscal preferences are astonishingly well explained by cultural determinants alone measured by the variable Language, as the adjusted R^2 varies between 0.867 and 0.895. Of course the positive relation between Language and fiscal preferences is always statistically significant at a level of confidence of 1%. The coefficient value is consistently fixed around 0'1.

Thus it can be affirmed reasonably that "Language" behaves as a good proxy for fiscal preferences in the Swiss model. At first sight, it seems to be a similar result to what is proposed by Bohn and Inman (1996) and Alesina and Bayoumi (1996) when they suppose that the South States of the USA are more fiscally conservative than the rest. The approach followed here is nevertheless definitively different. Here it has not only been assumed that German speaking cantons are fiscally conservative, but this assumption has been tested empirically when Language has been regressed against the measured value of fiscal conservatism. This latter measure is absent in the works mentioned (even though Bohn and Inman 1996 propose an additional measure of a general notion of conservatism built up by polls).

This results suggest that "Language" is not only linked with fiscal preferences, but can even be considered the main explanatory variable.

Establishing a link between the results of Dafflon and Pujol (2001) (fiscal preferences do matter for fiscal performance) and the new findings (cultural preferences do matter for fiscal preferences), a corollary follows: cultural preferences do matter for fiscal performance, at least in the Swiss cantonal case.

6. Conclusions

As fiscal preferences depend largely on the variable Language, together with the Left-wing parties variable and with other cultural variables to a minor extent, it can be advanced that fiscal preferences are largely exogenous. The aim pursued when choosing the variable Language was to take into account the slit between German-speaking Switzerland and French- and Italian-speaking zones, a division that moves away from simple language divisions. The variable Language captures the cultural identity of Swiss citizens (German, French and Italian spheres of influence). This differentiation is the main determining force behind strong social patterns, based on historical grounds and cultural inheritance. It is licit to suppose that this strongly differentiated heritage can produce effects in the *Weltanschauung* of each canton: the views on the relations between individuals and the State, the role and the size to give

to the public sector and, finally, the attitude towards fiscal imbalances, that is, the level of fiscal conservatism. This is in accordance with Hofstede's findings (1984). He carried out an analysis of international work-related values based on a large-sample polls for more than 40 countries. He found that such cultural differences do not seem to prevail between the two Belgian language areas, while "a completely different picture is found for the other bilingual surveyed country, Switzerland. In this case, German-speaking Switzerland is clearly culturally associated with Germany and French-speaking Switzerland with France; there is a wide culture gap between the two language areas, in particular on the dimension of Power Distance. The two parts of Switzerland belong to different culture areas" (Hofstede 1984: 228).

Language represents a purely cultural, historical notion, which cannot be reduced to a combination of other cultural or institutional variables. As we have said, Language contains to some extent the notion of preferences anchored in the common past. In the end, to say that fiscal preferences depend on preferences (cultural, historical) is the same as to say that we are not able to identify what the key factors are that mold fiscal preferences. That is why we conclude that preferences ought to be considered as being largely independent of standard socio-economic variables.

It has been possible to reach this conclusion thanks to the visible Swiss cultural differentiation based on language. But this easy proxy will be much harder to find in other countries and regions, even if, as in the Swiss case, the existence of heterogeneous fiscal preferences can be intuitively suspected.

The main implication of this discovery is that when one wants to measure the impact of fiscal preferences on fiscal performance, it is necessary to produce an *ad hoc* estimator of this complex notion, as it is not easy to propose *a priori* other substitute variables, as fiscal preferences depend on various complex factors, and furthermore, because they are largely exogenous.

Notes

1. Formally, if Y_{ti} is the original percentage of yes in the canton i for the referendum object t, the value Z_{ti} is defined as: $Z_{ti} = Y_{ti}/Y_i*50$, being Y_i the percentage of throughout Switzerland for the object i. The value of fiscal preferences for each canton during the period 1979 to 1998 is simply $Z_i = \Sigma Z_{ti}/n$, for $t = 1$ to 75 and $n = 75$.
2. Another 5 indexes derived from the main one were calculated by Dafflon and Pujol (2001) to take into consideration two facts. i) Referendums can have a different legal source (compulsory referendum; facultative referendum or popular initiative) and this could influence voters' behavior. ii) Some of the objects selected are submitted to referendum the same day with other fiscal objects. The response to several one-day polls tends to be more homogeneous than otherwise. A second series of indexes was calculated by legal nature and by giving only one value per day of voting. The differences from the original measure

are slight and do not modify the results. The derived indexes have thus been ignored in this paper.

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Table Appendix A1. Summary information about the model data

Variable	Description	Mean	Standard deviation	Minimal value	Median value	Maximum value
Federal funds	Percentage of cantonal resources coming from federal funds. Computed as the average annual value between 1979 and 1996	27.52	11.97	8.45	25.95	59.50
Cities	Percentage of cantonal population living in cities with more than 10'000 inhabitants.	32.00	25.16	0.00	29.32	99.41
Leftists parties	Percentage of center-left and left parties in the cantonal parliaments in the legislature 94–98, according to the *Annuaire statistique de la Suisse* classification.	24.97	13.31	1.92	24.74	51.00
Language	Percentage of resident people whom main language is German. 1990 federal census data.	67.14	33.92	4.80	85.35	93.20
Confession	Percentage of resident people adhered to one of the Protestant confessions. 1990 federal census data.	30.73	19.88	5.50	31.72	72.20
University	Dummy variable active for the university cantons.	0.31	0.47	0.00	0.00	1.00

Source. Annuaire statistique de la Suisse, Finances publiques en Suisse, Année politique suisse, Statistique de l'état annuel de la population

Table A2. Description of voting

Number referenda	Date	Object	Type	Legal Form	Pos. CF	Conserv. attit.	Message CF	Arrêté Parlem.	Sample correl	Consec. correl
294	II.79	Small routes	Exp +	IP	yes	Refuse	1977 I 1083	1978 II 901	0.309	
297	V.79	Reform indirect tax	Tax +	OBL	yes	Accept	1978 I 840	1978 II 1827	0.547	0.114
302	XI.80	Tax on stocks	Tax +	OBL	yes	Accept	1980 I 477	1980 II 633	0.890	0.440
303	XI.80	Tax on alcohol	Tax +	OBL	yes	Accept	1980 I 477	1980 II 634	0.891	0.988
304	XI.80	Wheat policy	Grant -	OBL	yes	Accept	1980 I 477	1980 II 635	0.876	0.952
305	IV.81	Solidarity with foreigners	Exp +	IP	no	Refuse	1979 III 605	1980 III 715	0.877	0.767
308	XI.81	Financial regime	Tax +	OBL	yes	Accept	1981 I 20	1981 II 545	0.167	0.049
312	II.83	Tax on customs	Tax +	OBL	yes	Refuse	1982 I 1361	1982 III 109	0.496	-0.123
313	II.83	Energy	Exp +	OBL	yes	Refuse	1981 II 299	1982 III 111	0.527	0.415
316	II.84	Tax on TIR	Tax +	OBL	yes	Accept	1980 I 1089	1983 II 722	0.483	-0.236
317	II.84	Tax on highways	Tax +	OBL	yes	Accept	1980 I 1089	1983 II 724	0.776	0.876
323	XII.84	Motherhood	Exp +	IP	no	Refuse	1982 III 805	1983 III 1052	0.811	0.459
324	XII.84	Radio, TV	Tax +	OBL	yes	Refuse	1981 II 849	1984 I 898	0.016	-0.446
325	XII.84	Victims	Exp -	FAC	yes	Accept	1983 III 901	1984 II 836	0.567	0.691
326	III.85	Primary education	Grant -	OBL	yes	Accept	1981 III 705	1984 II 12	0.799	0.672
327	III.85	Public health	Grant -	OBL	yes	Accept	1981 III 705	1984 III 15	0.806	0.974
328	III.85	Professional education	Grant -	OBL	yes	Accept	1981 III 705		0.801	0.913
331	VI.85	Tax on stocks	Tax +	OBL	yes	Accept	1981 III 705	1984 III 16	0.689	0.778
332	VI.85	Tax on alcohol	Tax +	OBL	yes	Accept	1981 III 705	1984 III 17	0.626	0.975
333	VI.85	Wheat policy	Grant -	OBL	yes	Refuse	1984 I 1281	1984 III 1470	-0.440	0.173
335	IX.85	Helping firms	Grant +	FAC	yes	Refuse	1983 III 497	1984 III 90	0.843	-0.554
339	IX.86	Culture	Exp +	IP	no	Refuse	1984 II 521	1986 I 46	0.671	0.815
340	IX.86	Professional education	Exp +	IP	no	Refuse	1984 II 1397	1986 I 856	0.598	0.933
341	IX.86	Sugar	Grant +	FAC	yes	Refuse	1984 II 1420	1985 II 302	0.418	-0.259
342	XII.85	Housing protection	Exp +	CP	yes	Refuse	1985 I 1369	1986 I 854	0.582	-0.139
343	XII.86	Tax on TIR	Tax +	IP	no	Accept	1985 II 655	1986 II 666	0.184	-0.536
346	IV.87	Defnce expenditures	Exp -	IP	no	Accept	1986 II 481	1987 I 14	-0.672	0.385
347	XII.87	Train	Exp +	OBL	yes	Refuse	1986 I 181	1987 I 46	0.267	-0.431
349	XII.87	Environment protection	Exp +	IP	no	Refuse	1985 II 1449	1987 I 969	0.333	0.354
350	XII.87	Health insurance	Exp +	FAC	yes	Refuse	1981 II 1069	1987 I 971	0.381	0.457
351	VI.88	Transportation policy	Tax +	OBL	yes	Accept	1983 I 909	1987 I 964	0.471	-0.448
352	VI.88	Age for pensions	Exp +	IP	no	Refuse	1985 II 597	1986 III 359	0.754	-0.061
356	VI.89	Small peasants	Grant +	IP	no	Refuse	1988 I 594	1988 III 1409	-0.231	0.308
363	IV.90	Viticulture	Grant +	FAC	yes	Refuse	1989 I 245	1989 II 866	0.581	-0.535
367	IX.90	Energy	Exp +	OBL	yes	Refuse	1988 I 297	1989 III 861	0.212	-0.331
368	IX.90	Public transport	Exp +	FAC	yes	Refuse	1986 III 197	1989 III 901	0.723	-0.092
370	III.91	Public transport	Exp +	IP	no	Refuse	1989 I 1218	1990 I 868	-0.311	-0.604
371	VI.91	Finance law	Tax +	OBL	yes	Accept	1989 III 1	1990 III 1581	0.591	-0.582
373	II.92	health insurance	Exp -	IP	no	Accept	1990 I 1515	1992 III 723	0.149	0.311
377	V.92	Water sources protection	Exp +	FAC	yes	Refuse	1987 II 1081	1991 I 226	-0.076	-0.006
381	V.92	Water sources protection	Exp +	IP	no	Refuse	1987 II 1081	1989 III 859	-0.048	0.906
382	IX.92	Alpine train	Exp +	FAC	yes	Refuse	1991 III 1570	1992 II 1015	0.713	0.221
384	IX.92	Tax on stocks	Tax -	FAC	yes	Refuse	1991 IV 505	1991 III 1588	0.201	0.591
386	IX.92	Parliament financing	Exp +	FAC	yes	Refuse		1991 III 1358	0.461	0.462
387	IX.92	Parties financing	Exp +	FAC	yes	Refuse		1991 III 1360	0.415	0.986
389	III.93	Tax on oil	Tax +	FAC	yes	Accept	1992 III 341	1992 VI 103	0.852	0.123
393	VI.93	Defence aivation	Exp -	IP	no	Accept	1992 VI 432	1993 I 980	-0.699	-0.496
397	IX.93	Health insurance	Exp -	FAC	yes	Accept			0.594	-0.522
398	IX.93	Unemployment insurance	Tax +	FAC	yes	Accept	1993 I 645	1993 I 981	0.635	0.698
399	XI.93	Financial regime	Tax +	OBL	yes	Accept	1992 I 781	1993 II 852	0.406	0.242
400	XI.93	Fiscal adjustment	Adjust	OBL	yes	Accept		1993 II 850	0.604	0.901
401	XI.93	Maintien sécu	Tax +	OBL	yes	Accept	1992 I 781	1993 II 848	0.482	0.972
405	II.94	Tax on highways	Tax +	OBL	yes	Accept	1992 II 725	1993 II 865	0.743	0.623
406	II.94	Tax on TIR	Tax +	OBL	yes	Accept	1992 II 725	1993 II 863	0.638	0.976
407	II.94	Tax on TIR	Tax +	OBL	yes	Accept	1992 II 725	1993 III 867	0.566	0.992
410	VI.94	Culture	Exp +	OBL	yes	Refuse	1992 I 515	1993 II 845	0.735	0.017
413	IX.94	Wheat policy	Grant -	OBL	yes	Accept	1993 IV 301	1994 II 222	0.442	-0.100
415	VI.94	Health insurance	Exp +	FAC	yes	Refuse	1992 I 77	1994 II 239	0.840	0.106
416	XII.94	Health insurance	Exp +	IP	no	Refuse	1991 IV 961	1993 I 3	0.862	0.945
418	III.95	Agriculture	Grant +	CP	yes	Refuse	1992 VI 284	1994 III 1777	0.659	0.404
421	III.95	Limits to expenditures	Adjust	OBL	yes	Accept	1993 IV 301	1994 III 1783	0.298	-0.032
422	VI.95	Health insurance	Exp -	FAC	yes	Accept	1990 II 1	1994 III 1784	0.807	0.484
423	VI.95	Extension pensions policy	Exp +	IP	no	Refuse	1993 II 533	1994 III 1780	0.740	0.763
425	III.96	Protection languages	Grant +	OBL	yes	Refuse	1991 II 301	1995 IV 451	0.678	0.811
427	III.96	Defence expenditures	Exp -	OBL	yes	Accept	1995 I 85	1995 II 349	0.188	-0.381
428	III.96	Distilation	Grant -	OBL	yes	Accept	1995 I 85	1995 II 350	0.033	0.879
429	III.96	Parkings	Grant -	OBL	yes	Accept	1995 I 85	1995 II 351	0.528	0.569
430	VI.96	Agriculture	Grant +	CP	yes	Refuse	1992 VI 284	1996 I 233	-0.095	-0.547

Table A2. Continued.

Number referenda	Date	Object	Type	Legal Form	Pos. CF	Conserv. attit.	Message CF	Arrêté Parlem.	Sample correl	Consec. correl
431	VI.96	Government salaries	Exp +	FAC	yes	Refuse	1993 III 949	1995 IV 454	0.738	0.391
436	VI.97	Gun powder	Grant -	OBL	yes	Accept	1996 II 1023	1996 V 961	0.382	-0.020
437	IX.97	Unemployment aid	Grant -	FAC	yes	Accept			0.935	0.352
439	VI.98	Fiscal adjustment	Adjust	OBL	yes	Accept	1997 IV 199	1997 IV 1408	0.898	0.904
442	IX.98	Tax on TIR	Tax +	FAC	yes	Accept	1996 V 505	1997 IV 1414	-0.061	-0.135
444	IX.98	Pensions	Exp +	IP	no	Refuse	1997 IV 1406	1997 II 593	0.899	-0.365
446	XI.98	Wheat policy	Grant -	FAC	yes	Accept	1996 IV 1	1998 2467	-0.072	-0.295