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Fiscal Equalisation and Citizens' Preferences: Evidence from Swiss Municipalities^{*}

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Abstract

The normative literature on fiscal federalism generally recognises the need for fiscal equalisation mechanisms to facilitate the mitigation of inequities in the distribution of resources. The question of how far to go in matters of fiscal equalisation is a very sensitive one. Choices in this area reflect the prevailing social norms and the political debates, in the context of which these norms are expressed. Moreover, the political debates are characterised by the usual tensions between selfish and altruistic visions of society.

The empirical part of this contribution analyses the results of two referenda recently held in the Canton of Vaud in Switzerland. It provides explanatory models for both ballots (acceptance rate of the propositions in each municipality). The model's explanatory variables show that the people of Vaud's voting behaviour was basically selfish. The widespread belief that voters are capable of altruism in this particular area is, therefore, rejected.

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1 Introduction

Thanks to the fiscal competition it generates, a certain degree of fiscal decentralisation is considered to be an efficiency factor. However, it is acknowledged that such competition is generally also a source of inequity. There are several factors at play here: the distribution of taxpayers' ability to pay leads to disparities in resources, and demographic, geographic, social, territorial and structural characteristics lead to disparities in needs and costs. Decentralised municipalities are, thus, obliged to apply different tax rates even when the services provided are the same in terms of quality.

Faced with these inequities, legal and administrative frameworks have always been torn between two extreme courses of action: (a) eliminate the inequities by devising a system whereby the same tax rates are applied for public services of the same quality; (b) give free rein to competition between municipalities and accept the resulting increase in inequities.

The normative literature considers that neither option is efficient and therefore recognises the need for a fiscal equalisation mechanism. However, it does not specify the degree of interventionism required. Thus, recommendation Rec(2000)14 of the Committee of Ministers of the Council of Europe mentions as a guideline that "a substantial degree of financial equalisation is a necessary condition of fiscal decentralisation and a strong local government". The recommendation adds that "fiscal equalisation mechanisms [...] should be designed so that they can at least partially equalise the fiscal strength of municipalities". As these statements clearly indicate, the question as to how far to go in matters of fiscal equalisation is a very sensitive one. Choices in this area reflect the prevailing social norms and the political debates, in the context of which these norms are expressed. Moreover, the political debates are characterised by the usual tensions between selfish and altruistic visions of society.

The aim of this article is to model the voting behaviour recorded when a fiscal equalisation issue is put to the people. This model should enable the isolation of the variables which influence the result of such a vote. It aims, in particular, to establish whether the voters' behaviour qualifies as *altruistic* or whether it should be classified as the opposite, i.e. *selfish* behaviour. The latter is characterised in particular by a "vote with one's wallet", i.e. decisions based on the voters' self-interest.

We consider the hypothesis whereby voters' reasoning is basically selfish. This hypothesis complies with the hypothesis presented by Meltzer and Richard (1983) who suggest that «*rich-to-poor*» redistribution is usually accepted by voters whose income is lower than average and tends to be rejected by voters with higher-than-average incomes.

However, we believe that voting behaviour cannot be fully explained in terms of a selfish rationality. Individuals must give equal consideration in their reasoning to ethical, i.e. altruistic, concerns with regard to values of redistributive justice and solidarity. Thus, the

two dimensions – selfishness and altruism – are linked in determining the actual outcome of the poll.

The hypotheses are tested using the results of two referenda held at a year's interval in the Swiss Canton of Vaud. In both cases, the ballot concerned the introduction of a new tax equalisation mechanism in the Canton's municipalities. In May 2000, the Canton's inhabitants voted in favour of a project proposed by the government and the Union of Vaud Municipalities (*Union des communes vaudoises*). The project in question can be described as minimalist. In June 2001, the same people rejected an initiative proposed by an extreme left-wing party, the Workers' Party (POP, i.e. *parti ouvrier populaire*). This project was far too ambitious as it proposed that the fiscal burden associated with the tax on the income of natural persons be made identical for all the municipalities in the Canton (i.e. full tax harmonisation).

2 The theoretical framework: altruism and voting on mechanisms of tax equalisation

Decentralised systems are credited with offering several advantages: e.g. the possibility of tailoring outputs to local tastes, the fostering of intergovernmental competition and the promotion of experimentation in locally provided goods and services. However, such systems have also disadvantages, including externalities, failure to exploit scale economies in the provision of public goods and tax collection, and inefficient tax systems. In addition to these disadvantages, decentralised systems also raise an equity issue. When the barriers to movement are low, it can be expected that an individual's choice of location will be influenced by the package of tax services provided by the various jurisdictions. In terms of equality, the consequences of this phenomenon are problematical. In effect, all municipalities are not equally equipped to cope with the competition. Different jurisdictions have different demographic, geographic, social, territorial and structural characteristics which lead to disparities in their needs and costs. The unequal distribution of the taxpayers' ability to pay among the different jurisdictions leads to disparities in resources. If measures are not taken, the gap between well-off low-tax jurisdictions and badly-off high-tax jurisdictions inevitably widens.

Fiscal equalisation mechanisms are probably the main solution available for bridging this gap, or at least preventing it from widening further. However, when the question of introducing a new system or modifying an existing one arises, the degree of equalisation is the key issue. A wide variety of solutions may be envisaged in the ensuing political debate, ranging between (a) the complete eradication of the gap between rich jurisdictions and poor jurisdictions, and (b) allowing the gap to evolve on the basis of the competition between jurisdictions.

The notion of solidarity, i.e. redistributive justice, is very prevalent in the political debates surrounding the introduction of equalisation mechanisms. As a result, these discourses carry an altruistic value. In standard usage, the term altruism denotes an unselfish interest in the welfare of others. In economics, an actor is altruistic if his/her utility is positively linked with the utility of other actors (Jarret, 1998). This value is the opposite of the paradigm of the selfish or selfish actor, according to which the economic (and political) actor aims exclusively to maximise his/her personal well-being or utility.

Beyond the empathy discourse, the actual impact of altruistic sentiments at the time of decision-making is questionable, irrespective of whether the decision is taken within a direct democratic system or in the context of representative democracy. In other words, do elected representatives or citizens act altruistically or selfishly when they have to vote in favour of or against a new equalisation mechanism (or a better equalisation mechanism). Meltzer and Richard (1983) have tested the hypothesis of selfish behaviour and show that a redistribution of wealth to the poor is only supported by persons (voters)

whose own income is below average; persons whose income is above average tend to oppose such measures. Thus, the result of a vote on an equalisation mechanism depends on selfish interests and on whether the average voter belongs to the group of contributors (rich) or beneficiaries (poor).

However, Goodin and Roberts (1975), Margolis (1982), Mueller (1989) and again Zamagni (1995) all demonstrated the existence of a tension between selfish and ethical considerations. These authors do not reject the existence of altruism in the objective function of the vote. As a result, they relativise the notion of purely selfish behaviour in the context of collective decisions. Thus, Margolis suggests that "... we have good reason to expect that a viable formal theory of politics will need to extend the traditional model of rational choice in at least three ways: provision of a central role for public goods; explicit treatment of altruistic motivation; and explicit treatment of the role of persuasion."

Furthermore, voting is generally associated with the spirit of civic duty, despite the fact, as suggested by Goodin and Roberts¹, there is a greater chance of being killed on the way to the polling station than of being able to change or influence the result of the ballot. Thus, they insist on the fact that individuals have selfish and ethical preferences and that their welfare functions include both ethical and selfish components, even if the latter usually take precedence over the former. This hypothesis is formalised by Mueller (1989) using an *objective function* which every voter seeks to maximise:

$$O_i = U_i + \theta \sum_{j \neq i} U_j$$

where O_i represents the objective function of the individual i . The function includes the utility of the object of the vote for the individual U_i and the sum of the utility for the other members j of the society U_j . The parameter θ expresses the more or less altruistic behaviour of the voter. The hypothesis, according to which the voter would take into account the utility of others, or the entire society, in his/her decision, implies that $0 < \theta < 1$. θ would not, however, assume extreme values. Firstly, entirely selfish behaviour ($\theta = 0$) is excluded in accordance with the hypothesis of Margolis, Goodin, Roberts, Zamagni and Mueller. Secondly, a strictly altruistic attitude ($\theta = 1$) would be incompatible with the Meltzer and Richard's paradigm of the selfish actor (the utility of the individual U_i being merely a marginal factor in the decision). Thus, the value of the parameter θ represents the voter's trade-off between his/her personal interests (selfishness) and his/her interest in the social welfare (altruism). From an empirical perspective, the entire question lies in the estimation of the parameter θ .

According to Hudson and Jones (1994) there is "significant support to the concept of an ethical voter put forward by Mueller, confirming that perceptions of the public interest

¹ «No rational egoist should bother voting because, as Skinner's Dr. Frazier notes, the probability of any one man casting the decisive vote «is less than the chance he will be killed on the way to the polls».»

have considerable influence in determining policy preferences". Their contribution presents a new approach in terms of the estimation of altruism and its effect on voters' preferences. With the aim of demonstrating the levels of selfishness or altruism shown by citizens, they carried out an empirical study among two samples comprising 466 and 345 people living in the English city of Bath using questions on current issues associated with government activity. The study ultimately showed that the level of education and income are important determining factors when it comes to altruism. This challenges the belief which was hitherto firmly established in the public choice literature that individual behaviour is solely motivated by selfish considerations.

Table 1 illustrates Mueller's model, according to which the voter (elected representative or citizen) either contributes to or benefits from the equalisation mechanism. If the voter contributes, his/her own utility U_i will definitely diminish (descending arrow); in contrast, the way in which the collective utility U_j evolves is ignored (bi-directional arrow). According to the traditional hypothesis of individual rationality, the outcome of the vote will be positive if the loss in utility is compensated by a gain in the collective utility². Conversely, if the voter is a beneficiary of the mechanism, his own utility U_i will certainly increase (ascending arrow); however, this also completely ignores the evolution of the collective utility U_j (arrow once again bi-directional). The outcome of the vote will be positive if the gain in individual utility is not made at the cost of an equal or greater loss in the collective utility.

Thus, irrespective of the voter is a contributor or beneficiary, the rule for voter decision-making can be expressed as follows...

$$\text{positive vote if } U_i + \theta \sum_{i \neq j} U_j > 0,$$

$$\text{negative vote if } U_i + \theta \sum_{i \neq j} U_j < 0.$$

TABLE 1
THE EVOLUTION OF UTILITY ON THE BASIS OF PARTICIPATION IN THE EQUALISATION MECHANISM

	Contributor	Beneficiary
U_i	↓	↑
U_j	↕	↕

² The individual rationality hypothesis must not, of course, be confused with the selfishness hypothesis.

In the case of the secret ballot, it is not possible to observe the individual voter behaviour³. Thus, in this case, it is necessary to avail of other means to establish whether altruistic motivations influence voters in their decisions. This case is covered by the work of Riker and Ordeshook (1968) and Ashenfelter and Kelley (1975), who recorded the characteristics and opinions of individual voters on the basis of an analysis of questionnaires distributed among voters in the United States during presidential elections. For example, Ashenfelter and Kelley established that the sense of civic duty is the primary motivation among voters; this is followed by a number of other variables such as education and variables connected with the sense of obligation to vote. In Switzerland, the VOX analyses provide insight into voter motivation. These are exit polls carried out during federal referenda which record information on voting and the individual characteristics of voters. However, these analyses do not reveal anything on the motivation of voters; at best they facilitate the demographic and sociological classification of the referenda results.

³ The behaviour of individuals is observable in the case of nominal voting or votes based on a show of hands.

3 Empirical evidence

3.1 The projects in the Swiss Canton of Vaud

Two referenda on equalisation mechanisms were recently held in the Swiss Canton of Vaud; the two referenda took the form of a secret ballot. Both of the proposed projects aimed to reduce the financial inequalities which exist among the Canton's municipalities.

It should be noted that in each of Vaud's municipalities, the tax rate levied on the income of natural persons is defined on the basis of a reference tax structure. This tax structure is applied in all of the municipalities. Each municipality sets a multiplier coefficient of the tax rates included in the reference tax structure. Thus, in the year 2000, the municipality with the Canton's lowest fiscal burden set a coefficient of 40 (40%), while the municipality with the highest fiscal burden set a coefficient of 135 (135%). Therefore, by choosing to reside in one municipality area rather than another, a tax payer end up paying over three times more tax.

In 2000, the Council of State (*Conseil d'État*, i.e. the cantonal executive body) and the Union of Vaud Municipalities (*Union des communes vaudoises*, i.e. UCV) proposed an 'official' project aimed at creating a horizontal equalisation fund between municipalities. The objective was to eventually reduce the coefficients applied by 90% of the municipalities to a range of between 70 and 110 (i.e. between 70% and 110%). Each municipality would pay a contribution to the fund corresponding to the sum represented by 13 coefficient points. Thus, the fiscally strong municipalities would contribute more than the financially weaker ones. The fund would then be redistributed among the municipalities on the basis of three criteria: fiscal strength, fiscal burden and demographics. The project was ratified by a majority of 63.46% in a referendum held in the Canton in May 2000.

Deeming the mechanism's objective as inadequate, the Worker's Party (POP) – an extreme left-wing party – then launched a popular initiative aimed at the introduction of a single coefficient for all of the municipalities. This coefficient was to be set at around 92 (92%) at the introduction of the mechanism and more or less corresponds to the average of the coefficients in force in 2000 weighted by the population levels in each municipality area. Under the mechanism proposed by the POP, all of the local-authority tax revenue would be combined and redistributed among the municipalities, more or less on the basis of the number of inhabitants in each authority area. The project's initiators predicted a decrease in taxes for 2/3 of taxpayers with a simultaneous increase in revenue for 2/3 of the municipalities and no major variation in the total local-authority tax revenue for the Canton. The 12,000 signatures necessary to launch the initiative were collected and the proposal was put to the people in a referendum in June 2001. It was rejected by a majority of 68.5%

After this, the Green Party launched its equalisation proposition which stipulates that the home municipality shall directly benefit from tax revenue based on the first CHF 250,000 of taxable income of the natural persons resident in its jurisdiction. With respect to wealth tax, a ceiling would be set at the first five million CHF. In cases, in which the taxable income or taxable wealth of certain residents exceed these sums, the tax revenue collected on the excess would be used to fund an equalisation mechanism. Thus, according to the initiative, this would make it possible for «*all municipalities to benefit from providential taxpayers*». The Greens publicised their proposition prior to the referendum on the POP project. Thus, it was presented *de facto* as a counter-project to the POP initiative.

3.2 Modelled results

The results of the referenda on these two projects – the ‘official’ project (proposed by the Council of State and the UCV) and the POP project – is now known. The two referenda took the form of secret ballots. Thus, there is no information available about individual voters. However, the individual acceptance rates for each of the Canton’s 384 municipalities are available.

Thus, it is possible to carry out an initial categorisation of the municipalities for the purpose of identifying those in which the average voter’s behaviour was altruistic and the municipalities in which the average voter’s behaviour was selfish.

- A municipality can be described as *altruistic* in the following two cases:
 - if the proposition – either the official or the POP proposition – yielded an acceptance rate that is greater than or equal to 50%, although it involves an increase in the tax coefficient for the municipality. In effect, as $U_j < 0$, it is essential that $\sum U_j > 0$ and that the value of θ be high enough for $U_i + \theta \sum U_j > 0$ (condition for a positive ballot). The higher the acceptance level, the more altruistic the municipality, the variation in tax coefficient being equal (Quadrant I, Figure 1 and Figure 2).
 - if the proposition yielded an acceptance rate that is lower than 50%, although it involves a reduction in the coefficient. The lower the acceptance rate, the more altruistic the municipality, the variation in tax coefficient being equal. In effect, as $U_j > 0$, it is essential that $\sum U_j < 0$ and that the value of θ is high enough for $U_i + \theta \sum U_j < 0$ (condition for a negative ballot). It should be noted, however, that this type of altruistic behaviour is related to ‘financial masochism’ as municipalities in question generally have financial difficulties (Quadrant III).
- A municipality can be described as *selfish* in the following two cases:

- if the proposition yielded an acceptance rate that is greater than or equal to 50%, although it involves a reduction in the tax coefficient for the municipality. In effect, as $U_i > 0$, if $\sum U_j < 0$, the value of θ must be low enough for $U_i + \theta \sum U_j > 0$ (condition for a positive outcome). Thus, the higher the acceptance rate, the more selfish the municipality, the variation in tax coefficient being equal (Quadrant IV).
- if the proposition yielded an acceptance rate that is lower than 50%, although it involves an increase in the coefficient. In effect, as $U_i < 0$, if $\sum U_j > 0$, the value of θ must be low enough for $U_i + \theta \sum U_j < 0$ (condition for a negative outcome). Thus the lower the acceptance rate, the more selfish the municipality, the variation in tax coefficient being equal (Quadrant II).

When linked with the expected evolution of the tax coefficient, the acceptance rate constitutes *a priori* the only element which enables the identification of altruistic or selfish behaviour in the context of a secret ballot. This is presented in graphical form in Figure 1, which is based on the result of the referendum on the 'official vote', and in Figure 2, which presents the data on the result of the referendum on the POP project. The x-axis expresses the rate of acceptance from 0% to 100%. The y-axis shows the increase (in relative terms) of the tax coefficient – from origin upwards – and reduction (in relative terms) of the tax coefficient – from origin downwards. The figures are divided into four quadrants, each of which presents a different behaviour in accordance with the typology described above.

In terms of the 'official' project, Figure 1 shows that the majority of the municipalities in the Canton of Vaud voted selfishly (Quadrants II and IV). Behaviour differed only in a few municipalities and these are shown in Quadrants I and III⁴. It should also be noted that the six municipalities which feature in the third quadrant could also be classified as 'masochistic' as they rejected a reduction in their tax coefficient.

Figure 2 shows that the outcome of the referendum on the POP project was significantly different. In this case, a significant number of municipalities are located in the third quadrant. These are the municipalities which rejected the project even though it would have meant a reduction in their tax coefficient. Again, the term 'altruistic and masochistic' municipalities is applicable here. These municipalities include the majority of the municipalities which had previously accepted the 'official' project and which, therefore, figured in Quadrant IV of Figure 1. Quadrant I in Figure 2 includes fewer municipalities than the corresponding quadrant in Figure 1. Only eight municipalities accepted the POP initiative although it would have meant an increase in their tax coefficient⁵.

⁴ The municipalities in question are: Le Vaud, Montchérand, Corbeyrier, St-Georges, Bretonnières and St-Livres in quadrant III and Sévery et Rovray for the extremities of quadrant I.

⁵ The municipalities in question are: Vaulion, Vaugondry, Romairon, Provence, Chessel, Oleyres, Mauborget and Seigneux.

The number of municipalities located on the right-hand side of Figure 1 exceeds the number of municipalities which feature on the left-hand side of the same graphic. Thus, the majority of municipalities accepted the 'official' project. The distribution of the population among these municipalities does not challenge this phenomenon as the project gained the majority of the votes cast. Conversely, in Figure 2 the vast majority of municipalities are located on the left-hand side. Thus, the majority of municipalities rejected the POP project. The population distribution between the municipalities does not have any affect on the outcome.

The two figures demonstrate the existence of a relationship between acceptance rate and fiscal pressure: in both cases, the lower the increase in the coefficient or the greater the reduction in the coefficient, the higher the acceptance rate. This is indicative of selfishness. However, this selfishness is less marked in the graphical representation of the result of the referendum on the POP project (Figure 2). This is due to the paradox whereby the acceptance rate in the municipalities to which the initiative promised a reduction in the coefficient was less than 50%. This acceptance rate was, however, higher than that in the municipalities which would have had an increase in their coefficient. Thus, significant variations can be observed in the voting behaviour in the referenda on the 'official' and POP projects.

FIGURE 1
 POSITIONING OF THE MUNICIPALITIES ACCORDING TO THE DEGREE OF ALTRUISM OR SELFISHNESS
 DEMONSTRATED IN THE REFERENDUM ON THE 'OFFICIAL' EQUALISATION MECHANISM PROJECT

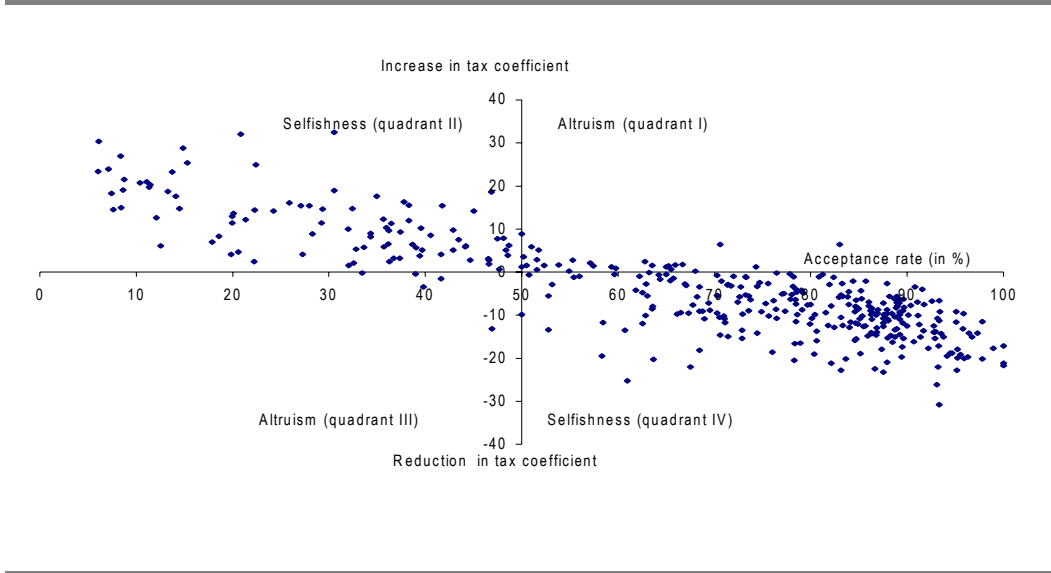
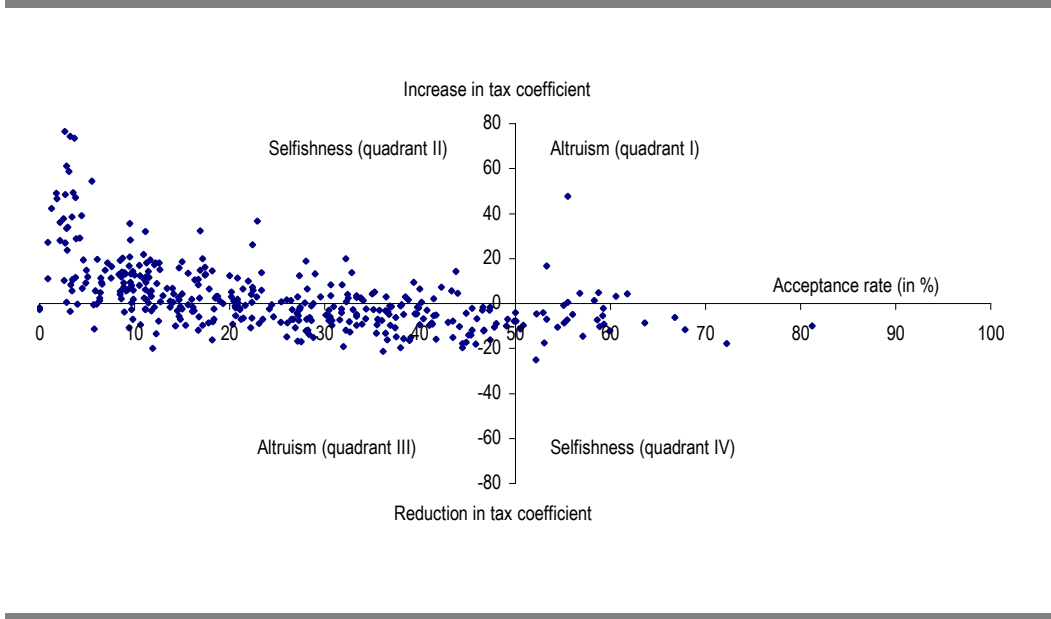


FIGURE 2
 POSITIONING OF THE MUNICIPALITIES ACCORDING TO THE DEGREE OF ALTRUISM OR SELFISHNESS
 DEMONSTRATED IN THE REFERENDUM ON THE POP EQUALISATION MECHANISM PROJECT



4 Econometric explanation of the voting

In graphically demonstrating a strong correlation between the acceptance rate and the variation of the tax coefficient, the above figures show that the variable 'tax coefficient variation' plays a decisive role in the average voter's objective function. If this is true, it is possible to deduce that the implicit value of θ is low. Failing the ability to estimate this value, it is at least possible to provide a clearer outline of the selfish behaviour of voters. To do this, the influence of variable 'tax coefficient variation' may be quantified in the explanation of the variation of the acceptance rate. It is also possible to try to demonstrate the influence of other variables which are indicative of selfish or altruistic behaviour. By trying to explain these rates using independent variables, we return to an approximation of Mueller's model. Thus, the meaning of the relationship with the independent variable provides information about the voting behaviour.

4.1 Estimation of the econometric models

As demonstrated above, there is a perceptible difference in the voting behaviour with respect to the 'official' project and the POP project. In an attempt to reach a better understanding of this difference, we use a transformation to model the relationship between the acceptance rate in each municipality and the explanatory variables. This transformation, proposed by Box and Cox (1964), enables the adaptation of the form of this relationship to the results.

As a result, the municipalities' acceptance rates (AR) are transformed according to the formula

$$AR^{(\lambda)} = \left[(AR + \lambda_2)^{\lambda_1} - 1 \right] / \lambda_1$$

where λ_1 is a Box-Cox parameter determined to normalise the error distribution and allows a great deal of flexibility in the search for an appropriate functional form. It is possible for the transformation to be linear ($\lambda_1=1$) or a natural logarithm ($\lambda_1=0$). A second Box-Cox parameter, λ_2 , has to be introduced in cases where the acceptance rate equals zero. The search for the values of both Box-Cox parameters that maximised the likelihood function requires a complex procedure. A value of 1 for λ_2 is therefore arbitrarily added to the acceptance rate (Mitchell and Carson, 1989, p. 372).

Table 2 shows the results of the modelling of the ballots on the 'official' project (model 1) and the POP project (models 2 and 3). In all cases, the dependent variable is each municipalities' acceptance rate for the project under consideration. Several explanatory variables were tested. Only the significant enough ones are used in the models presented here. These models have been estimated with the help of 384 observations. Each observation corresponds to a Vaud municipality.

TABLE 2
REGRESSION COEFFICIENTS FOR THE 'OFFICIAL' AND POP PROJECTS^a

Independent variable	'Official' project	POP project	
	Model 1	Model 2	Model 3
Constant	164.90** (8.818)	155.00** (9.610)	10.51** (13.396)
Variation of the tax coefficient, numerical variable indicating the variation of the local-authority tax coefficient before and after the implementation of the project [COEFFICIENT]	-5.20** (-31.889)	-1.19** (-11.305)	-0.08** (-15.025)
Gross debt, numerical variable indicating the gross local-authority debt per inhabitant, in thousand CHF [DEBT]	1.51** (3.379)	1.10** (2.806)	0.04* (2.312)
Cash flow, numerical variable indicating the cash flow (current revenue – current spending) per inhabitant, in thousand CHF [CASHFLOW]	23.96* (2.121)	-6.33** (-3.134)	-0.46** (-4.648)
Political leanings, numerical variable which reflects the municipality's political leanings, varying from 1.0 for totally left-wing leanings to 8.2 for totally right-wing leanings [POLITICS]	-5.59 (-1.717)	-18.13** (-6.496)	-0.84** (-6.186)
n	384	384	384
λ_1	1.26	1.26	0.33
L_{max}	-1510.18	-1567.27	-1470.11
Pseudo \bar{R}^2	0.73	0.36	0.46

a. The numbers shown in brackets beneath the estimated parameters represent the values of t . The coefficients marked with a double asterisk are significant at a level of 99%; those with a single asterisk are significant at 95% (two-sided test).

The specification given to the model of the voting behaviour on the 'official' project by the Box-Cox transformation is relatively close to a linear formulation, since λ_1 is quite close to one (1.26). Indeed, according to the maximum likelihood function, the parameter λ_1 lies with a 95% probability within the range $1.08 < \lambda_1 < 1.44$. Thus, the unit value (1) is almost included in the confidence interval for λ_1 .

Some independent variables prove to be negatively correlated with the acceptance rate. As already demonstrated in graphical form, this is the case for the variation of the local-authority tax coefficient (quantified in percent). Similarly, the higher the level of the municipality debt or cash flow per inhabitant, the higher the acceptance rate. The fact that there is a positive correlation between cash flow and the acceptance rate goes against the selfishness hypothesis. Conversely, however, the relationship with debt or the tax coefficient conforms to this hypothesis. It should, however, be noted that cash flow can vary significantly from one year to the next. Thus, this variable would reflect the recent evolution of the municipality's financial situation, while the debt reflects a more historical account of its financial strength or weakness. Hence, it would be dangerous to deduce from this that the financial ease offered by a sizeable cash flow promotes altruism while the existence of a sizeable debt would tend to lead to greater selfishness. The model also

includes a variable based on the municipality's political leanings. This information is derived from the voting percentages obtained by each political party in the municipality during the federal elections of 1999. It also takes each party's ideological discourse (more or less left, more or less right) into account. The value for each municipality is given in the form of an index which combines each party's power base and political ideology⁶. The lower the value of this variable, i.e. the closer to 1.0, the more left-wing the municipality. The higher the value, i.e. the closer to 8.2, the more right-wing the municipality. The acceptance rate is negatively correlated with political leanings: the more right-wing a municipality's leanings, the lower the acceptance rate. For almost each variable, except the variable based on the municipality's political leanings, the significance level is higher than 95%. As anticipated, it is particularly high in the case of the tax coefficient variation.

The same functional form, i.e. using a λ_1 of 1.26, was used to model the result of the referendum on the POP project (Model 2). According to the hypothesis, whereby the voting behaviour should have been identical for the two projects, the estimated coefficients should be relatively stable. This is not, however, the case, even if the sign of the relationship remains the same, with the exception of the cash flow variable. As a result and contrary to the previous model, the relationship with the cashflow also conforms to a selfish logic.

Even if this model offers a high level of significance for all the variables, it does not maximise the likelihood. For the likelihood to be maximised, one must relax the constraint over λ_1 . Thus, λ_1 assumes the value 0.33, i.e. the functional form tends towards logarithmicity (Model 3). However, the null value (0) lies far enough from the confidence interval, since according to the maximum likelihood function, the parameter λ_1 lies with a 95% probability within the range $0.23 < \lambda_1 < 0.45$. Even if the sign of the relationship remains the same than in model 2, the DEBT variable loses in significance.

In the two models for the POP project referendum, the degree of significance of the variation of the tax coefficient is lower than it is in the model for the 'official' project referendum. Conversely, the degree of significance of the political leanings is perceptibly higher in Models 2 and 3. Furthermore, the explanatory power of the model for the 'official' project referendum is significantly higher than that of Models 2 and 3 (73% as opposed to 36% for model 2 and 46% for model 3).

The variations in the significance of the variables in the different models, the shift from a positive correlation to a negative correlation with the cashflow and the large difference in the explanatory capacity and in the functional form show that the voting behaviour in the two objects was different.

Table 3 presents the matrix of simple correlation coefficients that exist between the different model variables for the two objects voted on. The coefficients shown in brackets correspond to the POP project (Model 3) and the others correspond to the official project

⁶ Index proposed by Lane and Ersson (1994), based on the considerations of Ladner and Brändle (1997) and presented in Ladner (1999 : 221).

(Model 1). This table enables the comparison of the influence of different variables on the acceptance rate.

It is possible to observe differences between the two coefficients. These differences are associated with the fact that the two projects involve a variation in the tax coefficient and different acceptance rates. With respect to the variables [DEBT] and [CASHFLOW], these differences originate from the fact that the values used in the «official» model are based on figures from 1998, and those used in the POP model are based on figures from 1999. The variable [POLITICS], which expresses the political trend, is based on the results of the 1999 federal elections. As a result, its value for each municipality is identical for both models. Thus, the difference between the coefficients arises from the fact that the two projects have a different acceptance rate.

Irrespective of the project ('official' or POP), the variation with respect to the municipality tax coefficient [COEFFICIENT] is the variable with the highest coefficient of correlation (-0.85 and -0.60). In the case of the 'official' project, this is followed by the municipality's debt per inhabitant [DEBT], cash flow per inhabitant [CASHFLOW] and, finally, political leanings [POLITICS]. On the other hand, in the case of the POP project, these two last variables play a more prominent role – even more prominent than DEBT. The fact that the POLITICS variable assumes such importance here (-0.27) is indicative of the widespread politicisation of the debate and the existence of significant political division.

Table 3 also enables the evaluation of the possible co-linearity between the explanatory variables. The simple correlation coefficients do not reach critical levels even between the CASHFLOW and DEBT variables.

TABLE 3
MATRIX OF SIMPLE CORRELATION COEFFICIENTS IN THE 'OFFICIAL' AND POP PROJECTS (LATTER IN BRACKETS)

	ACCEPTANC E	COEFFICIENT	DEBT	CASHFLOW	POLITICS
ACCEPTANCE	1.000 (1.000)	-0.851 (-0.604)	0.150 (0.208)	0.004 (-0.233)	0.002 (-0.272)
COEFFICIENT		1.000 (1.000)	-0.080 (-0.165)	-0.030 (0.059)	-0.051 (0.032)
DEBT			1.000 (1.000)	-0.213 (-0.054)	-0.071 (-0.067)
CASHFLOW				1.000 (1.000)	0.205 (0.085)
POLITICS					1.000 (1.000)

4.2 Could the result of the ballot on the POP project have been predicted?

In view of the fact that the two polls took place at a year's interval, the question arises as to whether the model based on the result of the first referendum on the 'official' project could have been used to predict the outcome of the vote on the POP project. The error this would have given rise to can also be examined.

This question can be investigated by means of simulation. Our simulation is based on the estimated model for the 'official' project (Model 1). It refers to the uniform tax coefficient of 92 which was to have been applied at the introduction of the POP equalisation mechanism. The tax variation for each municipality corresponds, therefore, to the variation in percentages between the municipality coefficient for 1999 and the 92 coefficient. The other variables do not change. In other words, the influence of determinants linked with the municipality debt per inhabitant, the margin of cashflow per inhabitant and the municipality's political leanings remain identical to the situation as it stood in the year 2000. The simulation gives an acceptance rate of the POP project of 64.9%.

The prediction error is significant given that the initiative was rejected by more than two thirds of the voters (68.5% no vote), which implies an actual acceptance rate of 31.5%.

How can this difference be explained? The statistical results show that there is little likelihood of a significant bias in the estimation of the model of the 'official' vote.

We believe that the more likely explanation is the nature of the two objects subject to the vote. *A priori*, these two objects may seem similar: two fiscal equalisation projects, each resulting in a larger or smaller reduction or increase in the fiscal burden.

However, these two objects were not voted on simultaneously but at an interval of one year (May 2000, June 2001). As a result, the attitudes of voters may have changed on the basis of the evolution of the framework conditions. Apart from a change in attitude, other elements which are intrinsic to the projects but which cannot be modelled most certainly played a role here.

Even if the POP initiative was presented as a reaction to the lack of equalising ambition in the 'official' project (at least in the eyes of the initiators), the 'official' project was probably perceived *de facto* by voters as a counter-project to the initiative⁷. Previous experience in Switzerland has shown that, faced with a counter-project originating from an executive body, an initiative has little chance of being accepted. The chances were certainly further reduced by the fact that the 'counter-project' had already been accepted by the people prior to the vote on the initiative.

⁷ The Greens' proposition/proposal is another implicit counter-project although it was not the subject of an initiative.

Furthermore, issues concerning identity and politics most certainly represented a further obstacle during the vote on the POP project. With respect to identity, in their efforts to militate in favour of a rejection of the POP initiative, several opinion leaders drew attention to the principle of local-authority autonomy. They emphasised the fact that the single rate proposed by the initiative would challenge the principle of identity among the users and payers of municipality services. This message was conveyed by the majority of the mayors, who, it must be noted, play a prominent role in the Canton's public life. Fear of centralisation and distrust of cantonal authority were added to the identity issue. Thus, some dismissed the possibility of entrusting the management of municipal affairs to a Canton which has been in very bad financial straits for several years while the financial status of its municipalities is generally healthy.

The strong influence of the POLITICS variable in the models of the vote on the POP project (and its higher level of significance *vis à vis* the model of the vote on the 'official' project) demonstrates the politicisation of the debate. This is also indicated by the reduction in the influence of the tax coefficient variant in this case: i.e. the voters relinquish a part of their (selfish) rationality and in some cases display 'fiscal masochism'⁸. Under these conditions, a proposition originating from an extremist left-wing party has little chance of success among the electorate of a Canton whose political centre of gravity is on the right of the spectrum.

4.3 Conclusion

The analysis gives a paradoxical result which is, however, expected. The paradox arises from the fact that a fiscal equalisation system based on a principle of altruism is evaluated on the basis of a selfish rationality when put to a popular vote. Thus, the voters of Vaud came out more strongly in favour of the proposed system when it would enable a reduction in the fiscal burden. Conversely, they expressed greater opposition when faced with an expected rise in the fiscal burden. This effect was anticipated and has been verified.

Thus, Melzer and Richard's hypothesis (1983) is verified in the case of the 'official' project. The average voter belongs to the group of taxpayers who live in a municipality in which the introduction of the measure meant a reduction in the fiscal burden.

⁸ The opponents of the POP initiative claimed that the single tax rate would ultimately have exceeded the predicted 92% if the lack of correspondence between the decision-makers and contributors were taken into account. If this is true, the number of beneficiaries of a reduction in taxes would have been lower than that stated by the POP.

It is interesting to note, however, that during the campaign for the 'official' project, information was provided on the municipalities in which fiscal pressure would be reduced and those in which fiscal pressure would increase as a result of the implementation of the project. This phenomenon did not really materialise in the interval between the two ballots and this may have contributed to an increase in the voters' distrust with respect to the promises made in relation to the POP project.

The initiators of the POP project also counted on selfish behaviour on the part of the voters. Our simulations show that had the voters had adopted the same behaviour with respect to the POP project as they did for the 'official' project, the full tax harmonisation mechanism would have been generally accepted. There can be no doubt that selfish behaviour was at work here but in a much more diffuse way than was the case in the ballot on the 'official' project. Other factors also influenced the outcome, however: identity factors linked with questions of municipality autonomy, distrust of the cantonal authorities, political factors connected with a strongly politicised vote and the low level of acceptance for a proposition emanating from the extreme left. This led to the rejection of the project by numerous voters although, in theory at least, this project could have brought them a reduction in taxes. This shows an altruism towards those taxpayers who would have been subject to an increase in taxes. To put it more trivially, this behaviour has certain similarities to 'fiscal masochism'.

In conclusion, the example of the Vaud ballots on the fiscal equalisation projects show that it is possible to design a project in such a way that it is acceptable to the people if two principles are kept in mind. According to the first principle, voting behaviour is characterised by a strong level of selfishness and the altruistic dimension is weak or marginal. According to the second, the average voter should personally benefit from the project. As demonstrated by the failure of the POP project, which respected the first two principles, there is, however, a third principle which must also be taken into account: the proposition must originate from an official and politically majoritarian milieu.

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