

# The Break-Up of Municipalities – Voting Behavior in Local Referenda

Anna Brink\*

Working Papers in Economics no 58  
Revised version September 2003

Department of Economics  
Göteborg University

## Abstract

This paper examines the economic and political conditions that influence people's attitudes regarding a municipality break-up. The theoretical model predicts intra-municipal differences in tax bases, political preferences, and population size to affect the expected gain from secession. The predictions of the model are tested using data on local referenda about municipality partitioning in Sweden. The data support one of the three effects; voters in municipality parts that are wealthy compared to other parts of the same municipality are more positive to secession.

*Keywords:* median voter, municipalities, referenda, break-up

*JEL classification:* H11, H73

---

\*I thank Henry Ohlsson, Lars-Erik Borge, Matz Dahlberg, Katarina Nordblom, Magnus Wikström and seminar participants at Göteborg University and Uppsala University for useful comments. This research was financially supported by the Swedish Research Council and Ejnar Lindhs kommunalvetenskapliga stiftelse.

# 1 Introduction

This paper deals with the breaking-up of municipalities. Under which conditions do individuals favor municipality break-ups? The question relates to the growing research branch in the political economy field that concerns the break-up and unification of nations and regions – a burning issue in Europe since the German unification, the dissolution of the Soviet union, and the enlargement of the European Union.<sup>1</sup> Contrary to the Tiebout (1956) framework where individuals “vote with their feet,” the action taken in this literature is to change the size of jurisdictions by secession or integration, and thereby changing the size of the public sector’s budget.

Alesina and Spolaore (1997), Bolton and Roland (1997), and Persson and Tabellini (2000) examine the trade-off between the efficiency of large jurisdictions and the costs of diverse populations, discussing the economic and political terms under which countries and regions decide to unify or break up. The theoretical framework in these models is well suited for analyzing the break-up of municipalities, and the Swedish municipality break-up data used in this paper make it possible to perform empirical testing of the theory, which, to my knowledge, has not previously been done.

The number of Swedish municipalities was reduced from 2,500 to 278 between 1952 and 1974 through two major municipal boundary reforms. During this period, the municipal responsibilities increased, which called for municipalities that were large enough to sustain an acceptable level of public administration, as well as to keep up schools and social services. The first demands for dividing one of the newly amalgamated municipalities were made two years after the last reform was completed. The first two municipality break-ups took place in 1980. In all, after the amalgamation reforms, 13 new Swedish municipalities have formed by secessions, two municipalities have amalgamated, and one parish has broken out from one municipality to join another.

The outline of the paper is as follows: The procedure and conditions for municipality break-ups are described in the next section. In Section 3, a theoretical model following Persson and Tabellini (2000) is presented, where the median voter, who obtains utility from private and public consumption, sets the proportional income tax in the municipality. In the case of a split, there are two new median voters (one

---

<sup>1</sup>For a literature survey see Bolton et al. (1996). Alesina et al. (1995) discuss politico-economic issues on separatism.

in each of the municipalities), each deciding the new tax rates. The question posed is under which conditions individuals favor a municipality break-up.

The model shows three effects influencing the utility gain for individuals in the seceding municipality part in case of a break-up. First, partitioning is inevitably associated with a decrease in population size, which gives rise to an efficiency loss compared to parts staying united. The second effect derives from a tax base difference in the united municipality and the seceding part; people in a richer municipality part gain from a break-out as the wealth is no longer shared with poorer municipality parts. Finally, a difference in political preferences between the median voter in the united municipality and the median voter in the seceding part brings about a change in tax rates. This effect is surely positive for the seceding part's median voter, since his preferred tax rate is implemented in case of secession. For other individuals, however, the tax rate change may be either good or bad depending on the individual's income.

The implications from the theoretical model are tested empirically on Swedish data from local referenda about municipality partitioning in 24 municipality parts. The data cover all settled partition cases subsequent to the amalgamations in the 1970s, half of them involving a referendum. The data set and variables are described in Section 4. The empirical results are presented in Section 5, which suggest that there is support for one of the effects derived from the theoretical model; the tax base effect is supported by data both in terms of statistical significance and impact on voting behavior.

Finally, Section 6 summarizes the results and concludes the paper.

## 2 The Procedure of Municipality Partition

For a municipality part to break out and form a new local jurisdiction, a municipality or a local resident can put forward a partition proposal to the Legal, Financial and Administrative Services Agency (*Kammarkollegiet*). If the proposal is not turned down immediately, the Agency refers the case to the municipal council in the concerned municipality and to the County Administrative Board (*Länsstyrelsen*) for an expert opinion. Based on their statements, the Legal, Financial and Administrative Services Agency decides whether to initiate an investigation, which in most cases is

carried out by a special investigator.<sup>2</sup> The investigation, which shall consider all factors affecting the matter, is referred back to the municipal council, which may choose to carry out a referendum.<sup>3</sup> The municipal council gives its recommendation about the partition case to the agency, and based on the investigation, the recommendation of the municipal council, and the referendum results, the agency comments on the case and forwards it to the central government, which finally decides on whether a partition is to be realized or not.

A factor of great importance for the agency's recommendation is the opinion of the local population. The municipal council is often taken to represent the united municipality, but a referendum or an opinion poll is nevertheless frequently used to get a clear idea about the public opinion. The opinion in the seceding municipality part is of certain interest – the municipal council cannot be presumed to represent their interests – and about a third of the referenda only encompasses the population in this part.

Since 1977, more than 50 applications have been submitted to the Legal, Financial and Administrative Services Agency, of which 49 were completed by the end of 2001. In Figure 1, these cases are grouped according to where in the decision process the matters were settled.

As shown, more than 60 percent of the cases were investigated. Out of the 31 investigated cases, 6 were withdrawn by the applicants (4 due to negative referendum results in the seceding parts). Finally, the 25 cases that were subject to governmental verdict are divided into 13 rejections and 12 approvals<sup>4</sup> – most following a referendum.

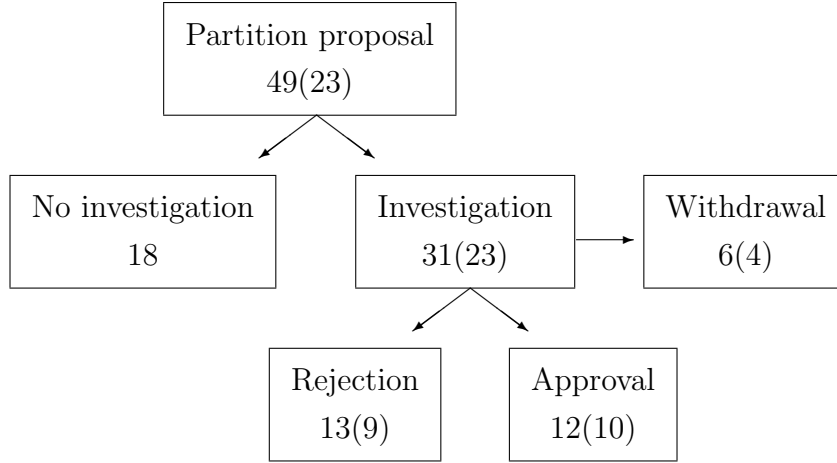
---

<sup>2</sup>The municipality can also initiate an investigation itself, and thereby evade the investigation decision. In such a case, the report is examined by an external investigator appointed by the Legal, Financial and Administrative Services Agency.

<sup>3</sup>A referendum can also be initiated by the agency or the central government, but this rarely occurs.

<sup>4</sup>The 12 approved proposals resulted in 13 new municipalities, since one of the cases concerned secession of two municipality parts.

Figure 1. Settled municipality partition matters, 1977-2001.  
 Number of referenda in parentheses.



### 3 The Model

We consider a simple model of majority voting following Persson and Tabellini (2000). Our focus is on the median voter in the seceding municipality part. The reason is that in Swedish municipalities, the local governments are – at least in the context of municipality partitioning – considered to speak for the united municipality. Furthermore, the empirical testing considers only the voters in the seceding parts. However, the median voter in the seceding municipality part is by no means decisive. It is the central government that passes the final verdict on partition matters, but since the opinion of the concerned population is supposed to be of great importance for the decision, the referenda are meant to provide the government with information on this matter. Individual  $i$  has preferences over private consumption,  $c^i$ , a publicly provided private good,  $g$ , and leisure,  $l^i$ .<sup>5</sup>

$$U^i = c^i + g + \Psi(l^i), \tag{1}$$

where  $\Psi(\cdot)$  is concave. Private consumption is constrained by disposable income, where  $t$  is a proportional tax rate and  $h^i$  is labor supply. The real wage rate is

---

<sup>5</sup>The services provided by the municipal sector are mostly of private good character, such as schooling, child care, elderly care, and social services.

normalized to unity.

$$c^i = (1 - t)h^i \quad (2)$$

Time can be allocated between leisure and labor. The effective time available is  $1 + e^i$ , where  $e^i$  is individual  $i$ 's productivity:

$$1 + e^i = l^i + h^i \quad (3)$$

The individual maximizes utility subject to the budget and effective time constraints. The optimal choice of leisure is

$$l^i(t) = \Psi_l^{-1}(1 - t), \quad (4)$$

where the subscript denotes a partial derivative.  $l_t^i(t) > 0$  due to the concavity of  $\Psi(\cdot)$ . The quasi-linear utility function brings in the property that the tax rate is the only variable acting on the optimal choice of leisure. An implication that follows from this is that all individuals choose the same amount of leisure.

The optimal choice of labor supply is

$$h^i(t) = 1 + e^i - \Psi_l^{-1}(1 - t), \quad (5)$$

where  $h_t^i(t) < 0$  and  $h_{e^i}^i(t) > 0$ . All differences in labor supply among individuals are due to differences in productivity. We can express individual  $i$ 's labor supply in terms of average labor supply as

$$h^i = h + e^i - e, \quad (6)$$

where  $h$  and  $e$  refer to municipality averages.

The publicly provided good is constrained by tax revenue and a fixed cost,  $k$ , which is independent of population size,  $N$ ,

$$g = th(t) - \frac{k}{N}. \quad (7)$$

The derived utility function for individual  $i$  becomes

$$V^i(t) = (1 - t)h^i(t) + th(t) - \frac{k}{N} + \Psi(1 + e^i - h^i(t)), \quad (8)$$

where  $h^i(t)$  is the optimal labor supply for individual  $i$  given the tax rate  $t$ , as expressed in Equation (5). Using the envelope theorem gives the following condition for individual  $i$ 's preferred tax rate:

$$V_t^i(t) = -h^i(t) + h(t) + th_t(t) = 0. \quad (9)$$

Substitute Expression (6) for  $h^i$  in Condition (9) to get

$$V_t^i(t) = -(e^i - e) + th_t(t) = 0, \quad (10)$$

which yields individual  $i$ 's preferred tax rate,

$$t^{i*} = \frac{e^i - e}{h_t(t)}. \quad (11)$$

If individual  $i$  has greater than average productivity, the preferred tax rate is negative, since  $h_t(t) < 0$ . In such a case,  $t$  may be regarded as an income subsidy and the publicly provided private good,  $g$ , as a lump sum tax. We, however, assume that the tax rate implemented is preferred by the median voter and that median voter income (productivity),  $e^m$ , is smaller than the average, which assures a positive tax rate.

In the united municipality, the preferred tax rate is

$$t^u = \frac{e^m - e^u}{h_t(t^u)}, \quad (12)$$

where superscript  $u$  refers to united. We focus on the median voter in the seceding municipal part and assume that he votes for partition if his expected utility gain from secession is positive. If the municipality breaks up, the preferred and implemented tax rate in the new municipality is

$$t^s = \frac{e^{ms} - e^s}{h_t(t^s)}, \quad (13)$$

where superscript  $s$  denotes the seceding municipality part and  $ms$  the median voter in the seceding part. In case of a break-up, he gets the indirect utility

$$V^{ms}(t^s) = (1 - t^s)h^{ms}(t^s) + t^s h^s(t^s) - \frac{k}{N^s} + \Psi(1 + e^{ms} - h^{ms}(t^s)). \quad (14)$$

Expression (6) can, for the seceding part, be restated as

$$h^{ms} = h^s + e^{ms} - e^s. \quad (15)$$

Substituting Expression (15) for  $h^{ms}$  in (14) gives

$$V^{ms}(t^s) = (1 - t^s)(h^s(t^s) + e^{ms} - e^s) + t^s h^s(t^s) - \frac{k}{N^s} + \Psi(1 + e^s - h^s(t^s)). \quad (16)$$

To compare median voter  $ms$ 's utility in the case of secession with staying united, it is useful to express average labor supply in the seceding part in terms of labor supply in the united municipality. The difference in average labor supply between the united municipality and the seceding part derives from differences in tax rates and average productivity,

$$h^s(t^s) = h^u(t^s) + e^s - e^u. \quad (17)$$

Substitute (17) into (16) and rearrange to get the indirect utility of the median voter in the seceding part if the municipality breaks up:

$$V^{ms}(t^s) = W^{ms}(t^s) - \frac{k}{N^s}, \quad (18)$$

where

$$W^{ms}(t^s) = (1 - t^s)(h^u(t^s) + e^{ms} - e^u) + t^s(h^u(t^s) + e^s - e^u) + \Psi(1 + e^u - h^u(t^s)) \quad (19)$$

The indirect utility of the median voter in the seceding municipality part if the municipality stays united is

$$V^{ms}(t^u) = W^{ms}(t^u) - t^u(e^s - e^u) - \frac{k}{N^s}, \quad (20)$$

where  $W^{ms}(t^u)$  is analogous to (19) but instead of  $t^s$  includes the tax rate in the united municipality,  $t^u$ , determined in Equation (12). The expected utility gain from



secession is

$$\begin{aligned}\Delta^{ms} &= V^{ms}(t^s) - V^{ms}(t^u) \\ &= [W^{ms}(t^s) - W^{ms}(t^u)] + t^u (e^s - e^u) - k \left[ \frac{1}{N^s} - \frac{1}{N^u} \right].\end{aligned}\quad (21)$$

The term in the first bracket is the utility gain deriving from differences in private consumption, the publicly provided private good, and leisure. If  $t^s \neq t^u$ , the term is positive, since the median voter in the seceding municipality part gets his preferred tax rate if the municipality breaks up. We denominate this as a political effect, since it captures the clear gain of autonomy for the median voter.

The second term can be regarded as a direct tax base effect. It is positive if average income – reflected in average productivity – in the seceding municipality part is greater than in the united municipality.

The third term captures the efficiency loss from secession due to the fixed costs associated with running a municipality. A smaller population faces a greater per capita cost than a united municipality, and the loss becomes greater the larger the population difference is. The more funds per capita needed to cover the fixed costs, the smaller the funds that will be available for the publicly provided good.

The model thus implies two plain effects on the median voter in the seceding part of the municipality: a utility gain from being the median voter and thus deciding on the tax rate, and a utility loss associated with a smaller population. For the tax base effect to yield a positive utility gain, average income must be higher in the seceding part than in the united municipality.

Out of the three effects acting on voting behavior, the efficiency effect and the tax base effect do not depend on the tax rate. Therefore, all individuals in the seceding part face the same gain or loss due to these two effects. The political effect, however, can for individuals other than the seceding part's median voter take either sign depending on how well the tax preferred by the median voter corresponds to their preferences. Since the political effect for the median voter is positive, it follows that the majority in the seceding part also faces a positive political effect from secession.

However, a new tax rate, and the corresponding size of public expenditures, will not benefit all individuals in the seceding municipality part. Even though a majority

gains from the political change, the average effect may be negative. The difference in utility gain or loss from secession between an individual with average income in the seceding part and its median voter derives entirely from the political effect,

$$\Delta^s - \Delta^{ms} = (t^u - t^s)(e^s - e^{ms}), \quad (22)$$

where  $\Delta^s$  is obtained in the same way as  $\Delta^{ms}$ , but replacing  $ms$  by  $s$ . If  $t^u > t^s$ , then Expression (22) is positive, as average income is higher than median income. But if  $t^u < t^s$ , and  $\Delta^{ms}$  is small enough, then the average gain from the new tax rate is negative; the utility gains of the majority are smaller than the losses of the minority.

## 4 Data and Variables

We test the predictions from the theoretical model by using a unique data set that includes Swedish data from 20 local referenda in 24 municipality parts, collected as a part of this research project.<sup>6</sup> The data cover all local referenda held after the municipality amalgamation reforms for those municipalities where partition applications were submitted and the cases completed by the end of year 2001. The cases are listed in the Appendix.

In the empirical analysis, only the seceding municipality parts are included, and not the remaining parts. The main reason for this is that the referenda encompass the seceding part only in 8 of the cases. The sample for the remaining parts is thus small with only 15 observations. In addition, the population shares belonging to the remaining parts are generally large, resulting in small changes in both tax rates and average tax bases if separation were to occur. The variation in these variables is therefore small for the remaining municipality parts.<sup>7</sup>

The referendum data are not available from one single source, but were constructed from filed documents at the archives of the Legal, Financial and Administrative Services Agency (*Kammarkollegiet*) and the Government Offices (*Regeringskansli-*

---

<sup>6</sup>In two of the referenda (Nacka and Norrtälje municipalities), the question was whether the municipality should split into three parts, i.e. there were two possible secessions in these municipalities. In the referendum in the Göteborg municipality, there were three possibly seceding parts, but also three separate questions.

<sup>7</sup>In an earlier version of this paper the remaining parts were included as well, but gave no significant results.

et).

From the referendum data we construct *YESSHARE*, a continuous dependent variable defined as the share of all votes positive to partition in the seceding part (in percent), not including the blank votes. In addition, we construct a binary dependent variable for the median voter model. If a majority of the voters in the seceding municipality part votes for secession, so does its median voter. The variable *VOTE* thus takes the value of one if  $YESSHARE > 50$ .

We also consider the turnout in the referenda, where the share of the electorate voting in a referendum is captured by the variable *TURNOUT*.

For the population difference, we define the variable  $\Delta POP$  as the share of the municipality's total population that belongs to the municipality part. The population figures date from the year when the application was submitted and are available at parish level from various issues of Statistics Sweden's Yearbook for Swedish Municipalities.

The variable  $\Delta TAXBASE$  is defined as the share of the tax base per capita in the municipality part in relation to the tax base per capita in the united municipality. The tax base is the municipality's taxable income, comprising labor income only. A tax equalization scheme is designed to give municipalities more equal conditions for providing services to citizens. The rules of the scheme are extremely complex and have changed over the years. Since there are no data available to examine the effects of the equalization scheme, only the actual tax bases are considered. As for the population figures, the tax base figures date from the year of application and are available at parish level from the same source.

The political effect is theoretically defined as the utility gain for the median voter in a municipality part, deriving from getting the preferred tax rate in case of secession. Unfortunately, median income data are not available at parish or municipality part levels. To capture possible political differences we instead make use of voting behavior in local elections.

We construct two variables to represent political differences. If the median voter in the seceding part and the median voter in the municipality vote for different political blocs in local elections, the binary variable *BLOCDIFF* takes the value of one, and zero otherwise.<sup>8</sup> The continuous variable  $|\Delta LEFT|$  is defined as the

---

<sup>8</sup>The political blocs are the socialist bloc: Sweden's Communist Party (skp), the Left Party (v), the Social Democratic Party (s), and the Green Party (mp), and the non-socialist bloc: the Centre

absolute difference between the shares of valid votes given to socialist parties in the municipality part and the municipality divided by the socialist parties' share in the municipality. The local elections considered are the ones closest preceding the application. The election data are available at the electoral district level from the Swedish Social Science Data Service and Statistics Sweden.

The data used for the independent variables are available at different levels. The economic data are available at the parish level, while the political data are available at the electoral district level. Parishes and electoral districts do rarely coincide, but the matching between parishes, electoral districts and municipality parts is straightforward in nearly all cases. Each municipality part contains at least one parish and at least one electoral district. By identifying which parishes and electoral districts correspond geographically to the concerned municipality parts, the data have been constructed to match at a common level.

Summary statistics for the 24 seceding municipality parts are presented in Table 1. Correlations are found in the Appendix.

Table 1. Summary statistics for seceding municipality parts.

Variable	Mean	Std. Dev.	Min.	Max.
<i>VOTE</i>	0.71		0	1
<i>YESSHARE</i>	56.52	20.42	5.38	89.50
<i>TURNOUT</i>	70.53	11.37	46.10	89.40
<i>BLOCDIFF</i>	0.25		0	1
$ \Delta LEFT $	0.20	0.17	0.00	0.60
$\Delta TAXBASE$	1.03	0.15	0.77	1.34
$\Delta POP$	0.17	0.12	0.04	0.44

In 71 percent of the cases, a majority voted in favor of secession. The results varied considerably among municipalities, with the positive share of the valid votes ranging from about 5 to 90 percent. The turnout in the referenda averaged more than 70 percent, but differed substantially over observations. In one fourth of the cases, the median voters in the seceding part and in the municipality voted for different political blocs in local elections. On average, there was a 20 percent absolute difference

---

Party (c), the Liberal Party (fp), the Christian Democrats (kd), the Conservative Party (m), and New Democracy (nyd). Non-specified parties are categorized as non-socialists.

in the socialist party vote share between the seceding municipality part and the municipality. The seceding part had on average a slightly greater tax base than the united municipality, but with a large variation over observations. The population share in the seceding parts was on average 17 percent of the municipal total, and all of the seceding parts contained less than half of the municipality population.

## 5 Empirical Results

To analyze median voter behavior, we need to employ a method suitable for binary outcomes. This is done by applying a probit model. After that, we leave the median voter framework and look at all the positive vote shares in the seceding municipality parts by least squares estimation. We conclude the empirical section by discussing and testing for possible selection problems.

### 5.1 Median Voters

Since  $\Delta^{ms}$  is not observable, we treat it as a latent variable. The observable variable  $VOTE^s$  takes the value zero or one depending on the value of  $\Delta^{ms}$ , where one indicates that the median voter in the seceding part votes for a partition and zero indicates that the median voter votes for the municipality to stay united:

$$VOTE^s = \begin{cases} 1 & \text{if } \Delta^{ms} > 0 \\ 0 & \text{if } \Delta^{ms} \leq 0. \end{cases} \quad (23)$$

The probit model to estimate is

$$Pr(VOTE^s = 1) = \Phi[\beta_0 + \beta_1 (BLOCDIFF^s) + \beta_2 (\Delta TAXBASE^s) + \beta_3 (\Delta POP^s) + \epsilon^s], \quad (24)$$

where  $\Phi$  is the cumulative normal distribution, and  $\epsilon^s$  is the error term for the median voter in seceding municipality part  $s$ . The expected parameter signs are  $\beta_1 > 0$ ,  $\beta_2 > 0$ , and  $\beta_3 > 0$ .

The expected sign of the estimate of  $\beta_1$  is positive, since a difference in political preferences should increase the utility gain from secession for the median voter in

the seceding municipality part.

The expected sign of the estimate of  $\beta_2$  is positive – a greater tax base results in a higher provision of the public good at any given tax rate. Since the population in a part of the municipality is always smaller than the population in the municipality as a whole, we expect the estimate of  $\beta_3$  to be positive.

The parameter estimates of Equation (24) are shown in Table 2.

Table 2. Effects on median voter behavior in seceding municipality parts. Probit estimates.

Variable	Coefficient	Marginal effect <sup>a</sup>
<i>BLOCDIFF</i>	-0.57 (0.77)	-0.16
$\Delta TAXBASE$	9.28* (3.89)	2.24
$\Delta POP$	0.74 (2.36)	0.18
<i>CONSTANT</i>	-8.54* (3.98)	
Number of obs.	24	
Wald $\chi^2(4)$	7.05	
Prob > $\chi^2$	0.07	
Pseudo $R^2$	0.32	

Notes: <sup>a</sup> The marginal effect for *BLOCDIFF* is for a discrete change from 0 to 1, and for the other variables evaluated at the variable means.

Huber/White robust standard errors in parentheses.

\* indicates significance at the 5 percent level.

The estimates show the expected sign, with the exception of the coefficient for *BLOCDIFF*; if the median voter in the seceding part votes for a different political bloc in local elections than the median voter in the municipality, then the support for secession is smaller, although not on a statistically significant level.

The estimate for the population share in the seceding part is positive as predicted, but is not statistically significant.

The estimate for the tax base effect is signed as predicted and is highly statistically significant; median voters in the seceding municipality parts with greater tax base than the rest of the municipality, are more positive to secession. For a municipality with the average tax base share, the results imply that an increase in the tax base share by one standard deviation increases the probability for a positive vote by 0.34.

## 5.2 All Voters

Next we deviate from the median voter framework and include all voters in the analysis by using the dependent variable *YESSHARE*, defined as the share of all valid votes positive to a partition.

We estimate the following model:

$$\begin{aligned}
 YESSHARE^s = & \beta_0 + \beta_1 (|\Delta LEFT|^s) + \beta_2 (\Delta TAXBASE^s) \\
 & + \beta_3 (\Delta POP^s) + \epsilon^s.
 \end{aligned}
 \tag{25}$$

Equation (25) is estimated by least squares regression, and the results are reported in the first column in Table 3. Due to the low number of observations, the assumption of normally distributed error terms is rather strong. We, therefore, follow Efron and Tibshirani (1993) and bootstrap the estimates by drawing 24 observations with replacement from the data set. By replicating the drawing 2,000 times we obtain a bootstrap distribution, from which we calculate standard errors and, based on the bias-corrected percentiles, confidence intervals for the point estimates. The reported standard errors and significance levels come from this procedure.

As shown in Table A2 in the Appendix, the turnout in the referenda is significantly and positively correlated with  $|\Delta LEFT|$ . Therefore, we also estimate an alternative model to (25), which considers the turnout in the referenda. We use the same explanatory variables as in (25), but modify the dependent variable

as  $(YESSHARE * TURNOUT) / 100$ , which is the share of positive votes in the electorate (in percent). The results are shown in the last column in Table 3.

Table 3. Effects on voting behavior in seceding municipality parts. Least squares estimates.

Coefficient of	Model 1	Model 2
$ \Delta LEFT $	-23.77 (24.61)	0.27 (20.82)
$\Delta TAXBASE$	41.74** (26.32)	33.82* (22.78)
$\Delta POP$	32.79 (41.98)	43.00 (43.47)
$CONSTANT$	12.66 (32.23)	-1.85 (26.55)

*Notes:* Dependent variable in (1) is percentage of positive votes out of all valid votes; in (2) the percentage of positive votes in the electorate. Bootstrapped standard errors in parentheses.

\*\* indicates significance at the 5 percent level, \* at the 10 percent level, based on bias-corrected percentiles of the bootstrap distribution from 2,000 replications.

When comparing the median voter results with the results for the same municipality parts but including all voters in the seceding parts, we see that the signs and the significance levels of the parameter estimates are the same in the first specification; neither the population effect nor the political effect is supported by the data. In the second specification, which also considers the turnout in the referenda, the parameter estimate for  $|\Delta LEFT|$  changes sign; it turns positive.

Once again, our data show clear support for the tax base effect. For a one standard deviation change in the tax base difference, the predicted impact on the positive vote share is an increase by 6.3 and 5.1 percentage points in the two specifications, respectively.<sup>9</sup>

<sup>9</sup>Log-linear specifications give results similar to the ones reported in Table 2 regarding signs and significance levels with one exception. The estimate for the political effect becomes negative in Model 2, but is not statistically significant.



### 5.3 Selection problems

The results obtained so far are conditioned on that a referendum was held in the seceding municipality part. To be able to generalize our results to all cases where a partition proposal is made, we have to investigate whether there are any selection problems in the process described in Section 2. The selection could be such that only municipality parts with strong preferences for secession had the possibility to participate in a referendum.

Since a referendum follows an investigation, referendum results for a municipality part are only observed if there is an investigation. As described in Section 2, the Legal, Financial and Administrative Agency decides whether the case should be investigated. The agency refers the case to the municipality, and the opinion of the municipal council is of great importance for the outcome of the investigation decision. In addition, a municipality can initiate an investigation on its own. The probability of a referendum is, thus, highly dependent on the municipal council.

The selection mechanism is

$$\begin{aligned} REFERENCEM^{*s} &= \gamma_0 + \gamma_1 MUNOPINION^s + u^s, & (26) \\ REFERENCEM^s &= 1 \text{ if } REFERENCEM^{*s} > 0 \\ &= 0 \text{ otherwise} \end{aligned}$$

where  $REFERENCEM^*$  is an unobserved latent variable, which depends on the opinion of the municipal council.  $MUNOPINION$  is a binary variable, taking the value of one if the municipality initiates an investigation or recommends the board to investigate the case, and  $u$  is the error term. We observe a referendum in municipality part  $s$  only if  $REFERENCEM^{*s} > 0$ .

We examine the selection problems by applying the Heckman selection model for the continuous voting models. We test whether the voting results are subject to the selection mechanism in (26) by checking the correlation  $\rho_{u\epsilon}$  between the error term  $\epsilon$  of the voting equation (25) for both specifications, and the error term in the selection model,  $u$  (Greene, 1997).

The results are presented in Table 4.

Table 4. Estimates of sample selection.

	Model 1	Model 2
$ \Delta LEFT $	-23.91 (18.17)	0.08 (16.36)
$\Delta TAXBASE$	41.51** (19.42)	33.29* (18.10)
$\Delta POP$	31.43 (36.72)	39.35 (34.38)
$CONSTANT$	11.93 (24.92)	-4.34 (22.67)
$MUNOPINION$	1.41*** (0.35)	1.41*** (0.35)
$CONSTANT$	-1.00*** (0.33)	-1.01*** (0.33)
$\rho_{u\epsilon}$	0.09 (0.49)	0.35 (0.34)
Wald test of independent equations		
$\chi^2(1)$	0.04	0.86
Prob > $\chi^2$	0.84	0.35
Number of observations <sup>a</sup>		
Censored	27	27
Uncensored	24	24
Wald $\chi^2(3)$	6.39	3.89
Prob > $\chi^2$	0.09	0.27

*Notes:* Estimated by maximum likelihood.

Huber/White robust standard errors in parentheses.

\*\*\* indicates significance at the 1 percent level,

\*\* at the 5 percent level, \* at the 10 percent level.

<sup>a</sup> The number of observations adds up to 51, since two of the applications concerned secession of two municipality parts.

The results indicate that the probability of observing a referendum increases if the municipal council recommends or initiates an investigation. This decision is not significantly correlated with the popular opinion in the municipality parts –  $\rho_{ue}$  is not significantly different from zero in any of the specifications. Comparing the results in Table 4 to the results in Table 3 shows that the estimated coefficients in the first specification of the voting model are nearly identical irrespective of whether we consider the selection into the referendum or not. In the second specification, the results are somewhat biased upwards when not considering the selection mechanism. However, the main results remain and we can conclude that the voting results supported by data are not subject to any major selection problems for cases where a partition proposal is made.

## 6 Summary and Conclusions

The theoretical model presented and tested in this paper predicts three effects to affect people’s utility from breaking up the municipality they live in into parts, and hence their voting behavior in local referenda. Firstly, the population decrease associated with partitioning gives rise to an efficiency loss compared to staying united. Secondly, differences in tax bases among the different municipality parts make individuals in wealthier municipality parts gain from a break-out as the wealth then does not have to be shared with poorer municipality parts. The third effect is politically determined; if median income differs between the united municipality and the seceding part, the tax rate will change in case of a break-up. A majority of the voters in the seceding municipality part will therefore get a more preferred tax rate if they gain autonomy.

When the predictions from the theoretical model are tested on Swedish referendum data from 24 municipality parts, we find support for one of the effects – the tax base effect is present; voters in municipality parts that are wealthy compared to other parts of the same municipality are more positive to secession.

These referenda are not decisive – the final partition decisions are made by the central government – but are supposed to give an indication of the popular opinion in the seceding parts, a factor intended to be of great importance for the governmental verdict. On the other hand, municipality partitions are not supposed to be carried through unless all municipality parts benefit from the change. Satisfying both of

these conditions seems to be a difficult task, especially if the political differences between the parts are of minor importance for the concerned population. It seems impossible for the government to pay much attention to the opinion of the local population in all municipality parts if their desire for a break-up depends on the own municipality part's tax base. The results from this study thus indicate that factors other than the popular opinion ought to play a major role for a municipality partition to come true.

## References

- Alesina, Alberto, Roberto Perotti and Enrico Spolaore, 1995, Together or Separately? Issues on the Costs and Benefits of Political and Fiscal Unions, *European Economic Review* 39: 751–758.
- Alesina, Alberto and Enrico Spolaore, 1997, On the Number and Size of Nations, *Quarterly Journal of Economics* 112: 1027–1056.
- Bolton, Patrick and Gérard Roland, 1997, The Breakup of Nations: A Political Economy Analysis, *Quarterly Journal of Economics* 112: 1058–1090.
- Bolton, Patrick, Gérard Roland and Enrico Spolaore, 1996, Economic Theories of the Breakup and Integration of Nations, *European Economic Review* 40: 697–705.
- Efron, Bradley and Robert J. Tibshirani, 1993, *An Introduction to the Bootstrap*, Chapman & Hall, New York.
- Greene, William H., 1997, *Econometric Analysis*, 3rd ed., Prentice-Hall, New Jersey.
- Persson, Torsten and Guido Tabellini, 2000, *Political Economics. Explaining Economic Policy*. Cambridge: MIT Press.
- Tiebout, Charles, 1956, A Pure Theory of Local Expenditure, *Journal of Political Economy* 64: 416–424.

## Appendix

Table A1. Referenda

Municipality	Municipality part	Year
Alingsås	Bjärke	1978
Borås	Bollebygd	1993
Borås	Fristad	1995
Botkyrka	Salem	1981
Gullspång	Hova	1980
Göteborg <sup>a</sup>	Askim	1998
Göteborg <sup>a</sup>	Torslanda	1998
Göteborg <sup>a</sup>	Älvsborg	1998
Huddinge	Trångsund	1999
Härjedalen	Tännäs/Hede	1978
Motala	Vadstena	1977
Nacka <sup>b</sup>	Boo	1992
Nacka <sup>b</sup>	Saltsjöbaden	1992
Norrköping	Vikbolandet	1997
Norsjö	Malå	1981
Norrtälje <sup>c</sup>	Hallstavik	1994
Norrtälje <sup>c</sup>	Rimbo	1994
Sigtuna	Sigtuna stad	1982
Södertälje	Järna	1993
Södertälje	Nykvarn	1997
Uppsala	Knivsta	1999
Vara	Essunga	1980
Vaxholm	Vaxholm	1978
Örebro	Lekeberg	1990

*Notes:* <sup>a</sup> There were three separate questions in the referendum. <sup>bc</sup> The referendum question was whether the municipality should be split into three.

Table A2. Correlations

	<i>YESSHARE</i>	<i>BLOCDIFF</i>	$ \Delta LEFT $	$\Delta TAXBASE$	$\Delta POP$	<i>TURNOUT</i>
<i>YESSHARE</i>	1.00					
<i>BLOCDIFF</i>	-0.05	1.00				
$ \Delta LEFT $	-0.18	0.40*	1.00			
$\Delta TAXBASE$	0.22	0.23	0.19	1.00		
$\Delta POP$	0.17	-0.33	-0.24	-0.24	1.00	
<i>TURNOUT</i>	0.24	0.00	0.43*	0.15	0.10	1.00

\* indicates statistical significance at the 10 percent level.