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District Magnitude and Representation of the Majority's Preferences: Quasi-Experimental Evidence from Popular and Parliamentary Votes

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**District Magnitude and Representation
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District Magnitude and Representation of the Majority's Preferences: Quasi-Experimental Evidence from Popular and Parliamentary Votes[#]

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Abstract

Members of parliament have more effective incentives to cater for the majority's preferences when they are elected in districts with few seats in parliament rather than in districts with many seats. We empirically investigate this hypothesis by matching voting behavior on legislative proposals of Swiss members of parliament with real referenda outcomes on the same issues for the years 1996 to 2008. This quasi-experimental data allows us to identify the impact of electoral systems through district magnitude on how members of parliament represent citizens' preferences. We find systematic, statistically significant and economically relevant evidence that members of parliament from districts with few seats vote along the majority's preferences.

Key words: Median Voter, Political Economy, Electoral Systems.

JEL Classification: D72, D70, H00.

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1 Introduction

The influence of electoral systems on policy outcomes is not only at the center of the public debate on policy reforms but it also increasingly attracts the interest of economists (see Grossman and Helpman 2005; Milesi-Ferretti et al. 2002; Persson et al. 2007). A main focus of analysis is district size and how it aligns the behavior of representatives with citizens' preferences.

From a theoretical perspective, district size, i.e. the number of seats in parliament, determines the incentives for representatives. Members of parliament from districts with many seats and proportional representation may win elections by proposing policies for groups at the boundary of the electoral spectrum. Conversely, members of parliament from districts with a limited number of seats or close to plurality systems are supposed to propose platforms closer to the majority's interests (see Gagliarducci et al. 2008).¹ Moreover, for members of parliament from districts with many seats, representation of their voters' interests may become a public good, while members of parliament from districts with fewer seats may have to take personal accountability for their decisions (see Lizzeri and Persico 2001). Thus, moving from few seats closer to a proportional system induces members of parliament to diverge more from the majority's will.²

However, the clarity of the theoretical reasoning contrasts with the lack of empirical evidence. Until now no study has analyzed the influence of electoral systems on the behavior of representatives by directly comparing their behavior with revealed voters' preferences on exactly the same issues. In this paper we provide such a comparative analysis which indicates whether members of parliament vote according to voter's preferences. Switzerland offers a unique quasi-experimental setting to analyze the influence of the electoral system on incentives for politicians to act according to the will of the majority: The districts for elections of the national parliament are identical with the cantons. Thus, the districts differ largely in magnitude, i.e. from pure plurality with one seat to proportional representation with 34 seats. Similar to other democratic countries, members of the Swiss national parliament vote on laws and law changes. But in contrast to other countries, a relatively small number of Swiss citizens (50'000 from a total population of almost 8 millions) can demand a popular referendum on parliamentary decisions before laws are enacted. Moreover, a group of citizens (100'000) can also start an initiative and

¹ The choices of the majority include by definition the choices of the median voter.

² The recent election and current discussion about introducing more proportional representation in Great Britain serves as an example how different electoral systems may induce large differences in political representation of the majority's will.

demand a constitutional amendment. Members of parliament then have to express their opinion on the proposed amendments before the population votes on them.

In the popular votes, citizens reveal their preferences for policy outcomes by ranking law proposals against the status quo, as already argued in by Schneider et. al. (1981). Referenda data can be matched with voting data from members of parliament on exactly the same political issues with the same wording. This fact makes Switzerland an ideal field to study the influence of district magnitude on the relationship between voters and their representatives. More specifically, our data allow us to identify empirically whether members of parliament from large districts with proportional representation diverge significantly more from voter's preferences than politicians from small districts even when controlling for deviations induced by party positions and many other factors. We directly identify two variables which indicate whether members of parliament have voted in the same way as the majority of the voters at the national and at the district level, respectively. These dependent variables are explained by the number of seats in parliament, i.e. the electoral system, of a district.

As an important advantage, our research design compares choices of members of parliament with referenda outcomes within a single country. Thus, it avoids the problems which are typical for cross-country research: When analyzing political decisions and preferences across countries, specific norms, rules, political patterns, history, culture and institutional contexts should be taken into account. In our case the sub-national electoral districts provide a broad empirical field within a common framework of identical basic characteristics.

Our empirical results from logistic regression models with district clustering indicate that decisions of members of parliament from districts with a large number of seats and proportional representation diverge more from the majority of constituents as well as from the national majority's preferences, independent of political party affiliations. Plurality rule measured by a low number of seats tends to align decisions of members of parliament with district voters' preferences as well as national voters' preferences. This result is robust to including controls for how the citizens of the district of the member of parliament have voted compared to the Swiss population as a whole, the importance of the referendum measured by participation rates, referenda types, party membership of legislators, as well as a large number of characteristics which are specific to referenda, district heterogeneity, and representatives.

The remainder of this paper is organized as follows: Section 2 provides theoretical considerations and additional explanations of the effects of the electoral system on voting

behavior of members of parliament. The data and the econometric model are presented in Section 3. Additionally, we provide a short overview on the Swiss political system and the role of referenda. Empirical results for all members of parliament in 102 national referenda over the years 1996 to 2008 are presented in Section 4. The econometric robustness of our hypotheses is extensively tested considering differential hypotheses and using Bayesian Model Averaging to investigate the effect of variable selection. Finally, Section 5 offers some concluding remarks.

2 Theory and Literature

2.1 The Literature so far

The question of how different electoral rules shape a nation's political system has received much attention amongst economists and political scientists (for recent contributions see Lizzeri and Persico 2001, Milesi-Ferretti et al. 2002, Bawn and Thies 2003, or Blume et al. 2009).

Starting with Duverger (1954) and Downs (1957), large parts of the literature has focused on the electoral systems' influence on the number of parties and their positions rather than on political outcomes. "Duverger's Law" and its modification usually predict the emergence of parties and two-party competition in districts with plurality rule. Downs (1957) first described what positions political candidates would take when competing for a seat in a small district with one seat only. The well known result in a Downsian world is convergence to the median voter's position. Thus, even the early literature argues that electoral competition in small districts concentrates on winning the majority as only few persons can gain seats in the district (for more recent contributions see, among others, Persson and Tabellini 2000, 2005 or Lizzeri and Persico 2001).

In contrast, proportional representation in districts with many seats induces multi-party competition and parties are expected to take more dispersed positions in multi-member districts as argued by Cox (1990). Generally speaking, electoral competition is dispersed over the political spectrum because winning the majority of voters is of little importance for a single politician (see Taagepera and Shugart 1989)..

There is a growing empirical literature analyzing the effects of district magnitude, i.e. proportional representation, on party positions. For instance, Dow (2001) finds differences in the extent of spatial dispersion among parties and candidates between plurality and proportional electoral systems when comparing data from election studies and surveys for Canada, Israel, the Netherlands and France. In systems with small districts, parties and

candidates are located significantly closer to the majority within the distribution of voters than their counterparts in proportional systems. A caveat to this line of research is that party positions are identified by electoral platforms which are known to be fuzzy, and voter's positions stem from constructed policy dimensions (e.g. left-right, liberal-conservative, etc.).

Members of parliament may also face several competing principals and competing interests when representing voters' interests according to Carey (2007) or Braendle and Stutzer (2010). Party affiliations, interest groups, personal linkages and heterogeneity play a role apart from the electoral system. Crisp et. al. (2004) argue that with central candidate selection and as district magnitudes increase, members of parliament will less frequently initiate legislation aimed at a particular constituency and rather focus on the national party's interest. By analyzing voting results of two different amendments enacted by the Swiss parliament and surveys conducted amongst the legislators, Bailer et al. (2008) find that deputies elected under proportional representation, i.e. from districts with a larger number of seats, act closer in accordance with their parties than deputies from small plurality or close to plurality districts. Thus, district magnitude influences members of parliament through their party affiliations.

Decisions of members of parliament directly affect individual utility and welfare. Therefore, it is not the influence of district magnitude on parties but its effects on policy outcomes which are of paramount interest to economists. Policy outcomes have just recently started to attract the interest of political economists (see Milesi-Ferretti et al. 2002 or Grossman and Helpman 2005). Political representation concerns the relationship between citizens' preferences and the behavior of legislators. In an ideal world the latter make legislation according to the people's will independently of their party positions.

Political representation has certain characteristics of a public good. Lancaster (1990) argues that regional representation is a public good for members of parliament from districts with many seats. If many members of parliament may claim responsibility for a certain policy with local ramifications, each individual deputy's incentives to provide good representation decreases. Hence, the link between representatives and their constituencies is strongest in plurality or close to plurality systems with few seats.

When focusing on individual or group welfare, researchers predominantly captured policy outcomes by financial measures. Persson and Tabellini (1999) as well as Milesi-Ferretti et al. (2002) argue that spending on transfers is larger under proportional electoral systems due to different incentives for redistribution. These authors are mainly concerned with incentives for pork barrels under alternative electoral systems. Milligan and Smart

(2005) find evidence from Canada, a plurality system, that the governing parties target swing districts. These findings substantiate the hypothesis that plurality systems create a direct incentive for members of parliament to better target the majority of voter with specific policies when the number of seats is small. Conversely, under proportional representation politicians' benefits are diffused across voters and members of parliament concentrate on different groups in the political spectrum instead of focusing on the majority's preferences.

2.2 Overcoming Measurement problems

Stratmann (1995), Bender and Lott (1996), Gerber and Lewis (2004) and Golder and Stramski (2010) among others argue that so far a major problem of empirical studies is to determine voters' positions on law proposals and match them with decisions/positions of members of parliament. Positions of voters and politicians are usually constructed policy dimensions which stem from survey data. Moreover, party positions are no measures for policy outcome. Financial measures allow identifying effects of electoral systems on policy outcomes but they are no sensible measure of the majority's preferences especially when more policy dimensions exist such as equity vs. equality, liberal vs. conservative etc.

We overcome possible measurement problems by introducing two unique measures for the majority's preferences which are confronted with real policy decisions by members of parliament. Swiss citizens regularly cast their votes on law and constitutional proposals which have passed national parliament with the exact same wording. Referenda results determine policy outcomes and are at the same time revealed preferences of citizens for these outcomes. More precisely, referenda permit the majority to rank policy outcomes induced by the proposed laws against the status quo without these law changes. Thereby, decisions in referenda are capable of capturing much broader issues than financial streams and it is not necessary to rely on expert's judgment or surveys concerning the utility implications for the majority. The majority's preferences reveal themselves in a referendum.

By comparing citizens' preferences from referenda with politicians' votes on the same decision, we get politicians' positions relative to the preferences of the majority of the population in their district as well as the national population. We explain divergence from voter's decision by differences in the electoral system through district magnitude. As our data also allows us to control for party positions of members of parliament, the identified influence of the electoral system on individual voting behavior is independent of possible effects of party affiliations. Hence, we can distinguish between deviance from the majority

induced by district magnitude and the electoral system from deviance induced by party affiliation as well as other influences. As data from referenda are available on national and district level, we can also map the politicians' pork barrel awareness. For this purpose, we compare politicians' decisions to the national majority's and the cantonal majority's preferences and analyze whether representation of voters' preferences is different when cantonal and national majority diverge.

3 Data and Estimation Strategy

For the purpose of evaluating the influence of the number of seats, i.e. the electoral system, in a district on voting with or against the majority of voters, we match data of 102 referenda with information on votes with the same wording of individual members of parliament in Switzerland for the years 1996 to 2008. Thereby, we create a unique dataset where real choices of all legislators on all referenda can be confronted with real choices of voters on exactly the same issues.

The Swiss National Council, i.e. the lower house, has 200 seats. The 26 Swiss cantons (sub-national jurisdictions) form the national parliament's electoral districts. The number of seats for each canton is proportional to the cantons' population sizes. Population size and, thus, the number of seats differ largely between cantons. The six cantons Appenzell a.R., Appenzell i.R., Glarus, Nidwalden, Obwalden, and Uri have only one member of parliament. Thirteen electoral districts have between one and five members of parliament while the remaining cantons have more than five members of parliament.³ This large heterogeneity allows us to identify the effect of district size on voting behavior of deputies in parliament under different electoral systems.

The National Council has twelve committees, each concerned with a policy area such as foreign affairs, social security, health, etc. These committees formulate the proposals for laws and law changes which are presented to the plenum where members of parliament decide on them. The parliamentary services record individual votes carried out on legislative proposals for every member of parliament and make them publicly available.⁴

³ Apart from the pure plurality districts, Jura and Schaffhausen each have two seats; Zug has three seats; Schwyz has four seats; Basel-City; Grison and Neuchâtel each have five seats; Turgovia has six seats; Basel-Country, Fribourg, Solothurn and Wallis have seven seats; Ticino has eight seats; Lucerne has ten seats; Geneva has eleven seats; St. Gall has twelve seats; Argovia has 15 seats; Vaud has 18 seats; Bern has 26 seats; Zurich has 34 seats in 2002.

⁴ A proposal is adopted as law or as a constitutional article if the majority of the National Council agrees as well as Council of States (upper house/senate).

However, proposals adopted by parliament do not necessarily turn into law. If a legislative proposal aims to change the constitution a referendum is mandatory. Moreover, for referenda on the changes of the constitution a double majority is required: the majority of the national electorate as well as a majority of the electorate in eleven and a half-canton⁵ (“Ständemehr” in German) have to agree to the proposed change.

If parliament intends to change or enact a new law, a referendum is not mandatory. All the same, Swiss citizens may demand a referendum on the proposed legislation by collecting at least 50000 signatures (“facultative referendum”). The proposed law change is rejected if 50 % of the population votes against it in a referendum. A majority of the cantons is not required.

Finally, citizens may also demand a constitutional amendment by referendum (called “initiative”) by collecting at least 100000 signatures. Members of parliament are required to vote on the text of an initiative which serves as a parliamentary recommendation for the referendum. Parliament and the government cannot refuse an initiative unless it violates formal rules. However, they can work out a counter-proposal to the initiative which is presented to the voters at the same time as the initiative in a referendum.

Referenda results are available for every electoral district and for the whole period of analysis from the years 1996 to 2008 by the Swiss Federal Statistical Office and the Swissvotes Database.⁶ We are able to compare legislative decisions by members of parliament with referenda outcomes on exactly the same legislative issues and with the same wording. Thus, we observe decisions of voters and members of parliament in the unique policy dimension which is defined by the referenda itself. This permits us to test empirically the effects of differences in the electoral system by analyzing whether members of parliament from smaller districts more effectively cater to the citizens’ preferences by voting more with the majority while members of parliament from larger districts diverge more from the majority. Put differently, we can identify whether the electoral system has an influence on how well members of parliament represent their voters’ interests.

As dependent variables we employ two indicator variables: The first indicator takes the value of one when a member of parliament does not vote as the majority of the whole Swiss population ($MP \neq CH$) and zero if he/she votes as the majority. The second indicator equals one when a member of parliament does not vote as the majority in his/her

⁵ For historical reasons, there are 20 full cantons and 6 half cantons (“Halbkantone”). There is no important difference between full and half cantons except that the latter have only one member in the upper house, each, and that they only count with half weight when calculating the “Ständemehr”.

⁶ As decisions in parliament usually precede referenda by several months, parliamentary decisions were made from 1995 to 2007.

district ($MP \neq District$). Consequently, the two dependent variables measure deviations by members of parliament from the will of the people at the national and the district level, respectively.

Our econometric logistic model explaining deviations from the majority is given by:

$$P(MP \neq CH) = \Lambda(\alpha_0 + \alpha_1 Seats + \sum_j \alpha_j x_j + \varepsilon) \quad (1)$$

$$P(MP \neq District) = \Lambda(\alpha_0 + \alpha_1 Seats + \sum_j \alpha_j x_j + \varepsilon) \quad (2)$$

The two dependent variables are binary measures and we use a logistic model ($\Lambda = \exp(X)/(1 + \exp(X))$ with X as design matrix). We cluster standard errors for districts and estimate the impact of exogenous variables on the probability that a member of parliament votes against the majority of citizens in Switzerland ($MP \neq CH$) in (1) or against his/her district's majority ($MP \neq District$) in (2). We therefore explain when a member of parliament does not represent the national voter's majority or the district's majority, respectively. The equations are motivated theoretically by the expected positive impact of a higher number of seats a district has in parliament on the probability that a member of parliament deviates from the majority. Thus, we expect $\alpha_1 > 0$.

Political decisions of members of parliament are not only influenced by the number of seats of their respective electoral district. In our case the sub-national units provide a broad empirical field within a common framework of identical basic characteristics as opposed to international comparisons. However, we include a number of political and economic control variables in the model. Their different impacts are represented by the coefficients α_j . The empirical analysis includes data on cantonal results, type of referenda, turnout, individual characteristics and party affiliations of members of parliament, as well as socio-demographic and economic variables characterizing the 26 Swiss cantons. Data for the independent control variables were obtained and matched from the Federal Statistical Office, the Swissvotes Database and the Swiss Parliamentary Services.⁷

In addition to the variable seats which measures effects of the electoral system, we control whether the district has voted as the majority of the national population by including a dummy variable which equals one if this is the case ($Canton=CH$). Locally elected politicians to national parliament may not only represent national interests as their mission would suggest. They may also try to please their local voters or engage in pork

⁷ See <http://www.bfs.admin.ch/> (Federal Statistical Office) <http://www.swissvotes.ch/> (Swissvotes) and <http://www.parlament.ch> (Swiss Parliamentary Services) for the respective databases and contact information. Daniel Schwarz from the IPW in Berne (<http://www.ipw.unibe.ch>) provided part of the parliamentary votes data which are matched with the other datasets.

barrels (Milesi-Ferretti et al., 2002). Controlling for whether the district majority equals the national majority allows us to exclude the influence of diverging local and national interests on parliamentary decisions.⁸ We expect that a member of parliament is less likely to deviate from the national as well as the district's majority if his/her district votes as the majority of the national population.

As mentioned above, constitutional proposals require mandatory referenda. Especially for constitutional changes, politicians are expected to vote as the majority of the population and as the majority of the cantons. Otherwise such proposal cannot be enacted. Thus, we include a dummy variable which indicates whether a referendum was mandatory or not (*RefMandatory*). Out of 102 referenda analyzed, 18 are mandatory. We expect a negative influence of mandatory referenda on the probability of voting against the majority at the national and at the cantonal level. Moreover, we include a dummy variable to control for the influence of the 50 initiatives (*RefInitiative*) on divergence between citizens and members of parliament. 34 facultative referenda form the omitted category.

A district's voter turnout (*Turnout*) is always included in the estimations as a measure for perceived importance of the referendum. The sign of voter turnout is ambiguous, a priori. High voter turnout may reflect the fact that the issue of the referendum is considered as important. However, important issues for voters are also likely to be important issues for interest groups. Moreover, high voter turnout may be a sign of discontent with political decisions. Whether a high voter turnout translates in a higher probability for a politician to vote in the same way as the majority depends on the relative importance he/she puts on voters versus interest groups and other personal linkages.

Turning from the influence of the interaction between local and national interests and referenda type to characteristics of a specific member of parliament, we include party affiliation. The inclusion of party affiliation is motivated by "Duverger's Law" in political science (Duverger, 1951). It is argued that proportional representation leads to a multi-party system while a simple-majority favors a two-party system. As a consequence, members of parliament from plurality districts tend to be members of center parties while members of parliament from districts with proportional representation tend to be from all over the political spectrum. Similarly, the larger a district in terms of the number of representatives, the greater the number of legislative parties and the more likely a politician deviates from the majority's preferences. In other words, possible influences which stem

⁸ Members of national parliament are supposed to act in the interest of national voters. However, it is likely that preferences of their district voters and preferences of national voters as a whole influence their voting behavior.

from the electoral system through the number of seats and which lead a member of parliament to diverge from the national or the district's majority could be due to party affiliation only. The electoral system induces different party positions and there is not necessarily a direct influence of seats on preference alignment with the majority. The direct effect of seats could be on parties only. Thus, we control for party affiliation by including different party groups. This serves as a stringent and conservative test for the influence of the electoral system on representation of the majority's preferences. When controlling for parties, any seat effect is a lower bound estimate for the influence of the electoral system on diverging from citizens' preferences. In our setting the center party called Christian Democrats (Christlich Demokratische Volkspartei CVP, in German) form the omitted group.⁹ Only very few members of parliament do not belong to a party group and we include a special dummy for these politicians (*NoPG*).

Apart from party affiliation, our data contains information on age in years (*Age*) of members of parliament. Younger members of parliament have greater chances of being elected in a proportional system and excluding age could thus bias our coefficient for the seats variable. Members of parliament also have to provide information on their interest affiliation with special interest groups, private companies and other private institutions. We compiled data on the number of interest affiliations for each politician in parliament (*Interests*). According to Lizzeri and Perciso (2001) politicians caring about the "spoils of office" may provide public goods differently under proportional versus winner-take-all systems.

Apart from controlling for the heterogeneity of politicians and parties, economic and social heterogeneity within a voting district may play an important role. Ordeshook and Shvetsova (1994) argue that amongst electoral institutions, such as district magnitude, other factors are intervening structures which may influence the number of parties or other control variables.¹⁰ Especially macroeconomic indicators such as the level of regional income as well as inequality have been used as controls (see Vatter, 2003; Neto and Cox, 1997). It is reasonable to assume that juggling heterogeneous interests could be challenging for a member of parliament if he/she tries to vote with the majority (see e. g. Gerber and Lewis, 2004). To control for the influence of intra-cantonal heterogeneity we use indicators of population density (*Density*), income inequality (*Inequality*) and regional income (*Income*).

⁹ In the left-right dimension parties in Switzerland are commonly ordered as follows: Socialist Party (left) and Greens (left); Christian Democrats (center) and Liberals (center); Right: Swiss Peoples Party (right).

¹⁰ For a number of different controls see, for example, Lijphart (1990), Neto and Cox (1997), Rae (1971) or Benoit (2001).

Keeping in line with existing empirical work on Switzerland, we always introduce a dummy for the Latin (i.e. French and Italian speaking) cantons. This dummy picks up cultural differences between those cantons and the German speaking majority.

Swiss voters have the possibility to change party list combinations at elections (panachages). In cantons where a high number of ballot papers were changed political competition is likely to be high (*ChangedBallotPapers*) which may lead to more extreme and dispersed positions. Moreover, we control for the effects of elections years (*ElectionYear*) as members of parliament may diverge less from the majority during election periods.

As a final test of robustness, we analyze a number of additional variables measuring party discipline coded as voting against the party line (*AgainstPartyLine*) and the number of referenda at the same day (*RefSameDay*). We also introduce a continuous measure for the political distance on the issue in the referenda between the district and the national level by introducing the absolute difference in the “yes vote” of the district minus the “yes vote” at the national level (*YesDiff*).

Matching referenda data with individual voting records in parliament allows us to study 17674 decisions of members of parliament in all 102 referenda from 1996 to 2009.¹¹ All variables, their sources, and a number of descriptive statistics are given in Table 1.

< Table 1 here >

4 Empirical Results

4.1 Baseline Results

Table 2 presents our main empirical results for the variable measuring whether a member of parliament diverges from the majority of the Swiss population ($MP \neq CH$) in specifications (1) to (3) and whether he/she diverges from the district’s majority ($MP \neq District$) in specifications (4) to (6). All specifications report robust standard errors with clustering at the cantonal (district) level. Next to each coefficient we report the change in the probability to diverge from the respective majority. The discrete effects for the variables represent a change from the first quartile to the third quartile for continuous variables and a change from zero to one for dummy variables while all other variables are hold fix at the median. We calculate robust standard errors for the changes in the probability using the Delta method.

¹¹ Note that members of parliament may be absent at votes due to sickness, voyage or other duties.

< Table 2 here >

Turning to specifications (1) and (4) first, we find that members of parliament from districts with a higher number of seats tend to diverge significantly more from the national majority's decisions (1) and the majority in their district (4) as suggested by the theoretical discussion, i.e. the seats variable has a positive sign and is significant at the one percent level in both specifications. If the district's majority votes as the majority in the population, members of parliament are less likely to disagree with citizens as the negative and significant coefficient of (*Canton=CH*) indicates. In mandatory referenda (*RefMandatory*) members of parliament diverge less from citizens' preferences in Switzerland as a whole as well as from citizens' preferences in their respective district. The same holds true for initiatives (*RefInitiative*) compared to the base category of facultative referenda¹² but the negative effect of mandatory referenda is larger in absolute terms than the negative effect of initiatives. Higher district voter turnout translates into an increased likelihood for deviating from the national and cantonal majority. Members of parliament from Latin cantons tend to vote less often with the majority for both measures but the effect is insignificant for diverging from the cantonal voter's position (*MP ≠ District*).

As shown next to each coefficient in column (1), a discrete increase in the number of seats from the first to the third quartile increases the probability of voting against the majority of the population (*MP ≠ CH*) by 5.6 percent when all remaining variables are at their median values. A change from pure plurality with one seat to a proportional system (median number of seats) would increase the probability of voting against citizens' preferences by 2.9 percent. As expected, these effects of the electoral system are marginally smaller when the dependent variable is voting against the district population (*MP ≠ District*). Increasing the number of seats from the first to the third quartile raises the probability of voting against the district's majority by 3.1 percent. Moving from pure plurality (one seat) to proportional representation (median number of seats) would increase the probability of voting against the district's preferences by 1.7 percent. Discrete changes of seats for both dependent variables are significant at the one percent level. Members of parliament from multi-member districts diverge from the position of the national and the cantonal median voter but moving from plurality to a more proportional system has a lower influence on diverging from the electoral district (3.1 percent) than from the majority

¹² Initiatives are often rejected by members of parliament and voters which leads to less divergence.

of the Swiss population (5.6 percent). In other words, members of parliament from a large district identify less with their district voter's majority of their district than members of parliament from a small district (column 4), but the divergence is even stronger at the national level (column 1). This is consistent with the view that members of parliament elected at a district level tend to favor their own electorate. The effect of seats of specifications (1) and (4) are in their sizes comparable to the influence of other control variables such as initiatives, turnout and language. Only the dummy (*Canton=CH*) has a significantly higher influence on the probability to diverge in both specifications as expected.

In cantons with only a small number of seats in parliament the competition for these seats will usually be among center parties as they are more likely to represent the decisive voter. In large districts with many seats, more parties enter the competition. If the number of seats is sufficiently large, parties which focus on votes at the boundary of the political spectrum may also win seats. In this case party affiliation of members of parliament itself could explain the observed positive impact of seats on the probability of diverging from the majority. The number of seats would then only have an indirect effect through a greater number of parties on diverging from the median voter instead of a direct effect. In specifications (2) and (5) we include political party affiliations of members of parliament as a conservative test and lower bound for the influence of the electoral system on diverging from the national majority (2) and the district majority (5). Including party membership increases the pseudo-R2 as well as the Log-Likelihood ratio substantially. Members of parliament from parties which are commonly denoted as left (SP, Greens) and right (SVP) are more likely to vote against median interest than center parties (FDP and CVP as the omitted category).¹³ Nevertheless, the effect of seats remains positive and highly significant. The discrete effects indicate that moving from plurality to more proportional representation increases the probability of a member of parliament to diverge from the majority's preferences in the population by 3.6 percent (column 2) and increases the probability to diverge from the district's majority by 2.1 percent (column 5).¹⁴

The influence of the district magnitude remains even stable and significant when including personal characteristics of members of parliament and their interest affiliations as shown in columns (3) and (6). While age does not have any significant influence on

¹³ SVP denotes the Swiss Peoples Party, FDP denotes the Liberals, SP denotes the Socialist Party, GPS denotes the Greens and CVP stands the Christian Democrats which form the omitted category.

¹⁴ Increasing the number of seats from one to the median number of seats in the dataset increases the probability to diverge from the national majority by 1.9 percent and the probability to diverge from the districts majority by 1.1 percent. The results of columns (2) and (5) are robust when the dataset is restricted to center parties (CVP and FDP) only.

diverging from the majority's preferences in both specifications, the number of interest affiliations has a negative influence. The discrete changes in the probability of seats on diverging from the median voter's choices are similar to specifications (2) and (5).¹⁵

4.2 Robustness

All robustness tests are reported in Table 3.

< Table 3 here >

District heterogeneity may have an influence on the extent to which members of parliament diverge from citizens' decisions as argued by Gerber and Lewis (2004). Therefore, we include in logistic regressions (1) and (2) a number of variables measuring district heterogeneity. Overall, including heterogeneity does not have an influence on the size or significance of the variable seats. The probability of diverging from the national (1) and the district majority (2) increases when moving from plurality to proportional representation as seats have a positive and significant influence in both specifications. In terms of their sizes the coefficients are comparable to earlier estimates.

Members of parliament may face stronger political competition if voters often change party list combinations in elections. Swiss voters have the possibility to change the party list by so called "panachages", i.e. they can put a person from a certain party on the list of another. We measure possible effects of higher electoral competition through "panachages" by including the fraction of ballot papers which were changed in national elections. Moreover, we take account of election years as an additional measure for political competition. Both variables have the expected signs but the election year is insignificant. Controlling for these measures of political competition has no effects on the sign or the significance of the seats variable as shown in specifications (3) and (4) for members of parliament diverging from the national majority and the district's majority, respectively. Politicians from districts with more seats in parliament vote more often against the majority of the population and the population of their electoral district, i.e. their canton.

The above results indicate a higher probability that politicians deviate from both national and cantonal median voters if turnout is high. If turnout is high under proportional representation it is likely that politicians are even more tempted to care for their specific (cantonal) voter groups instead of voting along with the national majority in

¹⁵ All results from Table 1 are robust when only results from initiatives are analyzed.

particular. To test this differential hypothesis we interact the variables turnout and seats. The interaction serves to identify if members of parliament from larger districts with more seats diverge more from the population of voters when the referendum has a high participation rate. Applied researchers often estimate interaction terms to infer how the effect of one independent variable on the dependent variable depends on the magnitude of another independent variable. Unfortunately, the intuition from linear regression models does not extend to nonlinear models. For our results we apply the reasoning of Ai and Northen (2003) and the discrete effects represent the total effect of a change in the probability, i.e. sum of base and interaction effect.¹⁶ The estimated coefficients indicate that deputies from districts with a small number of seats systematically vote like the national majority especially if turnout is high. Politicians from larger cantons are even more likely to vote against the national majority than politicians from small cantons if turnout is high. This can be seen from column (5), where we include (*TurnoutM*), the deviation from the median turnout, and the interaction term (*Seats × TurnoutM*). Participation rates which are higher than the median participation rate also raise the probability that members of parliament vote against the majority of their district's constituents but as expected the interaction term in (6) is only marginally significant. When turnout is high, divergence from the national majority is easier than from the districts majority as members of parliament are elected within districts.

Finally, we restrict our dataset to referenda where the parliamentary majority was less clear, i.e. we focus on referenda where less than 65 percent of members of parliament agreed (or rejected) the proposals. The results are presented in columns (7) and (8). Again, the effect of the electoral system is clear. Even for issues that passed parliament with a relatively small margin, we find that as the number of seats increases, the probability to diverge from the national majority's preferences raises and the probability to diverge the majority's preferences of the district increases too.

4.3 Bayesian Model Averaging Results

The basic methodology to analyze different variables on decision outcome measures consists of running cross-section regressions including the main variable of interest and a number of other controls (see Vatter 2003, Ordeshook and Shvetsova 1994). The problem with this approach is that economists who work empirically might not exactly know which independent control variables should be included in their regressions. Clearly, the choice

¹⁶ We use the Delta method again to estimate the standard errors of the total effects.

should be guided by theory. It is also clear though, that variable selection can have an important effect on the results and missing out explanatory variables might introduce considerable bias. In final robustness tests, we deal with the problem of variable selection by performing Bayesian Model Averaging (see Raftery 1995, Raftery, Madigan and Hoeting 1997).

The main idea behind Bayesian Model Averaging (BMA) is to estimate the distribution of unknown parameters of interest across a large number of different models (model space). In contrast to classical estimations, model averaging copes with model uncertainty by allowing a priori all possible models to be considered, which consequently reduces the bias of the parameters of interest. BMA asks the researcher to specify possible regressors that might have an impact on the respective measure whether a member of parliament votes with the majority of the population or the majority of the district.¹⁷ The interpretation of the estimates from BMA is straightforward as we can calculate conditional means and standard deviations which can be interpreted similarly to standard coefficients from logistic regression models. Furthermore, a posterior inclusion probability for any variable can be calculated which gives the probability that any specific variable is included in a model, i.e. the posterior inclusion probability gives an indication of the importance of the variable over the whole model space analyzed.¹⁸

Results of Bayesian Model Averaging are presented in Table 4.

< Table 4 here >

We include 21 independent control variables and a constant. This comparatively large number of controls may lead to problems of multi-collinearity, numerical stability, and computational precision. To evaluate the upper limit of possible numerical errors we calculate a “condition number” as proposed in numerical mathematics (see Schwarz and Köckler, 2004). The condition number is defined as the ratio of the largest to the smallest non-zero singular value of the full design matrix including all 21 variables. Generally speaking, a very high condition number will lead to problems with numerical estimations because a high number of floating point precision will be lost. The condition number for our full design matrix with all 25 controls is approximately $1.5 \cdot 10^6$ indicating that the

¹⁷ The Bayesian approach is feasible and has been applied to various problems in economics by other authors such as Fernandez, Ley and Steel (2001) or Sala-i-Martin, Doppelhofer and Miller (2004). Hoeting et al. (1999) give various other examples and mention possible applications.

¹⁸ Further explanations concerning BMA and applications can be found in the literature (Raftery, Madigan and Hoeting, 1997 and the follow up literature). We stipulate 1/2 as the prior probability of including any variable in the model.

problem is well-conditioned for digital computation. Therefore, we are neither likely to have problems with precision nor with correlation between explanatory variables, as the BMA algorithm itself chooses the variables having the highest effect according to the Bayesian Information Criterion.

Columns (1) to (3) present the results of BMA for the dependent variable indicating that a member of parliament votes against the population. We include all variables of our dataset for the BMA procedure, i.e. voting against the party line (*AgainstPartyLine*), the number of referenda at the same day (*RefSameDay*) and the absolute difference in the “yes vote” of the district minus the “yes vote” at the national level (*YesDiff*).

The conditional mean of the variable seats is positive and highly significant as shown in column (1). This indicates that the average effect of the size of a district on diverging from the national majority’s preferences regarding all estimates over the whole model space is positive. The other control variables have mostly the same signs concerning the conditional mean in BMA as they have in the other estimates presented above. The age of the members of parliament completely drops out as insignificant during the Leaps and Bounds algorithm (see Hoeting et al. 1999 for a tutorial on Bayesian Model Averaging). Concerning the additional control variables, all three additional controls turn out to be significant when looking at the whole model space. In column (2) we perform a Wilcoxon signed-rank test for the sign of the posterior mean conditional on inclusion. In the averaging procedure of BMA different models are estimated. In each of these models the sign of the variable under consideration is taken. It might be the case, for example, that the electoral system measured by seats has a negative impact on diverging from national majority’s interests in some specific models but a positive impact in others and on average. We test for this possibility and present the resulting p-values in column (2), i.e. we test whether the coefficients of the diverse models have the same sign as the reported posterior conditional mean. At the one percent level we can reject that the seats enters other models of the whole model space with a negative sign. Finally, we calculate the posterior inclusion probability of all variables. The inclusion probability of seats is at the maximum value, i.e. the variable should always be included.

Finally, columns (4) to (6) present BMA results when the dependent variable indicates whether a member of parliament votes against the majority of voter of his/her district. The posterior mean conditional on inclusion for seats is negative and highly significant. Moreover, the Wilcoxon signed-rank test for the sign of the posterior mean conditional on inclusion indicates that the positive sign is not just a statistical artifact of aggregation. We

can reject the hypothesis that the conditional mean is negative at the 1 percent level. The posterior inclusion probability is in the range of other important control variables.

5 Conclusion

If a district is large and has many seats in national parliament its electoral system exhibits proportional representation. In small districts with fewer seats, elections within the district follow a plurality rule. “Winner takes all” plurality districts with only one seat represent the extreme case. Good systems of political representation align citizen’s preferences with legislator’s behavior (see Gerber and Lewis, 2004). We extend the existing literature by analyzing whether the district magnitude induces members of parliament to diverge significantly more often from the majority’s preferences when moving from small districts with few seats to proportional representation in large districts.

To measure whether members of parliament deviate from the majority’s preferences, we take advantage of unique data from a quasi-natural experiment in Switzerland: Swiss referenda reflect voting behavior of citizens and thus how the majority values certain policy proposals against the status quo. Referenda results can be matched with voting data for members of parliament on exactly the same political issues with exactly the same wording. Hence, the Swiss referenda institutions allow us to identify empirically whether members of parliament from large districts with proportional representation diverge significantly more from the majority’s preferences than members of parliament from districts with plurality or close to plurality rules. The more often members of parliament vote in the same way as the majority of the electorate, the better they represent the majority’s interests.

Our empirical results with a logistic regression model and district clustering strongly indicate that members of parliament from small districts with fewer seats are more likely to vote in the same way as their local constituents as well as the majority of the national population. In other words, decisions of members of parliament and the majority diverge more in larger districts with many seats than in small districts. Thus, small district magnitude tends to better align deputies’ decisions with the majority’s preferences while proportional representation in large districts leads to more divergence. We also find evidence that the influence of the number of seats on the deputies’ behavior is a direct one, i. e. the electoral system not only affects members of parliament via their party membership as argued in part of the literature. Members of parliament from large districts deviate more often from the majority’s preferences than members from small districts even if we control for party membership and a number of other important factors.

Although the positions of national and district majority voters are highly correlated, our results indicate that members of parliament align their decisions more to their district's majority. Locally elected politicians seem to be closer to their local constituents even if the task of a national member of parliament is to represent national preferences.

Bibliography

- Ai, C. & Norton, E. C. (2003): «Interaction terms in logit and probit models», *Economics Letters* **80**(1), 123-129.
- Bailer, S.; Bütikofer, S.; Simon & Schulz, T. (2008): «Preferences, Party Discipline and Constituency Pressure in Swiss Parliamentary Decisions», mimeo University of Zurich.
- Bawn, K. & Thies, M. F. (2003): «A Comparative Theory of Electoral Incentives - Presenting the Unorganized under PR, Plurality and Mixed-Member Electoral Systems», *Journal of Theoretical Politics* **15**(1), 5-32.
- Bender, B. & Lott, John R, J. (1996): «Legislator Voting and Shirking: A Critical Review of the Literature», *Public Choice* **87**(1-2), 67-100.
- Benoit, K. (2001): «District Magnitude, Electoral Formula, and the Number of Parties», *European Journal of Political Research* **39**(2), 203-22.
- Blume, L.; Müller, J.; Voigt, S. & Wolf, C. (2009): «The economic effects of constitutions: replicating and extending Persson and Tabellini», *Public Choice* **139**(1), 197-225.
- Braendle, T. & Stutzer, A. (2010), «Public Servants in Parliament: Theory and Evidence on Its Determinants in Germany», *Public Choice*, forthcoming.
- Carey, J. M. (2007): «Competing Principals, Political Institutions, and Party Unity in Legislative Voting», *American Journal of Political Science* **51**, 92-107.
- Cox, G. W. (1990): «Centripetal and Centrifugal Incentives in Electoral Systems», *American Journal of Political Science* **34**(4), 903-935.
- Crisp, B. F.; Escobar-Lemmon, M. C.; Jones, B. S.; Jones, M. P. & Taylor-Robinson, M. M. (2004): «Vote-Seeking Incentives and Legislative Representation in Six Presidential Democracies», *Journal of Politics* **66**, 23-846.
- Dow, J. K. (2001): «A comparative spatial analysis of majoritarian and proportional elections», *Electoral Studies* **20**(1), 109-125.
- Duverger, M. (1954), *Political Parties: Their Organization and Activity in the Modern State*, Wiley.
- Fernandez, C.; Ley, E. & Steel, M. F. (2001): «Model Uncertainty in Cross-Country Growth Regressions», *Journal of Applied Econometrics* **16**(5), 563-576.

- Gagliarducci, S.; Nannicini, T. & Naticchioni, P. (2008): «Electoral Rules and Politicians' Behavior: A Micro Test», IZA Discussion Papers No. 3348.
- Gerber, E. R. & Lewis, J. B. (2004): «Beyond the Median: Voter Preferences, District Heterogeneity, and Political Representation», *Journal of Political Economy* **112**(6), 1364-1383.
- Golder, M. & Stramski, J. (2010), «Ideological Congruence and Electoral Institutions», *American Journal of Political Science* **54**(1), 90-106.
- Grossman, G. M. & Helpman, E. (2005): «Party Discipline and Pork Barrel Politics», NBER Working Paper No. 11396.
- Hoeting, J. A.; Madigan, D.; Raftery, A. E. & Volinsky, C. T. (1999): «Bayesian Model Averaging: A Tutorial (with discussion)», *Statistical Science* **14**(4), 382-417.
- Lancaster, T. D. (1986): «Electoral Structures and Pork Barrel Politics», *International Political Science Review* **7**(1), 67-81.
- Lizzeri, A. & Persico, N. (2001): «The Provision of Public Goods under Alternative Electoral Incentives», *American Economic Review* **91**(1), 225-239.
- Milesi-Ferretti, G. M.; Perotti, R. & Rostagno, M. (2002): «Electoral Systems And Public Spending», *Quarterly Journal of Economics* **117**(2), 609-657.
- Milligan, K. & Smart, M. (2005): «Regional Grants as Pork Barrel Politics», CESifo Working Paper No. 1453.
- Myerson, R. B. (2000): «Economic Analysis of Constitutions», Northwestern University, Center for Mathematical Studies in Economics and Management Science, Discussion Paper No. 1291.
- Myerson, R. B. (1999): «Theoretical comparisons of electoral systems», *European Economic Review* **43**(4-6), 671-697.
- Myerson, R. B. (1993): «Effectiveness of Electoral Systems for Reducing Government Corruption: A Game-Theoretic Analysis», *Games and Economic Behavior* **5**(1), 118-132.
- Neto, O. A. & Cox, G. W. (1997): «Electoral Institutions, Cleavage Structures, and the Number of Parties», *American Journal of Political Science* **41**(1), 149-174.
- Ordeshook, P. C & Shvetsova, O. V. (1994): «Ethnic Heterogeneity, District Magnitude, and the Number of Parties», *American Journal of Political Science* **38**(1), 100-123.
- Persson, T.; Roland, G. & Tabellini, G. (2007): «Electoral Rules and Government Spending in Parliamentary Democracies», Levine's Working Paper Archive No. 321307000000000880.
- Persson, T. & Tabellini, G. (2005): *The Economic Effects of Constitutions*, Vol. 1, MIT Press, Cambridge (MA).

- Persson, T. & Tabellini, G. (2000): *Political Economics: Explaining Economic Policy*, MIT Press, Cambridge (MA).
- Persson, T. & Tabellini, G. (1999): «The Size and Scope of Government: Comparative Politics with Rational Politicians», *European Economic Review* **43**(4-6), 699-735.
- Raftery, A.; Hoeting, J.; Volinsky, C.; Painter, I. & Yeung, K. Y. (2009): «BMA: Bayesian Model Averaging», R package version 3.10, Available online on <http://CRAN.R-project.org/package=BMA>.
- Raftery, A. E. (1995): «Bayesian Model Selection in Social Research», *Sociological Methodology* **25**, 111-163.
- Raftery, A. E.; Madigan, D. & Hoeting, J. A. (1997): «Bayesian Model Averaging for Linear Regression Models», *Journal of the American Statistical Association* **92**(437), 179-191.
- Sala-i-Martin, X.; Doppelhofer, G. & Miller, R. I. (2004): «Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach», *American Economic Review* **94**(4), 813-835.
- Schneider, F.; Pommerehne, W. W. & Frey, B. S. (1981), Politico-economic interdependence in a direct democracy: The case of Switzerland, in Douglas A. Hibbs & Heino Fassbender, ed., 'Contemporary Political Economy, Studies on the Interdependence of Politics and Economics', North Holland, Amsterdam.
- Schwarz, H.-R. & Köckler, N. (2004), *Numerische Mathematik*, Teubner Verlag, Wiesbaden.
- Stratmann, T. (1995): «Campaign Contributions and Congressional Voting: Does the Timing of Contributions Matter?», *Review of Economics and Statistics* **77**(1), 127-136.
- Taagepra, R. & Shugart, M. S. (1989), *Seats and Votes. The Effects and Determinants of Electoral Systems*, Yale University Press, New Haven & London.
- Vatter, A. (2003): «Legislative Party Fragmentation in Swiss Cantons: A Function of Cleavage Structures or Electoral Institutions?», *Party Politics* **9**(4), 445-461.

Table 1: Data Description & Sources

<i>Variable</i>	<i>Description & Source</i>	<i>1st Qu.</i>	<i>Median</i>	<i>Mean</i>	<i>3rd Qu.</i>	<i>SD</i>
MP#CH	Indicator variable: Member of parliament against majority of Swiss voters. Swiss Parliamentary Services Final Votes Dataset.	0.000	0.000	0.320	1.000	0.467
MP#District	Indicator variable: Member of parliament against majority of voters incanton (district). Swiss Parliamentary Services Final Votes Dataset.	0.000	0.000	0.325	1.000	0.468
Seats	Canton's number of seats in the national council. Federal Statistical Office.	7.000	12.000	15.810	27.000	10.860
Canton=CH	Indicator variable: If majority of voters in a member of parliament's canton votes as majority of voters in Switzerland. Swiss Parliamentary Services Final Votes Dataset.	1.000	1.000	0.904	1.000	0.295
RefMandatory	Indicator variable: If referendum is an obligatory referendum value is 1 (necessary for an amendment to the constitution initiated by the parliament). Swissvotes Database.	0.000	0.000	0.178	0.000	0.383
RefInitiative	Indicator variable: If referendum is an initiative value is 1. Swissvotes Database.	0.000	0.000	0.435	1.000	0.496
Turnout	Share of entitled voters in member of parliament's home canton casting a vote in referendum. Swissvotes Database.	0.383	0.443	0.442	0.503	0.086
PartySVP	Indicator variable: If member of parliament belongs to the SVP (Swiss People's Party) value is 1. Swiss Parliamentary Services.	0.000	0.000	0.219	0.000	0.413
PartyFDP	Indicator variable: If member of parliament belongs to the FDP (Liberals) value is 1. Swiss Parliamentary Services.	0.000	0.000	0.206	0.000	0.404
PartySP	Indicator variable: If member of parliament belongs to the SP (Socialists) value is 1. Swiss Parliamentary Services.	0.000	0.000	0.261	1.000	0.439
PartyGPS	Indicator variable: If MP belongs to the GPS (Greens) value is 1. Swiss Parliamentary Services.	0.000	0.000	0.042	0.000	0.201
NoPG	Indicator variable: If member of parliament does not belong to a party group value is 1. Swiss Parliamentary Services.	0.000	0.000	0.047	0.000	0.212
Age	Member of parliament's age at time of final vote in parliament. Swiss Parliamentary Services.	48.000	53.000	52.680	58.000	7.631
Interests	Number of interest groups affiliations. Swiss Parliamentary Services.	3.000	6.000	8.249	11.000	7.139
Density	Inhabitants per km2. Federal Statistical Office.	158.8	229.3	508.9	523.6	868.3
Inequality	Gini coefficient of income inequality in 2003. Federal Statistical Office.	0.357	0.386	0.389	0.409	0.041
Income	GDP per Capita in 2005 Swiss Francs. Federal Statistical Office.	43950.0	48990.0	52390.0	60820.0	12518.5
ChangedBallotPapers	Share of ballot papers which have been altered (e. g. cross voting) by the voters in the last election of the canton's National Councilors. Federal Statistical Office.	0.513	0.578	0.558	0.644	0.100
ElectionYear	Indicator variable: If the final vote in parliament took place in the same year as election took place value is 1. Swissvotes Database.	0.000	0.000	0.221	0.000	0.415
AgainstPartyLine	Indicator variable: If MP does not follow party line value is 1. If MP follows party line or free vote value is 0. Swissvotes Database.	0.000	0.000	0.075	0.000	0.264
RefSameDay	Number of referenda taking place at the same day as the referendum under consideration. Swissvotes Database.	2.000	3.000	3.727	5.000	1.993
TimeToRef	Number of days between final vote in parliament and referendum.	171.000	247.000	273.900	352.000	131.117
YesDiff	Absolute difference in the "yes vote" of the district minus the "yes vote" at the national level. Swissvotes Database.	0.019	0.042	0.055	0.078	0.050
Latin	Indicator variable: If the canton is largely French or Italian speaking value is 1. Federal Statistical Office.	0.000	0.000	0.272	1.000	0.445

Notes: Descriptive statistics are based on 17674 decisions of members of parliament on 102 referenda from 1996 to 2008. Data sources indicated next to variable descriptions.

Table 2: Divergence between members of parliament and majority's preferences

	MP#CH						MP#District					
	(1)	% Change	(2)	% Change	(3)	% Change	(4)	% Change	(5)	% Change	(6)	% Change
Seats	0.013*** (0.003)	0.056*** (0.014)	0.009*** (0.003)	0.037*** (0.012)	0.008*** (0.003)	0.034*** (0.011)	0.007*** (0.002)	0.032*** (0.010)	0.005*** (0.002)	0.022*** (0.008)	0.004** (0.002)	0.019** (0.007)
Canton=CH	-0.652*** (0.144)	-0.156*** (0.035)	-0.700*** (0.155)	-0.156*** (0.038)	-0.701*** (0.154)	-0.157*** (0.038)	-0.841*** (0.133)	-0.204*** (0.033)	-0.887*** (0.145)	-0.211*** (0.035)	-0.888*** (0.145)	-0.212*** (0.035)
RefMandatory	-0.390*** (0.076)	-0.080*** (0.015)	-0.429*** (0.078)	-0.075*** (0.014)	-0.431*** (0.078)	-0.076*** (0.014)	-0.493*** (0.045)	-0.100*** (0.008)	-0.533*** (0.045)	-0.100*** (0.009)	-0.535*** (0.045)	-0.101*** (0.010)
RefInitiative	-0.351*** (0.070)	-0.072*** (0.014)	-0.368*** (0.076)	-0.066*** (0.012)	-0.369*** (0.076)	-0.066*** (0.012)	-0.277*** (0.068)	-0.059*** (0.014)	-0.287*** (0.074)	-0.057*** (0.014)	-0.288*** (0.073)	-0.058*** (0.014)
Turnout	2.647*** (0.182)	0.070*** (0.004)	2.675*** (0.208)	0.063*** (0.005)	2.702*** (0.213)	0.064*** (0.005)	2.375*** (0.277)	0.063*** (0.007)	2.333*** (0.348)	0.059*** (0.009)	2.357*** (0.343)	0.060*** (0.009)
PartySVP			0.097 (0.135)	0.019 (0.027)	0.101 (0.132)	0.020 (0.027)			-0.180* (0.109)	-0.037* (0.022)	-0.177 (0.108)	-0.036 (0.022)
PartyFDP			-0.523*** (0.120)	-0.090*** (0.021)	-0.474*** (0.113)	-0.083*** (0.020)			-0.393*** (0.132)	-0.077*** (0.025)	-0.351*** (0.125)	-0.069*** (0.024)
PartySP			1.070*** (0.103)	0.248*** (0.022)	1.073*** (0.111)	0.250*** (0.024)			0.847*** (0.100)	0.201*** (0.023)	0.850*** (0.107)	0.202*** (0.025)
PartyGPS			1.174*** (0.130)	0.274*** (0.029)	1.155*** (0.134)	0.270*** (0.030)			0.912*** (0.145)	0.217*** (0.034)	0.895*** (0.151)	0.213*** (0.036)
NoPG			0.507** (0.257)	0.110* (0.058)	0.501** (0.251)	0.109* (0.056)			0.208 (0.144)	0.046 (0.032)	0.202 (0.144)	0.045 (0.032)
Age					0.001 (0.004)	0.001 (0.007)					0.001 (0.003)	0.002 (0.007)
Interests					-0.009** (0.004)	-0.013** (0.006)					-0.008** (0.004)	-0.013** (0.007)
Latin	0.203*** (0.050)	0.046*** (0.012)	0.147*** (0.056)	0.030*** (0.011)	0.133** (0.057)	0.027** (0.012)	0.077 (0.087)	0.017 (0.020)	-0.019 (0.106)	-0.004 (0.022)	-0.031 (0.107)	-0.007 (0.023)
(Intercept)	-1.392*** (0.126)		-1.604*** (0.185)		-1.571*** (0.310)		-0.972*** (0.176)		-1.031*** (0.193)		-1.027*** (0.291)	
N	17674		17674		17674		17674		17674		17674	
Pseudo-R2	0.046		0.140		0.141		0.050		0.117		0.117	
Brier	0.211		0.196		0.196		0.212		0.202		0.202	
Log-Likelihood	584.377		1862.621		1872.863		645.918		1544.586		1553.484	

Notes: *** indicates a significance level of below 1 %; ** indicates a significance level between 1 and 5 %; * indicates significance level between 5 and 10 %. Robust standard errors for logistic models using clustering at district level are given in parenthesis below the coefficient. Discrete effects (% Change) represent the effects on the probability to observe the dependent variable for change from the first quartile to the third quartile for continuous variables and a change from zero to one for dummy variables. Robust and cluster corrected standard errors for discrete changes using the Delta method are given in parenthesis.

Table 3: Divergence between members of parliament and majority's preferences - Robustness Tests

	(1) MP#CH		(2) MP#District		(3) MP#CH		(4) MP#District		(5) MP#CH		(6) MP#District		(7) MP#CH		(8) MP#District	
	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change	Coef. (SD)	% Change
Seats	0.010*** (0.002)	0.040*** (0.010)	0.005*** (0.002)	0.020*** (0.007)	0.010*** (0.002)	0.038*** (0.009)	0.004*** (0.002)	0.018*** (0.007)	0.009*** (0.003)	0.036*** (0.011)	0.004** (0.002)	0.015** (0.008)	0.008*** (0.003)	0.036*** (0.013)	0.007*** (0.003)	0.032** (0.013)
Canton=CH	-0.700*** (0.156)	-0.156*** (0.038)	-0.888*** (0.143)	-0.212*** (0.035)	-0.699*** (0.160)	-0.155*** (0.039)	-0.886*** (0.140)	-0.210*** (0.034)	-0.701*** (0.160)	-0.156*** (0.039)	-0.887*** (0.140)	-0.211*** (0.034)	-0.378*** (0.089)	-0.083*** (0.022)	-0.346*** (0.082)	-0.079*** (0.018)
RefMandatory	-0.425*** (0.079)	-0.075*** (0.014)	-0.522*** (0.047)	-0.099*** (0.010)	-0.421*** (0.082)	-0.073*** (0.015)	-0.516*** (0.049)	-0.097*** (0.010)	-0.416*** (0.081)	-0.073*** (0.015)	-0.512*** (0.049)	-0.096*** (0.010)	-0.449*** (0.132)	-0.083*** (0.019)	-0.448*** (0.128)	-0.088*** (0.019)
RefInitiative	-0.371*** (0.076)	-0.066*** (0.012)	-0.288*** (0.075)	-0.058*** (0.014)	-0.375*** (0.077)	-0.066*** (0.012)	-0.294*** (0.077)	-0.058*** (0.014)	-0.375*** (0.077)	-0.066*** (0.012)	-0.294*** (0.076)	-0.058*** (0.014)	-0.348*** (0.116)	-0.076*** (0.024)	-0.363*** (0.115)	-0.083*** (0.024)
Turnout	2.830*** (0.230)	0.066*** (0.006)	2.596*** (0.333)	0.066*** (0.008)	2.959*** (0.197)	0.069*** (0.005)	2.794*** (0.340)	0.071*** (0.008)					1.398*** (0.310)	0.032*** (0.008)	1.221*** (0.230)	0.030*** (0.006)
TurnoutM									2.414*** (0.372)	0.067*** (0.005)	2.368*** (0.502)	0.069*** (0.008)				
TurnoutM*									0.039** (0.016)		0.031 (0.024)					
Seats																
Parties	YES		YES		YES		YES		YES		YES		YES		YES	
Age	0.001 (0.004)	0.001 (0.007)	0.001 (0.003)	0.003 (0.007)	0.001 (0.004)	0.003 (0.007)	0.002 (0.004)	0.005 (0.007)	0.001 (0.004)	0.003 (0.007)	0.002 (0.004)	0.005 (0.007)	0.001 (0.004)	0.001 (0.007)	-4.4e-05 (0.003)	-9.6e-05 (0.006)
Interests	-0.009** (0.004)	-0.014** (0.006)	-0.007* (0.004)	-0.013* (0.007)	-0.009** (0.004)	-0.013** (0.006)	-0.007* (0.004)	-0.012* (0.007)	-0.009** (0.004)	-0.014** (0.006)	-0.007* (0.004)	-0.012* (0.007)	-0.010*** (0.004)	-0.016** (0.006)	-0.011*** (0.004)	-0.019*** (0.007)
Density	4.8e-06 (2.7e-05)	3.4e-04 (0.002)	-9.8e-05*** (2.4e-05)	-0.008*** (0.002)	7.9e-06 (2.1e-05)	0.001 (0.001)	-9.2e-05*** (2.5e-05)	-0.007*** (0.002)	1.1e-05 (2.4e-05)	0.001 (0.002)	-9.0e-05*** (2.4e-05)	-0.007*** (0.002)	4.3e-06 (3.6e-05)	4.6e-04 (0.004)	1.0e-05 (3.5e-05)	0.001 (0.004)
Inequality	-1.171** (0.546)	-0.012** (0.006)	-1.355* (0.766)	-0.015* (0.009)	-1.268*** (0.442)	-0.013*** (0.004)	-1.508** (0.681)	-0.017** (0.008)	-1.278*** (0.466)	-0.013*** (0.005)	-1.517** (0.674)	-0.017** (0.007)	-0.980* (0.527)	-0.010* (0.006)	-1.103 (0.689)	-0.012 (0.008)
Income	-1.8e-06 (2.7e-06)	-0.006 (0.009)	1.6e-06 (2.8e-06)	0.006 (0.010)	5.8e-07 (2.4e-06)	0.002 (0.008)	5.1e-06** (2.2e-06)	0.018** (0.008)	2.1e-07 (2.8e-06)	0.001 (0.009)	4.8e-06** (2.2e-06)	0.017** (0.008)	4.4e-07 (4.1e-06)	0.002 (0.014)	-4.9e-07 (3.7e-06)	-0.002 (0.013)
ChangedBallot-Papers					0.631*** (0.224)	0.016*** (0.006)	0.952** (0.399)	0.026** (0.011)	0.556** (0.232)	0.014** (0.006)	0.895** (0.411)	0.025** (0.011)	0.584** (0.279)	0.016** (0.007)	0.371 (0.423)	0.010 (0.012)
ElectionYear					-0.035 (0.048)	-0.007 (0.009)	-0.054 (0.047)	-0.011 (0.009)	-0.036 (0.047)	-0.007 (0.009)	-0.054 (0.046)	-0.011 (0.009)	-0.041 (0.037)	-0.008 (0.008)	-0.045 (0.033)	-0.010 (0.007)
Latin	0.169*** (0.044)	0.034*** (0.009)	0.005 (0.084)	0.001 (0.018)	0.258*** (0.052)	0.053*** (0.011)	0.137 (0.114)	0.030 (0.025)	0.240*** (0.054)	0.049*** (0.011)	0.124 (0.115)	0.027 (0.025)	0.220*** (0.063)	0.047*** (0.013)	0.195** (0.089)	0.043** (0.020)
(Intercept)	-1.124*** (0.325)		-0.683** (0.316)		-1.677*** (0.394)		-1.514*** (0.366)		-0.288 (0.404)		-0.217 (0.321)		-0.860** (0.372)		-0.402 (0.393)	
N	17674		17674		17674		17674		17674		17674		6131		6131	
Pseudo-R2	0.141		0.120		0.142		0.121		0.142		0.121		0.195		0.131	
Brier	0.196		0.201		0.196		0.201		0.196		0.201		0.206		0.219	
Log-Likelihood	1883.252		1588.779		1890.816		1606.701		1894.488		1609.044		957.770		627.802	

Notes: *** indicates a significance level of below 1 %, ** indicates a significance level between 1 and 5 %; * indicates significance level between 5 and 10 %. Robust standard errors for logistic models using clustering at district level are given in parenthesis below the coefficient. Discrete effects (% Change) represent the effects on the probability to observe the dependent variable for change from the first quartile to the third quartile for continuous variables and a change from zero to one for dummy variables. Robust and cluster corrected standard errors for discrete changes using the Delta method are given in parenthesis (see Ai and Northen 2003 for estimation of interaction terms).

Table 4: Divergence between members of parliament and majority's preferences - BMA

	<i>MP#CH</i>			<i>MP#District</i>		
	<i>Cond. Mean (Cond. SD)</i>	<i>Sign Test</i>	<i>Inc. Proba.</i>	<i>Cond. Mean (Cond. SD)</i>	<i>Sign Test</i>	<i>Inc. Proba.</i>
Seats	9.92E-03 (1.87E-03)	0.000	99.9	5.01E-03 (1.66E-03)	0.000	39.9
Canton=CH	-0.629 (0.065)	0.000	99.9	-0.884 (0.056)	0.000	99.9
RefMandatory	-0.329 (0.054)	0.000	99.9	-0.479 (0.054)	0.000	99.9
RefInitiative	-0.348 (0.042)	0.000	99.9	-0.262 (0.037)	0.000	99.9
Turnout	2.732 (0.233)	0.000	99.9	2.762 (0.222)	0.000	99.9
PartySVP	0.045 (0.052)	1.000	0.1	-0.200 (0.053)	0.000	93.7
PartyFDP	-0.522 (0.059)	0.000	99.9	-0.364 (0.062)	0.000	99.9
PartySP	1.106 (0.041)	0.000	99.9	0.912 (0.051)	0.000	99.9
PartyGPS	1.208 (0.082)	0.000	99.9	0.981 (0.086)	0.000	99.9
NoPG	0.378 (0.082)	0.000	99.9	0.104 (0.083)	0.181	0.7
Age	EXC	EXC	EXC	3.10E-03 (2.32E-03)	0.181	0.8
Interests	-8.41E-03 (2.78E-03)	0.000	43.1	-7.50E-03 (2.69E-03)	0.000	26.9
Density	-4.24E-05 (2.01E-05)	0.100	2.9	-8.59E-05 (2.35E-05)	0.000	94.8
Inequality	-1.304 (0.477)	0.000	21.7	-1.081 (0.507)	0.001	5.5
Income	-4.18E-06 (1.51E-06)	0.002	20.4	4.07E-06 (2.00E-06)	0.100	2.5
ChangedBallotPaper:	0.466 (0.230)	0.006	3.7	0.682 (0.192)	0.000	85.1
ElectionYear	-0.123 (0.052)	0.036	4.1	-0.068 (0.042)	0.100	1.4
AgainstPartyLine	1.345 (0.062)	0.000	99.9	1.040 (0.061)	0.000	99.9
RefSameDay	0.029 (0.010)	0.000	45.1	EXC	EXC	EXC
TimeToRef	1.10E-03 (1.36E-04)	0.000	99.9	3.94E-04 (1.33E-04)	0.000	35.7
YesDiff	1.455 (0.393)	0.000	88.2	0.500 (0.383)	1.000	0.2
Latin	0.131 (0.056)	0.000	9.8	EXC	EXC	EXC
(Intercept)	-2.042 (0.258)	0.000	99.9	-1.591 (0.277)	0.000	99.9

Notes: For the Bayesian Model Averaging (BMA) results, the conditional mean (Cond. Mean) and standard deviation (Cond. SD) are conditional on inclusion of the variable in the model. The sign-test in columns (2) and (5) is a Wilcoxon signed-rank test for the sign of the variable over all models. The p-value of the sign tests indicates whether the coefficient is on the same side zero as its posterior mean conditional on inclusion. Columns (3) and (6) give the posterior inclusion probability of all variables. EXC indicates variables which were excluded from the evaluation by the "Leaps and Bounds algorithm" preceding BMA. BMA results were obtained using the software of the R Project for Statistical Computing with the BMA package.