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Electoral Systems and the Influence of the Median Voter:
Quasi-Experimental Evidence from popular and parliamentary
votes[#]

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Abstract

When moving from a plurality rule to a proportional system, members of national parliament have more incentives to diverge from the median voter's preferences. We match voting behavior concerning legislative proposals of Swiss members of parliament with real referenda outcomes on the same issues for the years 1996 to 2009. This quasi-experimental data allows us to identify whether differences in electoral systems induce members of parliament to diverge from the choices of the median voter. Empirical results indicate that members of parliament from districts with proportional representation tend to diverge significantly more from the median voter's preferences than members of parliament from districts with plurality rule.

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

JEL Classification: D72, D70, H00.

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1 Introduction

The influence of electoral systems on policy outcomes increasingly attracts the interest of economists (see Grossman and Helpman, 2005; Milesi-Ferretti et al. 2002; Persson et al., 2007). Good systems of political representation align the behavior of representatives with preferences of citizens. Different electoral systems induce politicians to act differently towards their voters: Members of parliament from districts with a closely limited numbers of seats and, thus, with a plurality or close to plurality system are supposed to propose platforms closer to the median voter's interests. Conversely, members of parliament from districts with a proportional electoral system and many seats may win elections by proposing policies for groups at the boundary of the electoral spectrum (see Gagliarducci et al., 2008). Representation of their voters' interests may also be considered a public good by members of parliament from districts with many seats while members of parliament from districts with few seats may have to take personal accountability for their decisions (see Lizzeri and Persico, 2001). Thus, moving from a plurality rule closer to a proportional system induces members of parliament to diverge more from the majority's preferences.¹

The literature on political representation tries to analyze whether “what legislators do” corresponds to “what the majority wants”. However, until now no study has directly compared the voters' preferences with the decisions on the same issues by their representatives (see Gerber and Lewis, 2004 for an exception concerning the measurement of the median voter's preferences). In this paper we provide such a comparative analysis which indicates whether members of parliament vote according to the median 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: Similar to other democratic countries, members of the Swiss national parliament vote on laws and law changes. But in contrast to all other countries, in Switzerland a group of voters can demand a popular referendum on parliamentary decisions before laws are enacted. Moreover, a group of voters can also start an initiative demanding a constitutional amendment, and the members of parliament then have to express their opinion on the proposed changes before the population votes on them.

In the popular votes, citizens reveal their preferences for the policy alternatives. This data can be matched with voting data from members of parliament on exactly the same political issues. This fact makes Switzerland an ideal case to study the relationship between

¹ Note that the choices of the majority include by definition the choices of the median voter.

voters and their representatives. More specifically, our data allows us to identify empirically whether members of parliament from large districts with proportional representation diverge significantly more from the median voter's preferences than politicians from small districts with a plurality or close to plurality rule.

Another advantage of the chosen research design is that by comparing choices of members of parliament with referenda outcomes in a single country the problems typical for cross-country research are avoided: When comparing political decisions and preferences across countries, specific norms, rules, political patterns, historically developed cultures 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 dimensions.

By matching data from individual legislative decisions of members of parliament with referenda outcomes on exactly the same legislative issue we can empirically test the influence of the electoral system on the extent to which representatives diverge from the median voter's decision. We construct two variables which indicate whether members of parliament have voted in the same way as the majority of the voters at the national and the district level, respectively. The dependent variables are explained by the number of seats a district holds in parliament which characterizes the district's electoral system in the plurality-proportional representation dimension.

Empirical results using a logistic regression model with district clustering indicate that decisions of members of parliament from districts with a large number of seats and proportional representation systematically diverge from preferences of the median voter of the national population as well as the median voter of their constituents. Plurality rule as measured by a low number of seats tends to align decisions of members of parliament with the national median voter's preferences as well as with the district median voter's preferences. This result is robust to including controls for how the citizens of the district of the member of parliament have voted compared to Switzerland as a whole, the importance of the referendum as measured by participation rates, party membership of the respective representative, as well as a large number of characteristics which are specific to referenda, districts, 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 2009 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 Theoretical Considerations

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

In contrast, parties are expected to take more dispersed positions in multi-member districts with proportional representations as argued by Cox (1990). Generally speaking, electoral competition is diffused across a district in a system of proportional representation because the median voter is of little importance for a single politician according to Taagepera and Shugart (1989). In such a case, it is less risky for a politician to focus also on groups at the boundaries of the political spectrum. There is a growing empirical literature corroborating the basic intuition that district magnitude i.e. proportional representation, induces dispersed party positions. For instance, Dow (2001) finds systematic differences in the extent of spatial dispersion among parties and candidates between plurality and proportional electoral systems when analyzing and comparing data from election studies and surveys for Canada, Israel, the Netherlands and France. In plurality systems, parties and candidates are located significantly closer to the center of the distribution of voters than their counterparts in proportional systems. A major problem of this line of research is that party positions are identified by electoral platforms which can change.

Decisions of members of parliament directly affect individual utility and welfare. Therefore, it is not the influence of the electoral system on parties but its effects on policy outcomes which are of paramount interest. 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 citizen preferences and the behavior of legislators. The latter should make legislation according to the people's will.

Political representation has certain characteristics of a public good. Lancaster (1990) argues that regional representation is a public good for members of parliament from multi-member districts, i.e. 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 deputy and constituency is strongest in plurality or close to plurality systems.

Members of parliament may also face several competing principals when representing voter's interest according to Carey (2007). Party interests or interest groups play a role too 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.

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 different 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 by regional votes. These findings substantiate the hypothesis that plurality systems create the incentive through the small number of seats for members of parliament to target the median voter. Conversely, under proportional representation politicians benefits are diffused across voters and they may thus concentrate on different groups in the political spectrum instead of focusing on the median voter.

In spite of the importance centrality of the median voter theorem in political economy models, there is large evidence that members of parliament diverge from the median voter's preferences as reviewed by Stratmann (1995), Bender and Lott (1996), and Gerber and Lewis (2004). A major problem of empirical studies is to determine the median voter's preferences and match it with decisions by members of parliament. As stated above, party positions are no measures for policy outcome. On the other hand, financial measures allow identifying effects of electoral system on policy outcomes but they are not a measure of the preferences of the median voter. Thus, they do not represent ideal variables for measuring whether political representatives act according to the majority's interests.

We overcome measurement weaknesses by introducing two unique measures for the majority's preferences which can be confronted with policy decisions by members of parliament. Swiss citizens regularly cast their votes on proposals which have passed the 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 median voter, i.e. the majority, to rank policy outcomes against the status quo in a referendum. 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 concerning the utility implications for the majority of a referendum decision. The median voter's preferences reveal themselves in a referendum.

By comparing the citizens' majority votes from referenda with politicians' votes on the same decision, we get the politicians' positions relative to the majority of the population. In other words, we can identify when legislators take positions that diverge from the median voter. We explain divergence from the median voter's decision mainly by differences in the electoral system between districts but our data also allows us to control for party positions of members of parliament. Hence, we can distinguish between deviance from median induced by the electoral system from deviance induced by party affiliation and 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' to the national majority's decisions and the cantonal majority's decisions and test whether representation of the median voter's 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 referenda data with information on votes of individual members of parliament in Switzerland for the year 1996 to 2009. Thereby, we create a dataset where real choices of politicians can be confronted with real choices of individuals 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 their population size. 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 are considered as pure plurality districts as they have only one member of parliament. Legally they are referred to as half-cantons. Thirteen electoral districts have between two and ten members of parliament while the remaining cantons have more than ten members of parliament. This large heterogeneity allows us to identify the effect of district size on voting behavior of deputies.

The National Council has twelve committees, each concerned with a policy area such as foreign affairs, social security, health, etc. These committees write out the proposals for laws and law changes which are presented to the plenum. The parliamentary services record individual votes carried out on legislative proposals for every deputy and make them publicly available. A proposal is adopted if the majority of the National Council and the Council of States (upper house) agree on the proposed law.

However, proposals adopted by parliament do not necessarily turn into law. If a legislative proposal aims to change the constitution a referendum is mandatory. For referenda on the changes of the constitution a double majority is required; 50 percent of all citizens have to agree to the proposed change as well as citizens in a majority of the cantons, i.e. the majority of citizens in eleven and a half-canton ("Ständemehr" in German). If parliament intends to change or enact a new law, a referendum is not mandatory. Though, Swiss citizens may demand a referendum on the proposed legislation by collecting 50000 signatures. The proposed law change is rejected if 50 % of the population vote against it. A majority of the cantons is not required. Finally, citizens may also demand a constitutional amendment by referendum (called initiative) on their own by collecting 100000 signatures. Members of parliament are required to vote on the text of such an initiative which serves as a recommendation for the referendum. Parliament and the government cannot refuse an initiative unless it violates formal regulations. 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 year 1996 to 2008 by the Swiss Federal Statistical Office.² Thus, we are able to compare legislative decisions by members of parliament with referenda outcomes on exactly the same legislative issue and with the same wording. This permits us to test empirically the effects of differences in the electoral system by analyzing whether members of parliament from smaller districts better incorporate citizens' decisions by voting more with the majority while members of parliament from larger districts diverge more from the majority. Put differently, we can test whether the electoral system has an influence on how well members of parliament represent the median voter.

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 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 of his/her respective 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 for the deviations from the majority of the people is given as follows:

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

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

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 (equation 1) or against his/her district's majority (equation 2). We therefore explain when a member of parliament does not represent the national median voter or the district's median voter respectively. The equations are motivated theoretically by the expected positive impact of a higher

² As decisions in parliament usually precede referenda by more than one year, parliamentary decisions were made from 1995 to 2007.

number of seats a district has in parliament on the probability that a member of parliament deviates from the majority of the population in general. Thus, we expect $\alpha_1 > 0$.

Political decisions of members of parliament are not only influenced by the number of seats of their electoral district. In our case the sub-national units provide a broad empirical field within a common framework of identical basic dimensions 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 . Apart from voting results of members of parliament and referenda outcomes, the empirical analysis includes data on individual characteristics and party affiliations of members of parliament, as well as socio-demographic and economics variables characterizing the 26 Swiss cantons. Data for the independent control variables were obtained and matched from the Federal Statistical Office, BADAC and the Swissvotes Database.³

In addition to a district's size 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. 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 and engage in pork barrels (Milesi-Ferretti et al., 2002). Controlling for whether the district's vote equals the national vote allows us to exclude the influence of diverging local and national interests on parliamentary decisions.⁴ 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. Moreover, 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*). Controlling for whether the canton votes as the rest of Switzerland, we expect a higher difference in the yes vote to increase the probability that the politician deviates from the majority.

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 a priori ambiguous. High voter turnout may reflect 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 the a higher probability for a politician

³ See <http://www.bfs.admin.ch/> (Federal Statistical Office), <http://www.badac.ch/> (BADAC) and <http://www.swissvotes.ch/> (Swissvotes) for the respective databases and contact information.

⁴ Note that members of national parliament are supposed to act in the interest of national voters. However, it is likely that preferences of their district voters may influence their voting behavior.

to vote as the majority depends on the relative importance he/she puts on voters versus interest groups.

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*). We expect a negative influence of mandatory referenda on the probability of voting against the majority at the national and at the cantonal level.

Turning from the influence of the interaction between local and national interests to characteristics of a specific member of parliament, we include his/her 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 also the number of legislative parties and the more likely a politician may deviate from the majority’s preferences. In other words, possible influences which stem 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. After inclusion of parties in the regression, the number of seats would then only have an indirect effect of preference alignment with the median voter. The direct effect would be through parties. Thus, we control for party affiliation by including different party groups. This serves as a conservative test for the influence of the electoral system on representation of the median voter’s preferences. The Christian Democrats (Christlich Demokratische Volkspartei CVP, in German) form the omitted group. 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 personal characteristics such as gender (*Gender*) and age in years (*Age*). Younger and female members of parliament have greater chances of being elected in a proportional system and their exclusion 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 total 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.⁵ Especially macroeconomic indicators such as the level and growth 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 urbanization, population density, income inequality, wealth inequality, regional income, and growth in regional income. Keeping 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 attitudinal differences between those cantons and the German speaking majority.

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 be higher (*ChangedBallotPapers*).

As a final test of robustness, we analyze a number of additional variables measuring party discipline coded as voting against the party line (*AgainstPartyLine*), effects of election years (*ElectionYear*), and the number of referenda at the same day (*RefSameDay*).

Matching referenda data with individual voting records in parliament allows us to study 17328 decisions of members of parliament on 102 referenda from 1996 to 2009.⁶ Out of the 102 referenda 21 were mandatory referenda and 45 initiatives. All variables, their sources, and a number of descriptive statistics are given in Table 1.

< Table 1 here >

⁵ For a number of different controls see, for example, Lijphart (1990), Neto and Cox (1997), Rae (1971) or Benoit (2001).

⁶ Not that members of parliament may be absent at votes due sickness, voyage or other duties.

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 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 probability to diverge from the majority. The discrete effects for the respective 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. We calculate robust standard errors for the changes in the probability using the Delta method.

< 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 median voter of the population and the median voter in their district 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 the member of parliament is less likely to disagree with citizens as the negative and significant coefficient of ($Canton=CH$) indicates. However, controlling whether the canton votes as the rest of Switzerland, a higher absolute difference in the agreement to the referenda between cantonal population and the whole population ($YesDiff$) positively influences the probability that a politician does not vote with the majority. Higher district voter turnout translates into an increased likelihood for deviating from the national and cantonal majority while in the case of mandatory referenda a member of parliament diverges less from the median voter's preferences. 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 median voter's position ($MP \neq District$).

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 ($MP \neq CH$) by 5.8 percent when all remaining variables are at their median values. The effect is marginally smaller when the dependent variable is voting against the district population ($MP \neq District$). Increasing the number of seats from the

first to the third quartile raises the probability of voting against the district's majority by 3.0 percent. Both discrete changes 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 (3.0 percent) than from the majority of the population (5.8 percent). In other words, members of parliament from a large district identify less with the median voter 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 electoral districts. The effect of seats of specifications (1) and (4) are in their sizes comparable to the influence of other control variables such as voting in a mandatory referendum on the probability of diverging from the majority.

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 only 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 electoral system and the number of seats would then have an indirect effect through a greater number of parties on diverging from the median voter. In specifications (2) and (5) we include political party affiliations of members of parliament. As suggested 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).⁷ 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 to diverge from the median voter's preferences in the population by 4.0 percent (column 2) and increases the probability to diverge from the district's median voter by 2.2 percent (column 5).

The influence of the electoral system 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 gender and age do not have any significant influence on diverging from the median voter in both specifications, the number of interest

⁷ SVP denotes the 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.

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)

4.2 Robustness

All robustness tests are reported in Table 3.

< Table 3 here >

District heterogeneity may have an influence on whether members of parliament vote like the median voter 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 seats variable. The probability of diverging from the national and the cantonal majority increases when moving from plurality to proportional representation as district size has a positive and significant influence in both specifications.

Politicians from plurality districts face stronger electoral competition. But also members of parliament from districts with proportional representation may face strong political competition if voters 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. Controlling for this additional measure of political competition has no effects on the sign or the significance of the seats variable as shown in specifications (3) and (4). Politicians from districts with more seats in parliament rather tend to vote against the majority of the population and their canton.

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 voter group instead of voting along with the majority. To test this 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 median of the population 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. The estimated coefficients indicate that deputies from districts with a small number of seats systematically vote like the median voter of the population especially if many voters participate in the referendum. 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 $Seats \times TurnoutM$. A participation rate higher than the median participation rate also raises the probability that members of parliament votes against the median voters of their districts. However, there is no statistically significant difference between members of parliament from cantons with a small number of seats and those from cantons with a large number of seats as can be seen from the interaction term in (6) indicating that divergence is easier at the national than at the district level.

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, Shvetsova, 1994). The problem with this approach is that empirical economists might not exactly know which independent control variables should be included in their regressions. Clearly, the choice should be guided by theory. It is also clear thought, 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 and 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. 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. 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.⁸

Results of Bayesian Model Averaging are presented in Table 4.

< Table 4 here >

We include 25 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. 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 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*), being in an election year (*ElectionYear*) and the number of referenda at the same day (*RefSameDay*) enter the estimation too.

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 median voter 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 member

⁸ 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.

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 seats has a negative impact on diverging from the median voter 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 median 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 89.1 percent and in the range of other important control variables.

5 Conclusion

If a district has many seats in the national parliament its electoral system exhibits proportional representation. The fewer inhabitants, i.e. fewer seats, a district has, the closer elections within the district are to a plurality rule. “Winner takes all” plurality districts represent the extreme case. We have analyzed the influence of differences in the electoral system on political parties and certain policy outcomes. 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 electoral system leads members of parliament to diverge significantly more from the median voter position when moving from plurality to proportional representation.

To measure whether members of parliament deviate from the median voter's preferences, we take advantage of unique data from a quasi-natural experiment in Switzerland: Swiss referenda reflect voting behavior of citizens and thus the median voter. Referenda results can be matched with voting data for members of parliament on exactly the same political issues. 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 median voter 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 median voter, the better they represent the majority's interests and the median voter's preferences compared to a status quo.

Our empirical results with a logistic regression model strongly indicate that members of parliament from small districts are more likely to vote like the median voter of the national population as well as the median voter of their district. Decisions between members of parliament and the majority diverge more in larger districts. Thus, small district size tends to better align deputies' decisions with the median voter's preferences while proportional representation leads to a more divergence. We also find evidence that the influence of the electoral system on the deputies' behavior is a direct one, i. e. the electoral system not only affects members of parliament via their party membership. Members of parliament from large districts deviate more often from the median voter than members from small districts even if we control for party membership.

Although the positions of national and cantonal median voters are highly correlated, our results indicate that members of parliament align their decisions generically more to district medians if district's interests contravene national interests.

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Table 1: Data Description & Sources

Variable	Description & Source	1st Qu.	Median	Mean	3rd Qu.	SD
Members of the Parliament (MP)						
MP≠District	Indicator variable: MP does not vote yes/no in the final vote when the majority of voters in his home canton also votes yes/no in the corresponding referendum. Final votes dataset.	0.00	0.00	0.33	1.00	0.47
MP≠CH	Indicator variable: MP does not vote yes/no in the final vote when the majority of Swiss voters also votes yes/no in the corresponding referendum. Final votes dataset.	0.00	0.00	0.32	1.00	0.47
Age	MP's age at time of final vote in parliament. Members of the Parliament dataset.	48.00	53.00	52.66	58.00	7.64
Sex	Indicator variable: If MP is female value is 1. Members of the Parliament dataset.	0.00	0.00	0.24	0.00	0.43
PartySVP	Indicator variable: If MP belongs to the SVP value is 1. Members of the Parliament dataset.	0.00	0.00	0.22	0.00	0.42
PartyFDP	Indicator variable: If MP belongs to the FDP value is 1. Members of the Parliament dataset.	0.00	0.00	0.21	0.00	0.41
PartySP	Indicator variable: If MP belongs to the SP value is 1. Members of the Parliament dataset.	0.00	0.00	0.26	1.00	0.44
PartyGPS	Indicator variable: If MP belongs to the GPS value is 1. Members of the Parliament dataset.	0.00	0.00	0.04	0.00	0.20
NoPG	Indicator variable: If MP does not belong to a party group value is 1. Members of the Parliament dataset.	0.00	0.00	0.05	0.00	0.21
AgainstPartyLine	Indicator variable: If MP does not follow party line value is 1. If MP follows party line or free vote value is 0. www.swissvotes.ch.	0.00	0.00	0.08	0.00	0.26
Interests	Number of interest groups affiliations. Members of the Parliament dataset.	4.00	6.00	8.41	11.00	7.11
Referenda						
Canton=CH	Indicator variable: If majority of voters in a MP's home canton votes for the same outcome as Switzerland as a whole value is 1. Final votes dataset.	1.00	1.00	0.90	1.00	0.30
RefYear	Year when referendum took place. www.swissvotes.ch.					
RefSameDay	Number of referenda taking place at the same day as the referendum under consideration. www.swissvotes.ch.	2.00	3.00	3.74	5.00	2.01
RefObligatory	Indicator variable: If referendum is an obligatory referendum value is 1(necessary for an amendment to the constitution initiated by the parliament). www.swissvotes.ch.	0.00	0.00	0.18	0.00	0.38
RefInitiative	Indicator variable: If referendum is an initiative value is 1 (amendment to the constitution initiated by extra-parliamentary group, referendum is obligatory). www.swissvotes.ch.	0.00	0.00	0.44	1.00	0.50
Turnout	Share of entitled voters in MP's home canton casting a vote in referendum under consideration. www.swissvotes.ch.	0.38	0.44	0.44	0.50	0.09
Cantons						
Urbanization	Share of population living in municipalities with more than 10000 inhabitants within the canton. Swiss Federal Statistical Office via BADAC.	0.555	0.587	0.6707	0.907	0.2135621
IncomeInequality	Gini coefficient of income inequality in 2003. Swiss Federal Tax Administration.	0.357	0.386	0.3894	0.409	0.0411611
WealthInequality	Gini coefficient of wealth inequality in 2003. Swiss Federal Tax Administration.	0.775	0.831	0.822	0.845	0.0472793

(Continued on next page)

(Table 1 continued)

PopulationDensity	Inhabitants per km2. Swiss Federal Statistical Office.	159.4	229.4	509.9	681.8	864.81745
GDPperCapita	GDP per Capita in 2005 Swiss Francs. Swiss Federal Statistical Office.	43970	48990	52480	60820	12505.205
GDPperCapitaGrowth		-0.1619	0.8012	0.9118	1.879	3.975315
Latin	Indicator variable: If the canton is largely French or Italian speaking value is 1.	0	0	0.2671	1	0.4424484
Seats						
	Canton's number of seats in the national council at time of final vote. Swiss Federal Statistical Office.	7	12	15.85	27	10.889251
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. Swiss Federal Statistical Office.	0.5133	0.5781	0.5572	0.644	0.1000024
ElectionYear	Indicator variable: If the final vote in parliament took place in the same year as election took place value is 1. www.swissvotes.ch .	0	0	0.1854	0	0.3886511

Final votes dataset: All vote results are recorded by the Swiss Parliamentary Services. Some were taken directly from www.parliament.ch, a substantial part of the votes were refined and kindly provided by Daniel Schwarz from the IPW Bern (www.ipw.unibe.ch), some older vote results are provided by Tobias Hohl from Parlarating (www.parlarating.ch).

Members of the Parliament dataset: Most data origin from the Swiss Parliamentary Services' webpage (www.parliament.ch), some data stem from the dataset provided by Daniel Schwarz.

Table 2: Divergence between members of parliament and median voter

	MP#CH						MP#District					
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change
Intercept	-1.443 *** (0.138)		-1.639 *** (0.207)		-1.538 *** (0.314)		-0.992 *** (0.204)		-1.035 *** (0.223)		-1.026 *** (0.298)	
Seats	0.013 *** (0.003)	0.058 *** (0.014)	0.010 *** (0.003)	0.040 *** (0.013)	0.010 *** (0.003)	0.040 *** (0.011)	0.007 *** (0.002)	0.030 *** (0.010)	0.005 ** (0.002)	0.022 ** (0.009)	0.005 ** (0.002)	0.020 ** (0.008)
Canton=CH	-0.596 *** (0.151)	-0.142 *** (0.037)	-0.637 *** (0.165)	-0.141 *** (0.041)	-0.640 *** (0.165)	-0.144 *** (0.041)	-0.809 *** (0.129)	-0.196 *** (0.032)	-0.849 *** (0.135)	-0.202 *** (0.033)	-0.851 *** (0.135)	-0.203 *** (0.033)
YesDiff	1.216 * (0.624)	0.016 * (0.008)	1.489 ** (0.627)	0.017 ** (0.007)	1.469 ** (0.630)	0.017 ** (0.007)	0.121 (0.841)	0.002 (0.011)	0.291 (0.884)	0.004 (0.011)	0.265 (0.883)	0.003 (0.011)
Turnout	2.514 *** (0.192)	0.066 *** (0.005)	2.469 *** (0.225)	0.058 *** (0.005)	2.524 *** (0.232)	0.061 *** (0.006)	2.355 *** (0.255)	0.063 *** (0.007)	2.247 *** (0.326)	0.057 *** (0.008)	2.288 *** (0.322)	0.059 *** (0.008)
RefObligatory	-0.385 *** (0.079)	-0.079 *** (0.016)	-0.426 *** (0.082)	-0.075 *** (0.015)	-0.427 *** (0.082)	-0.077 *** (0.015)	-0.484 *** (0.047)	-0.099 *** (0.008)	-0.526 *** (0.048)	-0.100 *** (0.010)	-0.527 *** (0.048)	-0.101 *** (0.010)
RefInitiative	-0.353 *** (0.073)	-0.073 *** (0.015)	-0.370 *** (0.079)	-0.066 *** (0.013)	-0.372 *** (0.079)	-0.068 *** (0.013)	-0.284 *** (0.068)	-0.060 *** (0.014)	-0.293 *** (0.074)	-0.059 *** (0.014)	-0.295 *** (0.073)	-0.060 *** (0.014)
PartySVP			0.091 (0.137)	0.018 (0.027)	0.077 (0.125)	0.016 (0.026)			-0.182 (0.111)	-0.037 (0.023)	-0.187 * (0.102)	-0.039 * (0.021)
PartyFDP			-0.527 *** (0.123)	-0.091 *** (0.022)	-0.470 *** (0.116)	-0.084 *** (0.021)			-0.384 *** (0.135)	-0.075 *** (0.026)	-0.339 *** (0.127)	-0.068 *** (0.025)
PartySP			1.073 *** (0.105)	0.249 *** (0.023)	1.090 *** (0.118)	0.256 *** (0.026)			0.848 *** (0.103)	0.202 *** (0.024)	0.857 *** (0.114)	0.205 *** (0.027)
PartyGPS			1.176 *** (0.130)	0.275 *** (0.029)	1.198 *** (0.146)	0.282 *** (0.033)			0.888 *** (0.150)	0.211 *** (0.036)	0.885 *** (0.166)	0.212 *** (0.039)
NoPG			0.497 * (0.258)	0.108 * (0.058)	0.490 ** (0.246)	0.108 * (0.056)			0.206 (0.143)	0.046 (0.032)	0.200 (0.142)	0.045 (0.032)
Gender					-0.092 (0.064)	-0.018 (0.012)					-0.032 (0.067)	-0.007 (0.014)
Age					0.000 (0.003)	-0.001 (0.007)					0.001 (0.003)	0.002 (0.007)
Interests					-0.010 *** (0.004)	-0.014 *** (0.006)					-0.009 ** (0.004)	-0.013 ** (0.006)
Latin	0.175 *** (0.058)	0.040 *** (0.013)	0.097 (0.071)	0.019 (0.015)	0.070 (0.069)	0.014 (0.014)	0.087 (0.090)	0.020 (0.021)	-0.024 (0.112)	-0.005 (0.024)	-0.040 (0.112)	-0.009 (0.024)
N	17328		17328		171		17328		17328		17328	
Pseudo-R2	0.046		0.141		0.142		0.049		0.115		0.115	
Brier	0.211		0.197		0.196		0.212		0.202		0.202	
Log-Likelihood	580.1		1842.92		1862.11		613.85		1485.55		1497.21	

*** 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 are given in parenthesis below the coefficient. Discrete effects 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 median voter - robustness checks

	MP≠CH		MP≠District		MP≠CH		MP≠District		MP≠CH		MP≠District	
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	Discrete Change	Coefficient	discrete change
Intercept	-1.056 *** (0.358)		-0.712 * (0.371)		-1.860 *** (0.410)		-1.647 *** (0.393)		-0.502 (0.429)		-0.363 (0.361)	
Seats	0.012 *** (0.003)	0.048 *** (0.013)	0.005 * (0.003)	0.021 * (0.012)	0.011 *** (0.003)	0.046 *** (0.012)	0.005 * (0.003)	0.020 * (0.011)	0.011 *** (0.003)	0.042 *** (0.013)	0.004 (0.003)	0.017 (0.011)
Canton=CH	-0.630 *** (0.165)	-0.141 *** (0.041)	-0.839 *** (0.134)	-0.200 *** (0.033)	-0.630 *** (0.167)	-0.139 *** (0.041)	-0.839 *** (0.132)	-0.199 *** (0.032)	-0.631 *** (0.167)	-0.140 *** (0.041)	-0.840 *** (0.132)	-0.199 *** (0.032)
YesDiff	1.63 *** (0.617)	0.019 *** (0.007)	0.472 (0.923)	0.006 (0.012)	1.69 *** (0.608)	0.019 *** (0.007)	0.549 (0.927)	0.007 (0.012)	1.72 *** (0.605)	0.020 *** (0.007)	0.574 (0.940)	0.007 (0.012)
Turnout	2.670 *** (0.251)	0.0635 *** (0.0062)	2.526 *** (0.312)	0.0649 *** (0.00779)	2.848 *** (0.214)	0.0666 *** (0.00536)	2.737 *** (0.309)	0.0692 *** (0.00753)				
RefObligatory	-0.421 *** (0.08.21)	-0.076 *** (0.015)	-0.516 *** (0.0492)	-0.099 *** (0.010)	-0.412 *** (0.0833)	-0.073 *** (0.015)	-0.505 *** (0.0519)	-0.095 *** (0.011)	-0.407 *** (0.0822)	-0.072 *** (0.015)	-0.501 *** (0.0518)	-0.095 *** (0.011)
RefInitiative	-0.374 *** (0.079)	-0.0678 *** (0.0132)	-0.293 *** (0.076)	-0.0593 *** (0.0139)	-0.378 *** (0.080)	-0.0673 *** (0.0129)	-0.298 *** (0.077)	-0.0592 *** (0.0136)	-0.378 *** (0.080)	-0.0674 *** (0.0130)	-0.298 *** (0.077)	-0.0592 *** (0.0135)
PartySVP	0.080 (0.125)	0.016 (0.025)	-0.190 * (0.105)	-0.039 * (0.022)	0.084 (0.126)	0.017 (0.025)	-0.186 * (0.108)	-0.038 * (0.022)	0.081 (0.125)	0.016 (0.025)	-0.188 * (0.106)	-0.038 * (0.022)
PartyFDP	-0.459 *** (0.115)	-0.082 *** (0.021)	-0.342 *** (0.126)	-0.068 *** (0.025)	-0.455 *** (0.114)	-0.079 *** (0.020)	-0.337 *** (0.128)	-0.066 *** (0.025)	-0.455 *** (0.114)	-0.0795 *** (0.0205)	-0.337 *** (0.128)	-0.066 *** (0.0252)
PartySP	1.10 *** (0.120)	0.257 *** (0.026)	0.878 *** (0.121)	0.210 *** (0.028)	1.11 *** (0.120)	0.259 *** (0.026)	0.897 *** (0.122)	0.213 *** (0.028)	1.11 *** (0.120)	0.259 *** (0.026)	0.897 *** (0.122)	0.213 *** (0.028)
PartyGPS	1.206 *** (0.140)	0.284 *** (0.0316)	0.907 *** (0.170)	0.217 *** (0.0403)	1.231 *** (0.140)	0.288 *** (0.0313)	0.936 *** (0.166)	0.223 *** (0.0390)	1.230 *** (0.140)	0.288 *** (0.031)	0.935 *** (0.166)	0.223 *** (0.039)
NoPG	0.515 ** (0.253)	0.113 ** (0.057)	0.233 (0.150)	0.052 (0.034)	0.523 ** (0.256)	0.114 ** (0.057)	0.242 (0.152)	0.054 (0.034)	0.521 ** (0.256)	0.113 ** (0.057)	0.241 (0.152)	0.053 (0.034)
Gender	-0.087 (0.063)	-0.017 (0.012)	-0.028 (0.065)	-0.006 (0.014)	-0.090 (0.062)	-0.017 (0.011)	-0.031 (0.065)	-0.007 (0.014)	-0.092 (0.062)	-0.0176 (0.0114)	-0.032 (0.065)	-0.0068 (0.0136)
Age	-5.49E-05 (0.00325)	0.000 (0.007)	0.00156 (0.00329)	0.003 (0.007)	6.51E-04 (0.00330)	0.001 (0.006)	0.00242 (0.00336)	0.005 (0.007)	6.45E-04 (0.00332)	0.001 (0.007)	0.00240 (0.00337)	0.005 (0.007)
Interests	-0.011 *** (0.004)	-0.0149 *** (0.00556)	-0.008 ** (0.004)	-0.0124 ** (0.00596)	-0.010 ** (0.004)	-0.0133 ** (0.00556)	-0.007 * (0.004)	-0.0104 * (0.00622)	-0.010 ** (0.004)	-0.014 ** (0.006)	-0.007 * (0.004)	-0.011 * (0.006)
Urbanization	-0.044 (0.169)	-0.003 (0.012)	-0.029 (0.321)	-0.002 (0.024)	-0.025 (0.143)	-0.002 (0.010)	-0.010 (0.298)	-0.001 (0.022)	-0.003 (0.139)	0.000 (0.010)	0.008 (0.290)	0.001 (0.022)
PopulationDensity	1.18E-05 (3.03E-05)	0.001 (0.003)	-9.86E-05 *** (2.57E-05)	-0.011 *** (0.003)	1.55E-05 (2.17E-05)	0.002 (0.002)	-9.33E-05 *** (2.59E-05)	-0.010 *** (0.003)	1.79E-05 (2.49E-05)	0.00183 (0.00258)	-9.18E-05 *** (2.50E-05)	-0.0101 *** (0.00277)
IncomeInequality	-1.262 * (0.667)	-0.0131 * (0.00686)	-1.360 (0.830)	-0.0152 (0.00929)	-1.412 *** (0.482)	-0.0144 *** (0.00474)	-1.540 ** (0.705)	-0.0170 ** (0.00771)	-1.447 *** (0.515)	-0.015 *** (0.005)	-1.569 ** (0.694)	-0.017 ** (0.008)
GDPperCapita	-2.04E-06 (3.17E-06)	-0.007 (0.011)	2.15E-06 (4.41E-06)	0.008 (0.016)	1.30E-06 (2.75E-06)	0.004 (0.009)	5.96E-06 * (3.35E-06)	0.021 * (0.012)	7.25E-07 (3.30E-06)	0.002 (0.011)	5.56E-06 * (3.35E-06)	0.020 * (0.012)
GDPperCapitaGrowth	-0.003 (0.004)	-0.00122 (0.00177)	-0.008 * (0.005)	-0.00371 * (0.00202)	-0.004 (0.004)	-0.00146 (0.00166)	-0.009 ** (0.004)	-0.00395 ** (0.00191)	-0.004 (0.004)	-0.00141 (0.00172)	-0.009 ** (0.005)	-0.00392 ** (0.00194)
ChangedBallotPapers					0.913 *** (0.248)	0.023 *** (0.006)	1.068 ** (0.466)	0.030 ** (0.013)	0.826 *** (0.271)	0.021 *** (0.007)	1.004 ** (0.472)	0.028 ** (0.013)
Latin	0.108 ** (0.048)	0.022 ** (0.010)	-0.007 (0.070)	-0.002 (0.015)	0.235 *** (0.052)	0.048 *** (0.011)	0.139 (0.108)	0.030 (0.024)	0.212 *** (0.055)	0.0435 *** (0.0113)	0.122 (0.110)	0.0265 (0.0240)

(Continued on next page)

(Table 3 continued)

TurnoutM					2.214 ***	0.065 ***	2.255 ***	0.068 ***
					(0.387)	(0.005)	(0.457)	(0.007)
Seats x TurnoutM					0.045 ***		0.035	
					(0.017)		(0.024)	
N	17328	17328	17328	17328	17328	17328	17328	17328
Pseudo-R2	0.143	0.118	0.144	0.120	0.145	0.145	0.120	0.120
Brier	0.196	0.202	0.196	0.202	0.2	0.2	0.202	0.202
Log-Likelihood	1875.83	1535.95	1888.44	1554.19	1893.18	1893.18	1557.06	1557.06

*** 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 are given in parenthesis below the coefficient. Discrete effects 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 4: Divergence between members of parliament and median voter - BMA results

	MP#CH			MP#District		
	Cond. Mean (Cond. Sd.)	Sign Test	Inclusion Probability	Coefficient	Sign Test	Inclusion Probability
Intercept	-1.671 (0.308)	0.00	100.0	0.636 (0.401)	0.00	100.0
Seats	0.01 (0.002)	0.00	100.0	0.006 (0.002)	0.00	89.1
Canton=CH	-0.65 (0.062)	0.00	100.0	-0.853 (0.056)	0.00	100.0
YesDiff	1.833 (0.4)	0.00	100.0	0.617 (0.382)	0.37	1.6
Turnout	2.342 (0.23)	0.00	100.0	2.554 (0.222)	0.00	100.0
RefObligatory	-0.475 (0.054)	0.00	100.0	-0.53 (0.053)	0.00	100.0
RefInitiative	-0.344 (0.042)	0.00	100.0	-0.249 (0.038)	0.00	100.0
PartySVP	0.06 (0.052)	1.00	0.4	-0.222 (0.053)	0.00	99.5
PartyFDP	-0.492 (0.058)	0.00	100.0	-0.322 (0.06)	0.00	100.0
PartySP	1.118 (0.046)	0.00	100.0	0.885 (0.047)	0.00	100.0
PartyGPS	1.231 (0.092)	0.00	100.0	0.951 (0.086)	0.00	100.0
NoPG	0.369 (0.083)	0.00	99.7	0 (0)	1.00	0.0
Age	0 (0)	1.00	0.0	0 (0)	1.00	0.0
Gender	-0.125 (0.044)	0.00	28.8	-0.056 (0.043)	0.37	1.0
Interests	-0.01 (0.003)	0.00	85.7	-0.01 (0.003)	0.00	85.3
Urbanization	-0.143 (0.095)	1.00	0.6	0.305 (0.107)	1.00	0.7
PopulationDensity	0 (0)	1.00	0.5	0 (0)	0.01	16.5
IncomeInequality	-1.298 (0.45)	0.00	27.6	-0.725 (0.483)	0.37	1.4
WealthInequality	-0.327 (0.397)	1.00	0.3	-2.311 (0.444)	0.00	99.5
GDPperCapita	0 (0)	0.02	5.3	0 (0)	1.00	0.4
GDPperCapitaGrowth	-0.017 (0.005)	0.00	83.7	-0.014 (0.005)	0.00	55.8
ChangedBallotPapers	0.504 (0.21)	0.00	11.8	0.449 (0.294)	0.18	1.7
AgainstPartyLine	1.3 (0.063)	0.00	100.0	1.026 (0.061)	0.00	100.0
ElectionYear	0.427 (0.047)	0.00	100.0	0.281 (0.046)	0.00	100.0
RefSameDay	0.036 (0.01)	0.00	88.2	0 (0)	1.00	0.0
Latin	0.113 (0.056)	0.10	1.4	0.082 (0.047)	0.37	2.0

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 (3) 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. BMA results were obtained using the software of the R Project for Statistical Computing with the BMA package.