



Center for Research in Economics, Management and the Arts

# Testing the Median Voter Model and Moving Beyond its Limits: Do Characteristics of Politicians Matter?

Working Paper No. 2013-05

CREMA Südstrasse 11 CH - 8008 Zürich [www.crema-research.ch](http://www.crema-research.ch)

# Testing the Median Voter Model and Moving Beyond its Limits: Do Characteristics of Politicians Matter?#

Marco Portmann  
(University of Fribourg)

David Stadelmann  
(University of Bayreuth and CREMA)

March 01, 2013

## Abstract

We exploit a natural measure of congruence between politicians and their constituency's preferences to directly quantify the extent of legislative shirking and evaluate the mechanism of the median voter model. The median voter model explains the behavior of politicians with respect to revealed preferences of their constituency about 18.8 percentage points better than a random decision benchmark. However, it fails to account for a substantial part of its theoretical prediction of convergence. Nevertheless, competition for voters under majority rule crowds out individual characteristics and party affiliations as potential factors which explain legislative shirking.

**Key words:** Constituents' Preferences, Median Voter Model, Political Economy.

**JEL Classification:** D7, H7.

---

# Acknowledgements: We would like to thank Mario Jametti and Reiner Eichenberger for illuminating discussions.

*Contact:* Marco Portmann, University of Fribourg, Department of Economics, Bd. de Pérolles 90, 1700 Fribourg (Switzerland), marco.portmann@unifr.ch

David Stadelmann, University of Bayreuth, RW Building I, Room 1.0 02 148, Universitätsstraße 30, 95447 Bayreuth (Germany), david.stadelmann@uni-bayreuth.de; CREMA - Center for Research in Economics, Management and the Arts, Switzerland

## 1 Introduction

The median voter model is a central theoretical building block of numerous theoretical models of the behavior of politicians and policy choices. Theories on the size of government, taxation or redistribution often rely on the median voter model as a foundation (see, e.g., Romer 1975 or Meltzer and Richard 1981 for seminal papers and Persson and Tabellini 2000 or Mueller 2003 for applications). Unfortunately, the median voter model is at odds with empirical evidence and measuring the median voter's position is highly controversial.<sup>1</sup> The extent to which politicians' policy choices actually reflect the median voter's preferences and potential reasons for legislative shirking are subject of a vivid and unresolved scientific discourse.<sup>2</sup>

Exploiting a unique institutional setting, we cannot only directly evaluate the extent to which politicians deviate from the median voter, but can also analyze if electoral competition crowds out individual characteristics as explanatory factors for divergence. Swiss parliamentary representatives cast final votes on laws and constitutional amendments. However, all parliamentary decisions may be subject to a popular referendum and citizens can advance constitutional amendments themselves through initiatives. Thus, Swiss voters reveal their preferences regularly in referenda by ranking policy proposals against the status quo (see Schneider et al. 1981; Frey 1994, 1997). Notably, politicians and citizens vote on precisely the same and identically worded pieces of legislation and each referendum represents as a single policy dimension. We obtain a direct and natural measure of whether politicians correspond to the revealed preferences of the majority of their constituents by matching politicians' decisions with the preferences of their constituencies. As representatives of the Swiss upper house (Council of States) are elected by majority rule, the basic median voter theorem predicts that their decisions should represent median voter preferences of their constituency independently of their individual characteristics and party affiliations.

Empirical results indicate that politicians reflect the median voter's preferences in 68.8% of the full set of analyzed referenda from 2008 to 2012. Therefore, the explanatory power of the median voter model is about 18.8 percentage points and significantly higher than predictions from a random decision benchmark. However, about 31.2% of the level of

---

<sup>1</sup> See, e.g., Gouveia and Masia (1998) or Screvini (2012) with respect to predictions on redistribution, and Kenny and Lotfinia (2004) or Gerber and Lewis (2004), among others, concerning convergence in general.

<sup>2</sup> Padovano (2012) provides a current and extensive review of the literature on the median voter model and presents alternative theories to understand deviations from the model's predictions.

congruence remains unexplained which indicates that deviations from the median voter's preferences are rampant and variation of legislative shirking levels between politicians is large.

Motivated by observed variations of congruence levels and recent research which shows that individual characteristics of politicians may affect parliamentary decisions,<sup>3</sup> we examine whether divergence between the median voter and majority elected representatives depends on individual characteristics. We explain actual congruence levels between representatives' choices and median voter preferences by individual characteristics including age, gender, place of birth, marital status, education, etc. as well factors linked to politics and the parliamentary process such as party affiliations and time in office. Results show that none of these factors explains existing divergence from the median voter's preferences, i.e., legislative shirking is independent from politicians' individual characteristics. Further tests using Bayesian Model Averaging (BMA) substantiate this finding.

Our analysis shows that the median voter model often fails to predict actual policy outcomes correctly and the model's driving force of electoral competition is only capable of achieving marginal convergence. Nevertheless, individual factors such as personality, party affiliations, etc. do not explain any existing differences between politicians regarding their level of congruence with the median voter's preferences. Hence, electoral competition seems to crowd out the influence of individual characteristics as explanatory variables when analyzing the behavior of politicians towards the majority of their constituents.

The remainder of this paper is structured as follows: Section 2 discusses the related literature. Section 3 introduces the institutional setting and the data. Section 4 presents our empirical results focusing on overall congruence between members of parliament and the median voter followed by evidence that divergence is independent from individual characteristics and party affiliations. Finally, section 5 offers concluding remarks.

---

<sup>3</sup> See, e.g., Ågren et al. 2006 for general socio-economic characteristics, Washington (2008) for the influence of having daughters as a member of parliament their attitudes toward female issues, Padovano and Ricciuti (2009) for the effect politician quality on economic performance and Freier and Thomasius (2012) for the effect mayor characteristics on public finances.

## 2 Related literature

### 2.1 Divergence from the median voter

Downs (1957) seminal contribution highlights the conditions under which the force of competition leads to convergence of politicians to the median voter's preferences. The elegance of the median voter model and its clear cut prediction has led to many theoretical contributions analyzing policy consequences under the assumption that policy choices reflect the median voter's preferences.<sup>4</sup> Unfortunately, empirical evidence points against convergence and legislative shirking seems to exist. Evidence against the median voter hypothesis is derived from different sources.

If the median voter's preferences were decisive for policy choices then macro aggregates should also correspond to the median voter's preferences regarding these aggregates. This is usually not the case as numerous studies indicate: For instance, using US panel data Gouveia and Masia (1998) test an extended version of the Meltzer and Richard (1981) model but find little evidence to support the predictions. More recently, Brunner and Ross (2010) conclude for U.S. local spending that the income of 40th percentile voter is relatively more important than the median.

Other branches of the literature put forward evidence against the median voter model by examining parliamentary roll calls. An extensive body of literature is based on scores issued by interest groups like the "Americans for Democratic Action" (ADA). The respective interest group usually chooses a subset of roll call votes they consider to reflect well their own ideological position, often measured on a liberal-conservative scale. Then representatives' scores are calculated by comparing parliamentarians' votes with interest group positions.<sup>5</sup> Early contributions such as Kau and Rubin (1979), Kau et al. (1982), Kalt and Zupan (1984) and Peltzman (1984) investigated congressional shirking and the role of ideology by means of ADA scores. Reviews are provided by Lott and Davis (1992), Kau and Rubin (1993) as well as Bender and Lott (1996).

Instead of using interest group assessments, one-dimensional representations of representatives' roll calls may be directly elicited from voting data by means of statistical scaling methods. Recent literature draws on the NOMINATE method pioneered by Poole and

---

<sup>4</sup> For classical papers and first applications see Romer (1975) or Meltzer and Richard (1981). For extensive discussions of the median voter theorem, theoretical extensions and alternatives see Grofman (2004), Padovano (2012) or the masterly volumes by Persson and Tabellini (2000) or Mueller (2003).

<sup>5</sup> The use of interest group ratings has been criticized (see Snyder 1992, among others) as they often focus on polarizing political issues.

Rosenthal (1985, 1997). The method bases on the assumption that politicians maximize their own utility function by choosing the alternative closest to their ideal points when voting on policy proposals. Similar techniques have been applied, among others, by Heckman and Snyder (1997), Snyder and Groseclose (2000), Ansolabehere et al. (2001).

The literature based on ADA scores, NOMINATE scores and similar scaling techniques generally finds evidence against the convergence, i.e., against the median voter hypothesis, and explores alternatives to the median voter model (see Bullock and Brady 1983, Poole and Rosenthal 2007, Erikson and Wright 1997, Fiorina 1974, Grofman et al. 1990 or Green and Shapiro 1994). This literature is summarized by Grofman (2004).

The identification of voter preferences constitutes the second central pillar for a direct test of the median voter model. Lott and Davis (1992) argue that comparing representatives' positions against each other without including a measure for the median voter's position may allow for a test of convergence but no conclusions can be drawn if and how well the median voter is represented and about the extent of legislative shirking. Representatives may gather around one single point which is far off the median voter's position. At the same time, observing dispersed positions of politicians may actually imply higher congruence. Put simply, politicians may rally 'round the "wrong" flag.

When median voter preferences are accounted for, it is commonly achieved by including a number of district characteristics as right-hand-side variables in estimations explaining representatives' voting behavior. Ardoin and Garand (2003) note that scholars mostly rely on demographic variables and presidential election results in the United States as a potential proxy for district ideological orientation. The interpretation of results is, thus, sensitive to the selection of variables, e.g., whether demographic variables only, socio-economic variables or even variables reflecting other proxies for ideology are included.

To address the problem of measuring voter positions Gerber and Lewis (2004) draw on voting data from Californian referenda and transform them to a one-dimensional scale. They then analyze the correlation of approximated county median voter positions with legislator NOMINATE scores. Their results indicate that a bare-bones median voter hypothesis has limited power when explaining the scores of legislators. However, since voters and legislators are not measured on the same scale, the constructed scores are not directly comparable and "no stronger predictions than monotonicity can be made" (Gerber and Lewis 2004, p. 1375). This is a common issue for many studies trying to construct median voter positions which are not measured on the same scale as representatives' positions (see, e.g., Achen 1977 or Matsusaka 2001, 2010 for cautioning remarks and Gerber 1996, 1999 for contributions bearing mind of

this issue). The literature on the empirical quality of the median voter framework and its predictions continues to grow as does the literature on the existence and the extent of legislative shirking.

Our contribution overcomes measurement issues by using revealed constituents' preferences from referenda for which directly comparable parliamentary decisions exist. Only very few studies performed a referendum by referendum comparison between voters and representatives. Using three decisions on "sin" issues, Hersch and Dougall (1988) find that a one percent change in the constituent share of acceptance is associated with a 1.7 to 6.3% increase in the probability that a member of parliament in Texas also accepted the corresponding bill. Garret (1999) analyzed a single referendum on a lotteries and corresponding roll calls. He suggests that 68% of legislators in the West Virginia House of Delegates voted in accordance with their constituency's preferences. The match between referendum decisions and legislators' roll call votes has been revived for large datasets by Stadelmann et al. (2012, 2013), Portmann et. al (2012), and Carey and Hix (2013). Recently, Brunner et al. (2013) also employed a broad set of referenda in California to investigate effects of income on representation.

## **2.2 Beyond the median: Effects of individual characteristics**

The evidence against the median voter model's predictions has led to an extensive body of literature exploring potential theoretical alternatives to and within the Downsian vision of political competition.<sup>6</sup> Starting from the premise that candidates face certain centripetal forces, scholars study modifications and extensions to the original Downsian framework (see, e.g., Witman 1983; Calvert 1985; Mueller 2003; Padovano 2012).<sup>7</sup> Within the median voter framework several contributions study the influence of candidate's valence, i.e., individual characteristics which are not directly related to policy outcomes. If voters consider such aspects

---

<sup>6</sup> In comparison, citizen candidate models (see Osborne and Slivinsky 1996; Besley and Case 1997) suggest that candidates running for an election may stick to their personally preferred policy which is supposed to make them credible. Voters then select their most preferred candidate. While the mechanisms between the citizen candidate and the median voter framework are different both may generate similar policy outcomes under specific institutional conditions.

<sup>7</sup> Carey (2007) discusses a number of potential factors influencing divergence. Eusepi and Wagner (2012) argue that parliamentary assemblies may deviate from voters' preference because they may follow the notion of a "monopolistic republic". Jottier et al. (2012) highlight the importance of imperfect information for real-world politicians.

when voting, politicians have a potential leeway to shirk and from the median voter's position (see, e.g., Groseclose 2001; Zakharov 2008).

In empirical studies individual characteristics of politicians have been found to influence electoral success (see, e.g., Armstrong and Graefe 2011). Washington (2008) shows that having daughters affects US congresspersons' attitudes towards women's issues. Svaleryd (2009) finds that the share of women in Swedish local councils affects local public expenditure patterns as spending on childcare and education relative to elderly care increases in the share of women within the local council.

Hayo and Neumeier (2012) analyze the German Länder and show that prime ministers tend to support more the social class in which they were socialized. In particular, they provide evidence that leaders with a poorer background spend relatively more on issues favoring the poor. In line with this evidence, Jochimsen and Thomasius (2012) study the development of public deficits in the German Länder and show finance ministers who gained financial expertise prior to their appointment achieve lower deficits. Gagliarducci and Nannicini (2010) find that higher wages attract more educated candidates which in turn sizes down government by improving internal efficiency. They exploit a regression discontinuity in Italian municipalities with more than 5000 inhabitants where mayors' wages increase discontinuously.

Brändle and Stutzer (2010a) show that stricter incompatibility rules negatively affect the share of public servants in the parliaments of the German Bundesländer while compensation for having to hold one's office in absence has a positive influence. Analyzing the effects of public servants in parliament, Brändle and Stutzer (2010b) find evidence that the share of public servants increases the number of submitted interpellations.

Ågren et al. (2006) draw on a survey of Swedish voters who indicated their preferences on public spending before three elections from the late 60ies to the early 90ies. They then compare politicians with different socio-economic characteristics such as age, gender, educational level and marital status with voters having similar characteristics. Interestingly, their results show that politicians with similar socio-economic characteristics as voters exhibit preferences for significantly higher levels of spending on locally provided services.

While the above articles highlight the importance of politicians' individual characteristics in politics, none of them directly analyzes whether politicians' characteristics have an influence on the general level of legislative shirking or convergence to the median voter and whether political decisions correspond at all to the median's preferences as done in the present contribution.



### 3 Institutional setting and data

#### *Measuring congruence between representatives and voters*

Our setting allows us to directly match revealed preferences of constituents with decisions of majority elected representatives on the very same issues. This results in a natural measure of congruence to evaluate the extent of legislative shirking and the mechanism of the median voter model. We also analyze whether individual characteristics of politicians explain deviations from the median voter's preferences.

Switzerland has a bicameral parliament. The 46 members of the upper house of parliament, Council of States ("Ständerat" in German), are elected by majority rule.<sup>8</sup> They serve four-year terms without term limits and are elected in 26 electoral districts, the Swiss cantons (sub-national jurisdictions). For historical reasons, 20 districts hold each two seats and the other six are single-member districts. Parties and elections are decentralized, i.e., candidates are appointed by cantonal sections of the parties. Members of the Council of States are seen as "representatives of the Cantons", according to the Swiss Constitution, article 150(1), i.e., they are supposed to represent their constituency's preferences in parliament.<sup>9</sup> This view is widely shared by voters and politicians themselves. Thus, politicians should represent the district median voter (the majority) who elects them and the Council of States fulfills the requirements to test the median voter model.

To identify representatives' behavior towards their constituency we draw on 33 final roll call votes, which are most proximate to the adoption of governmental policies (see Krehbiel 1993). While the total result of the decisions in the Council of States is always made public, individual roll calls are only registered if a majority of the members demands so before the respective decision. However, since winter 2006 a camera records the Council's debates for media coverage. The same camera records the voting decisions, i.e., it records if members of the Council of States hold up their hands or not to vote yes or no. We identified for all videos published on the parliament's webpage, whether representatives attended the session and if so, we recorded their individual voting behavior. Representatives may be absent or abstain from

---

<sup>8</sup> The only exception is the Canton of Jura where the two representatives are elected by proportional voting. Omitting them does not change the results. Citizens of the Canton of Neuchâtel voted in favor of changing the electoral system from majority voting to proportional representation on September 26, 2011; all parliamentary decisions in our sample took place before this date.

<sup>9</sup> In comparison members of the proportionally elected lower house (National Council) are more widely seen as "representatives of the People".

voting due to sickness, voyage, political duties, professional bias, or other responsibilities (see Brunner et al. 2013 or Stadelmann et al. 2013).<sup>10</sup> There is no systematic component to absent politicians in the data regarding personal characteristics and party affiliations.

Switzerland features a system of direct democracy also at the national level. After parliament adopts a new bill, citizens are granted the right to collect at least 50,000 signatures out of approximately 4.9 million registered voters within 100 days in order to ask for a *facultative referendum*. Any new law or law change proposed by parliament can be rejected if 50% of voters decide against it. If parliament intends to alter the constitution a *mandatory referendum*, for which no collection of signatures is required, automatically takes place. Acceptance requires a majority of all voters nationwide as well as the majority of voters in eleven and a half cantons.<sup>11</sup> Finally, by collecting 100,000 signatures citizens may advance a so called *initiative*, a referendum on a constitutional amendment drafted by themselves. Hence, citizen can set the agenda by addressing issues not raised by parliament through initiatives. Voters accept or reject policy proposals in referenda and thereby reveal their preferences by ranking proposals against the status quo (Schneider et al. 1981; Frey 1994, 1997; Matsusaka 2010).

Representatives and their constituents vote on identically worded pieces of legislation: For mandatory and facultative referenda citizens are demanded to confirm the amendments enacted by parliament while for initiatives parliament votes before a referendum takes place to indicate whether parliament agrees or disagrees with the content of the initiative.<sup>12</sup> Thus, our setting allows us to perform a vote by vote comparison on 33 policy issues over a broad set of topics between representatives and voters which features important advantages. While Achen (1977), Matsusaka (2010) and Hug (2011) highlight difficulties when voters' positions and politicians' decisions are not measured on the same scale, we have the distinct possibility to directly observe choices of politicians and their constituents on the very same issues. Instead of having to estimate preferences from constituency characteristics, we employ revealed median voter

---

<sup>10</sup> In a small number of cases the video stream's quality does not allow identification of all individual votes. Our analysis includes all roll call votes on final votes since footage from the cameras in the Senate's meeting room is available.

<sup>11</sup> For historical reasons, cantons which have a single representative in the Council of States are counted as one half when calculating the number of cantons in which voters have accepted a referendum.

<sup>12</sup> Parliament may also elaborate a *counter proposal* to the initiative which is then put on the ballot together with the initial initiative.

preferences from referenda decisions. Referenda confront voters with the same question which politicians face in their roll call vote.

The use of a direct measure of congruence relying on referenda and roll call votes has been advocated recently by Hermann and Leuthold (2007) for Switzerland and suggested by Matsusaka (2010) for the United States. In thematically different contributions Stadelmann et al. (2013) and Portmann et al. (2012) consider issues related to using a subset of parliamentary decisions and discuss how this congruence measure generalizes.<sup>13</sup> Carey and Hix (2013) highlight the advantages of such a measure and use the same setting of Swiss referenda data combined with roll call votes from the lower house to show that district magnitude exerts a non-monotonic relationship on congruence between members of parliament and voters. In a research note Stadelmann et al. (2012) present first results on the quality of the median voter model with a limited set of referenda and roll call votes. Brunner et al. (2013) apply the same concept of a congruence measure to Californian data, discuss potential issues related to such a direct measure, and suggest that results generalize to other US states. We recognize that direct evidence on the generalizability of results with this congruence measure for other countries or regions cannot be provided. Nevertheless, similar to the above literature, we expect inferences based on this measure to be reliable and to provide further insights into the workings of democracies and the factors influencing the quality of political representation.

#### *Data and variables employed*

The present analysis extends the limited sample from Stadelmann et al. (2012) to all available 33 referenda from 2008 to 2012 covering social, economic, demographic, regional and defense issues among others (the original text of each referendum's topic is given in a supplement). We also examine whether individual characteristics have an effect on the level of legislative shirking or explain divergence from the preferences of the median. All individual characteristics are collected from parliament's official homepage which provides a short biography for each member of the Council of States. Table A1 offers descriptive statistics.

As common in studies on roll calls and the effects of individual characteristics, we analyze age (*Age*) and age squared (*Age squared*) at the time of voting in parliament. Age may indicate the levels of experience, networks and incumbency effects. As many effects of experience or incumbency do not necessarily follow from biological age but from the time spent in parliament and experience accumulated in office, we also include time in office in years (*Time in office*

---

<sup>13</sup> For the proportionally elected lower house only, Portmann et al. (2012) focus on the effect of district magnitude and Stadelmann et al. (2013) analyze the quality of representation.

and *Time in office squared*) at the time of voting. Finally, age potentially picks up cohort effects, for instance, due to different socialization over time. We capture this effect by a binary variable which indicates whether a member of the Council of States was older than 18 in the year 1968 (*Pre 1968*). This date is chosen as the end of the 1960ies and the beginning of the 70ies generally marked a period of societal changes.<sup>14</sup>

We also analyze the effect of gender, having children and being married on the way majority elected politicians represent their median voters by including the three binary variables *Is woman*, *Has children* and *Is married*. Moreover, higher education is generally seen as a measure of competence of a politician (see Jochimsen and Thomasius 2012 or Padovano 2012). Therefore, we analyse formal education for members of the Council of States captured by the identifier *Master/Doctor* which indicates whether a representative's highest degree is a master or a doctoral degree. Similarly to other countries, serving in the army is often considered a sign of quality and civic duty in Switzerland. Moreover, professional or private relationships and networks can be formed and higher army positions might be considered as a sign for leadership skills. Therefore, we include a binary identifier for higher positions in the army (*Army officer*) as well as a binary variable for those who did not serve in the army (*No army*).

More detailed knowledge of a constituency and stronger interactions with citizens might be in order to represent a constituency's preferences.<sup>15</sup> Therefore, we include an identifier for representatives who were born outside their constituency (*Born outside constituency*).

Although, the median voter model predicts that all politicians should converge to the median voter's position independently of their party affiliation we analyse potential influences of party affiliation on the level of congruence captured by binary variables for left and right party affiliations (*Left party affiliation* and *Right party affiliation*). Left party affiliation comprises the Socialists and the Greens. The Swiss People's Party is considered a right wing party. Remaining parties (Christian Democratic Party, the Liberals, the Green Liberals and the Conservative Democratic Party) stem from the center and form the reference category.

---

<sup>14</sup> For Switzerland, this period is also of particular significance as women suffrage at the national level was introduced in 1971.

<sup>15</sup> Eichenberger and Funk (2009) argue, in contrast, that a deregulation of the market for politicians and potential migration of politicians may improve convergence.

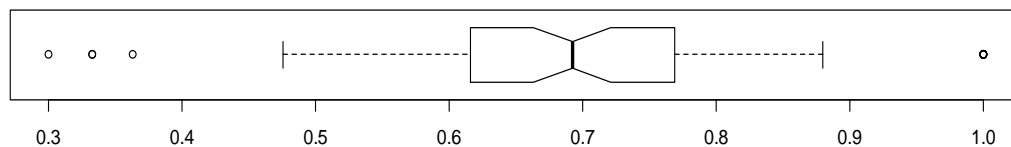
## 4 Empirical results on convergence and explaining divergence

### 4.1 Level of congruence with the median voter

We can directly identify congruence between majority elected members of the Council of States and median voters in their respective constituency by comparing representatives' individual final votes to their constituency's majority decision in the corresponding referendum. Thus, as dependent variables we employ an indicator variable,  $MP = \text{Median voter}$ . The indicator takes the value of one if a member of the Council of States (MP) votes in the final roll call vote in line with the median voter of her constituents in the respective referendum, and zero if she does not.

This indicator variable allows us to directly evaluate the quality of the median voter model and to answer the question if politicians' policy choices actually reflect the preferences of the majority, which includes the median voter, or whether legislative shirking is prevalent. Figure 1 represents average congruence levels for all individual politicians in our sample.

**Figure 1: Probability of congruence with the median voter**



**Notes:** The Box-Whisker-Plot is based on votes of individual members of the Council of States with the preferences of the majority of their constituents expressed in referenda. The whiskers extend to the most extreme data point which is no more than 1.5 times the interquartile range from the box. Dots represent observations outside the interquartile range.

Over the period analyzed individual representatives of the Council of States voted at least once on an issue which was subject to a referendum. Congruence levels with the median voter range from 30.0% to full congruence of 100.0%. While the prediction of full convergence of the median voter does not seem to occur in general, there is substantial variation of congruence levels between members of the Council of States which makes a case for a potential influence of individual characteristics to explain existing divergence patterns. Table 1 reveals details and test statistics which show how often members of the Council of States vote in line with the median voter in their constituency and how often they shirk.

Column (1) in panel (a) indicates the average match for all referenda. We observe that the probability of a match between a representative and her median voter amounts to 68.8%.<sup>16</sup> Thus, the congruence level of majority elected politicians with the median voter is approximately 18.8 percentage points higher than the benchmark of random voting, i.e. 50%. However, approximately 31.2% of congruence remains unexplained and we may not conclude that majority elected politicians do not deviate significantly from the median voter, i.e., full convergence is clearly not observed and legislative shirking is prevalent.

**Table 1: Congruence between representatives and the median voter**

	<i>All districts (1)</i>	<i>Districts with one representative (2)</i>	<i>Districts with two representatives (3)</i>
<i>Panel (a): all referenda decisions</i>			
Congruence with median voter	0.688*** (13.724)	0.692*** (5.187)	0.687*** (12.700)
Observations (referenda)	1152 (33)	156 (33)	996 (33)
<i>Panel (b): excluding close referenda decisions</i>			
Congruence with median voter	0.735*** (16.333)	0.750*** (6.506)	0.7330*** (14.987)
Observations (referenda)	943 (33)	128 (32)	815 (33)

**Notes:** The table presents the probability of a match between decisions of members of the Council of States in parliament and the majority of constituents in referenda (# of matches divided by total # of decisions). Panel (b) excludes referenda where 45 to 55% of constituents voted "yes". The t-value in parenthesis tests whether the mean of the matches is significantly different to 50 percent. \*\*\*, \*\*, and \* indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Six districts are represented by one delegate while the other districts hold two seats in the Council of States. We analyze two subsamples with cantons with only one and two majority elected representatives in columns (2) and (3) in panel (a).<sup>17</sup> Congruence for single-member districts amounts to 69.2% and is not significantly larger than the congruence level of 68.8% for two-member districts.

Majorities accepting or rejecting a referendum can be larger than 50%. While a strong interpretation of the median voter model would predict that majority elected politicians should always match the majority's position, it is realistic to expect that politicians have more difficulties in matching the majority when results are close (see Huder et al. 2011 and Jottier

<sup>16</sup> This quantitative effect closely corresponds to Garret (1999) who analyzes essentially the same setting but with only a single referendum on a lottery issue. While the set of referenda increased by more than one third compared to Stadelmann et al. (2012), congruence levels change by less than one percentage point indicating the high robustness of congruence levels.

<sup>17</sup> McKelvey (1986) and Goff and Grier (1993) suggests that politicians' positions may differ in one and two member districts when the policy space is multi-dimensional and voter preferences are heterogeneous.

et al. 2012). Accepted referenda are accepted on average by 63.5% of district voters while rejected referenda are rejected by 65.1%. Hence, politicians usually have the simple task of predicting the outcome of decisions made by large majorities within their constituency. Nevertheless, we acknowledge that referendum results closer to 50% may have led to wrong choices by representatives although they intended to represent the median voter of their constituency. In panel (b) we drop referendum results where the share of yes votes lies between 45 and 55% which allows an error margin of 10 percentage points for politicians. As expected, we observe that the level of congruence rises to 73.5%. Thus, the match between representatives and median voters is less than five percentage points' higher but still 26.5 percentage points off the pure median voter model's prediction. Again, there is only a minor difference between single-member and two-member districts as shown in columns (2) and (3).

To sum up, a direct analysis of congruence between observed median voter preferences and politicians' decisions reveals that the median voter framework has some explanatory power over a random voting assumption. However, policy choices only partially reflect the preferences of the median voter and full convergence is not observed. Large parts of the level of congruence remain unexplained and legislative shirking from the median voter's preferences exist. Moreover, congruence levels of politicians vary considerably.

## 4.2 The influence of individual characteristics

To investigate whether politicians tend to converge regarding the way they represent the preferences of the median and to understand potential factors driving legislative shirking, we employ a logistic model. We analyze if individual characteristics have an effect on the probability  $P(MP = Median\ voter)$  that members of the Council of States correspond to the median voter's preferences. The basic estimation equation is as follows:

$$P(MP = Median\ voter) = \Lambda(\sum_j \alpha_j x_j + \varepsilon)$$

where  $\Lambda$  is the logistic function  $\Lambda(X) = e^X / (1 + e^X)$ , individual characteristics are denoted by  $x_j$ , and their effects on convergence/divergence is captured by the coefficients  $\alpha_j$ . A significant positive coefficient  $\alpha_j$  indicates that the respective characteristic increases the probability of convergence between individual members of the Council of States with their median voter while a significant negative coefficient  $\alpha_j$  explains divergence from the median voter.

*Congruence levels do not depend on individual characteristics*

Table 2 presents the main findings on the way politicians represent the majority's preferences. For each of the specifications, we report robust standard errors clustered by constituency.<sup>18</sup>

**Table 2: Individual characteristics do not explain divergence from the median voter**

	(1)	(2)	(3)	(4)	(5)
Is women	0.0501 (0.1470)	0.0758 (0.1460)			0.0404 (0.2481)
Age	-0.0100 (0.0831)				0.0712 (0.0880)
Age squared	2.0e-05 (8.0e-04)				-7.3e-04 (8.1e-04)
Pre 1968		-0.0960 (0.1270)			
Born outside constituency	-0.0982 (0.1165)	-0.0944 (0.1140)			-0.1238 (0.1070)
Master/Doctor			0.1362 (0.1279)		0.1396 (0.1529)
No Army			-0.0847 (0.2764)		-0.0501 (0.2936)
Army officer			-0.1944 (0.2781)		-0.1830 (0.2797)
Is married			0.1561 (0.1308)		0.1882 (0.1349)
Has children			0.0146 (0.1341)		0.0555 (0.1453)
Time in office				0.0056 (0.0255)	0.0065 (0.0294)
Time in office squared				-4.6e-04 (0.0010)	-1.6e-04 (0.0011)
Left party affiliation				0.0027 (0.1523)	-0.0174 (0.2060)
Right party affiliation				-0.1482 (0.1316)	-0.1866 (0.1494)
Intercept	1.3171 (2.1392)	0.8441*** (0.0862)	0.6985** (0.3218)	0.8146*** (0.1256)	-1.0147 (2.5092)
(Pseudo) R2	0.0015	0.0015	0.0042	0.0012	0.0077
Brier score	0.2146	0.2146	0.2142	0.2147	0.2136
n. Obs.	1152	1152	1152	1152	1152

**Notes:** The dependent variable for all estimations is "MP=MedianVoter" which equals one if a representative votes in line with the majority of voters in his/her district. Robust clustered standard errors are reported throughout the table. \*\*\*, \*\*, and \* indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Specification (1) includes non-choice individual characteristics, i.e., gender, age and place of birth. We observe that none of the variables has any significant influence on the level of congruence. The same holds true when focusing on potential socialization effects in specification (2) where we replace *Age* and *Age squared* by a dummy variable indicating

<sup>18</sup> Observations are clustered by constituency in recognition of the likelihood that observations in the same constituency are not independent.



whether representatives have been 18 years of age before 1968. None of these characteristics has as a centripetal or centrifugal effect on the level of congruence.

Specification (3) advances from innate characteristics to variables also reflecting choices of politicians such as educational level, army career, marriage, and having children. Again, none of the variables exerts an influence on the level of congruence between politicians and the median voter.

Congruence may not only be influenced by individual factors but instead by factors directly related to politics. The time spent in parliament accounts for experience and might thus be correlated with existing deviations. However, neither this variable nor the squared term exhibit any important relationship as shown in specification (4). The same holds true for party affiliations. Majority elected politicians from different parties do not exhibit statistically different levels of congruence with the median voter.

In specification (5) we jointly include all individual characteristics. They all fail to provide any explanatory power for existing legislative shirking.<sup>19</sup> Thus, given average congruence levels of approximately 68.8% there are no centripetal or centrifugal forces related to the individual characteristics employed which explain divergence. Independent of their individual characteristics, politicians represent the constituents' majority equally well (badly) which suggests that the pressure of competition for voters crowds out individual characteristics as factors explaining congruence.

#### *Further evidence on independence of congruence levels*

Table 3 shows that the level of congruence with the median voter is independent of representatives' individual characteristics when focusing on two separate subsamples, including fixed effects and when applying alternative estimation techniques.

In specification (1) we focus on a subsample of members of the Council of States from parties which are also in the national government. Results indicate that the general independence of congruence levels with the median voter is not due to politicians belonging to parties which are not in government and may thus have a different leeway towards their voters. Apart from being married none of the individual characteristics turns out as having any explanatory power regarding congruence levels.

---

<sup>19</sup> Individual characteristics also have no significant explanatory power when we abstain from clustering for constituencies.

**Table 3: Robustness checks for the influence of personal characteristics**

	<i>Party in government</i> (1)	<i>Districts with two representatives</i> (2)	<i>District fixed effects</i> (3)	<i>District random effects</i> (4)	<i>Individual random / district fixed effects</i> (5)	<i>Bayesian model averaging</i>		
						<i>Inclusion probability</i> (6)	<i>Conditional mean and sd</i> (7)	<i>Sign test</i> (8)
Is women	0.0230 (0.2639)	-0.0277 (0.2209)	-0.3984 (0.2940)	0.0404 (0.2263)	-0.3984 (0.4296)	2.1	0.063 (0.16)	0.999
Age	0.0558 (0.0863)	0.0536 (0.0921)	0.2264** (0.1017)	0.0712 (0.1463)	0.2264 (0.2139)	2.7	-0.008 (0.01)	0.999
Age squared	-6.2e-04 (8.0e-04)	-4.9e-04 (8.5e-04)	-0.0023** (9.7e-04)	-7.2e-04 (0.0013)	-0.0023 (0.0019)	2.7	-7.1E-5 (8.7E-5)	0.999
Born outside constituency	-0.1303 (0.1138)	-0.1094 (0.1032)	-0.0669 (0.1476)	-0.1238 (0.1604)	-0.0669 (0.3224)	2.4	-0.088 (0.135)	0.999
Master/Doctor	0.0969 (0.1537)	0.1521 (0.1385)	-0.2254 (0.1788)	0.1396 (0.1682)	-0.2254 (0.3002)	2.2	-0.005 (0.011)	0.999
No Army	-0.0406 (0.2945)	-0.0688 (0.2805)	0.4637 (0.3026)	-0.0501 (0.3146)	0.4637 (0.5603)	2.3	-2.3E-4 (4.6E-4)	0.999
Army officier	-0.1243 (0.2899)	-0.1555 (0.2651)	0.3291 (0.3134)	-0.1830 (0.3297)	0.3291 (0.6050)	2.9	0.119 (0.134)	0.999
Is married	0.2687** (0.1356)	0.1058 (0.1397)	0.1810 (0.2287)	0.1882 (0.1953)	0.1810 (0.3789)	4.7	0.177 (0.132)	0.999
Has children	0.1052 (0.1619)	0.0596 (0.1532)	0.2622 (0.3037)	0.0555 (0.2091)	0.2622 (0.4696)	2.8	0.116 (0.132)	0.999
Time in office	0.0055 (0.0293)	0.0259 (0.0290)	0.0237 (0.0414)	0.0065 (0.0420)	0.0237 (0.0680)	2.5	-0.103 (0.139)	0.999
Time in office squared	8.2e-05 (0.0011)	-0.0012 (0.0011)	5.4e-04 (0.0020)	-1.6e-04 (0.0018)	5.4e-04 (0.0029)	2.0	0.037 (0.132)	0.999
Left party affiliation	-0.0851 (0.2329)	0.1568 (0.2073)	-0.0957 (0.2594)	-0.0174 (0.2270)	-0.0957 (0.4382)	2.0	0.038 (0.153)	0.999
Right party affiliation	-0.2183 (0.1512)	-0.1513 (0.1649)	-0.3624 (0.2157)	-0.1866 (0.2158)	-0.3624 (0.3346)	2.8	-0.154 (0.177)	0.999
Intercept	-0.5877 (2.4847)	-0.8485 (2.6257)	-5.0787* (2.7940)	-1.0147 (4.2112)	-5.0787 (6.0058)	inc	0.801*** (0.157)	0.000
(Pseudo) R2	0.0108	0.0071	0.0411	0.0017	0.0090	-	-	-
n. Obs.	1059	996	1152	1152	1152	-	1152	-

**Notes:** The dependent variable for all estimations is "MP=MedianVoter" which equals one if a representative votes in line with the majority of voters in his/her district. Robust clustered standard errors are reported throughout the table. For the Bayesian Model Averaging (BMA) results in columns (4) to (6), the coefficient and standard deviation are conditional on inclusion of the variable in the model. Column (4) gives the posterior inclusion probability of all variables. "INC" denotes variables which are included by construction in the Bayesian Model Averaging procedure. The sign-test in column (6) is the p-value of 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. BMA results were obtained using the software of the R Project for Statistical Computing with the BMA package (Raftery et al. 2011). \*\*\*, \*\*, and \* indicate a mean significance level of below 1 %, between 1 and 5 %, and between 5 and 10 %, respectively.

Similarly, we observe in specification (2) that individual characteristics do not explain divergence from the median voter's preferences in districts with two majority elected representatives. Virtually the same results are obtained when focusing on politicians from the six single-member districts (results not reported here but available on request).

Applying fixed effects for representatives is not feasible with individual characteristics which are time invariant. However, it is possible to include district fixed effects as presented in specification (3). Thereby, we control for institutional differences between the constituencies, such as differences in the strength of direct democratic institutions at the district level, which might affect the level of congruence. Apart the effect of age, we observe the same pattern as before, i.e., generally congruence levels between politicians do not depend on individual characteristics.<sup>20</sup>

Next, we employ an alternative estimation technique by using a non-linear mixed-effect model. The strength of the method is its ability to adequately deal with hierarchical data and assume interdependence of observations at a lower level, for instance, decisions by one representative, and interdependence at a second level, such as districts at the same time. We present two specifications with cluster specific random errors either at the district and the individual level in specifications (4) and (5) respectively. Again, none of the individual characteristics and party affiliations turns out significant, fostering the view that majority elected politicians represent the median voter independently of their individual characteristics.<sup>21</sup>

While the median voter model fails to fully explain congruence levels between politicians and voters, results so far suggest that individual characteristics and party affiliations have no room as factors explaining the quality of representation and legislative shirking. Using Bayesian Model Averaging (see Raftery 1995; Raftery et al. 1997), we show that these factors are not only insignificant for explaining congruence levels in our specifications but they do not even influence congruence levels over a large number of combinations of independent variables.<sup>22</sup>

---

<sup>20</sup> Instead of opting for constituency clusters there might be an argument for clustering for representatives. The number of cluster would be unreasonably high compared to the number of observations per cluster. In this case, even if clusters for representatives are used, such a change does not influence the results presented.

<sup>21</sup> Note that individual random effects estimation in in specification (5) yields identical coefficients as specification (3). Differences concern the standard errors.

<sup>22</sup> Bayesian Model Averaging is nowadays a commonly applied method to investigate issues of variable selection and to estimate the distribution of parameters over a large model space (see Raftery et al. 1997 and the follow up literature).

The central idea behind Bayesian Model Averaging is to estimate the distribution of unknown parameters of interest across a large number of different models (model space). This allows us to calculate conditional means and standard deviations which can be interpreted similarly to standard coefficients from logistic regression models. More importantly, we can calculate a posterior inclusion probability for every variable which can be interpreted as the probability that any specific variable is included in a model. Thereby, it serves as a potential indicator for the importance of the specific variables over the whole model space.<sup>23</sup> The basic results of Bayesian Model Averaging are presented in columns (6) to (8).

We include all variables considered before as well as a constant and stipulate 1/2 as the prior probability of including any variable in the model. As throughout the paper the variable explained by the BMA is *MP = Median voter*, which indicates that a member of the parliament voted in line with the majority of voters in her district. Column (6) shows the probability of inclusion, which reflects how often the respective variables turn out to be of explanatory importance when testing all models in the model space. Results show that all individual characteristics have low posterior inclusion probabilities which are even far below the prior probability of 1/2. Column (7) reports the conditional means and standard deviations over all estimates performed in BMA where the respective variables were included. None of the individual characteristics is ever significant. Finally, in column (8) we perform a Wilcoxon signed-rank test for the sign of the posterior mean conditional on inclusion. For each model estimated by BMA the sign of the variable under consideration is taken. We test whether coefficients for the same variable employed in the diverse models have the same signs as the reported posterior conditional mean. We can never reject the hypothesis that the conditional mean represents the opposite sign. Thus, individual characteristics are not only insignificant when explaining observed congruence but they have a low inclusion probability and their signs over numerous specifications are highly instable. Although the median voter model fails to converge fully, congruence levels of politicians elected under majority are independent of their individual characteristics.

---

<sup>23</sup> Further explanations on BMA and applications can be found in the literature (see Raftery 1995 and <http://www2.research.att.com/~volinsky/bma.html>).

## 5 Conclusions

The median voter model represents a central workhorse in political economy. A large amount of literature shows that the pure median voter model is at odds with empirical evidence. Some empirical findings motivated by theoretical contributions go beyond the median voter model and suggest that individual characteristics of representatives are potentially capable of explaining deviations from the median voter.

Using a natural measure of congruence between majority elected politicians and the median voter's preferences, we contribute to answering the question how politicians represent the revealed preferences of the median voter and whether individual characteristics of politicians explain existing divergence patterns. Our analysis draws on data from all 33 Swiss referenda since 2008 and the corresponding final roll call votes of majority elected members of the upper house, i.e., members of the Swiss Council of States. Since representatives in Switzerland vote on the same pieces of legislations as voters, we can perform a referendum by referendum comparison to determine whether representatives voted in line with their district's median voter.

We show that congruence between representatives and median voters amounts to 68.4% on average. Thus, the median voter framework has some explanatory power over a random voting assumption but politicians systematically deviate from the median voter. As substantial parts of the level of congruence remain unexplained, we analyze whether individual characteristics of politicians are able to explain existing levels of legislative shirking. Results of logit models with fixed effects and mixed-effects models explaining the level of congruence show that individual characteristics such as age, gender, place of birth, marital status, being parent, education, time in office and even party affiliations generally do not explain any variation in observed congruence levels.

Our results complement and extend the existing literature in important ways. On the one hand side, low levels of congruence suggest that the median voter model misses out a non-negligible part of actual behavior of politicians towards constituents and legislative shirking is prevalent. On the other hand side, electoral competition under majority rule seems to be capable of keeping politicians partly off from pursuing their own interests at the costs of the majority's preferences. Thus, while the prediction of convergence is only partly fulfilled, all representatives face equal electoral incentives and represent their constituency independently of their individual characteristics.

These findings entail two consequences for the evaluation of past research results and provide new perspectives for future research: Firstly, the median voter model is often used to predict or model policy choices such as taxes and redistribution, i.e., concerns are on the level of congruence between the preferences of the median voter and representatives. But large deviations exist with respect to the level of congruence and, thus, using the median voter model to explain policy outcomes seems critical. Secondly, however, a central insight from Downsian competition for democracy and political economic theory remains valid: Given a majority voting system, party affiliations and individual characteristics need not necessarily be considered in equilibrium because competition for voters fosters behavioral patterns of politicians regarding the level of representation of voters which are independent of individual characteristics and party affiliation.

We expect that, in particular, institutional factors outside the median voter framework might explain the level of congruence which opens a promising field for future research. The crucial point for institutions is that they symmetrically affect all representatives. With this premise, insignificant effects of individual characteristics and party affiliations reflect constrained convergence induced by the competition for the median voter in general. Nevertheless, institutional factors play a role in determining the overall level of congruence and the quality of political representation. Finally, institutional factors may interact with individual characteristics of politicians in determining effective levels of congruence.

## **Bibliography**

- Achen, Christopher H. 1977. "Measuring Representation: Perils of the Correlation Coefficient." *American Journal of Political Science*, 21(4): 805–15.
- Ågren, Hanna, Matz Dahlberg, and Eva Mörk. 2006. "Do politicians' preferences correspond to those of the voters? An investigation of political representation." *Public Choice*, 130(1-2): 137–62.
- Ansolabehere, Stephen, James M. Snyder, JR., and Charles Stewart, III. 2001. "The Effects of Party and Preferences on Congressional Roll-Call Voting." *Legislative Studies Quarterly*, 26(4): 533–72.
- Ardoin, P. J. 2003. "Measuring Constituency Ideology in US House Districts: A Top-Down Simulation Approach." *Journal of Politics*, 65(4): 1165–89.
- Armstrong, J. S. and Andreas Graefe. 2011. "Predicting elections from biographical information about candidates: A test of the index method." *Journal of Business Research*, 64(7): 699–706.

- Beate R. Jochimsen and Sebastian Thomasius. 2012. "The Perfect Finance Minister: Whom to Appoint as Finance Minister to Balance the Budget?" DIW Berlin, German Institute for Economic Research 1188.
- Bender, Bruce and John R. Lott, JR. 1996. "Legislator Voting and Shirking: a critical Review of the Literature." *Public Choice*, 87(1-2): 67–100.
- Besley, Timothy and Stephen Coate. 1997. "An Economic Model of Representative Democracy." *Quarterly Journal of Economics*, 112(1): 85–114.
- Brändle, Thomas and Alois Stutzer. 2010a. "Political Selection of Public Servants and Parliamentary Oversight." Faculty of Business and Economics - University of Basel 2010/08.
- Brändle, Thomas and Alois Stutzer. 2010b. "Public servants in parliament: theory and evidence on its determinants in Germany." *Public Choice*, 145(1): 223–52.
- Brunner, Eric J. and Stephen L. Ross. 2010. "Is the median voter decisive? Evidence from referenda voting patterns." *Journal of Public Economics*, 94(11-12): 898–910.
- Brunner, Eric J., Stephen L. Ross, and Ebonya L. Washington. 2013. "Does Less Income Mean Less Representation?" *American Economic Journal: Economic Policy* (forthcoming).
- Bullock, Charles S., III and David W. Brady. 1983. "Party, Constituency, and Roll-Call Voting in the U. S. Senate." *Legislative Studies Quarterly*, 8(1): 29–43.
- Calvert, Randall L. 1985. "Robustness of the Multidimensional Voting Model: Candidate Motivations, Uncertainty, and Convergence." *American Journal of Political Science*, 29(1): 69–95.
- Carey, John M. 2007. "Competing Principals, political Institutions, and Party Unity in legislative Voting." *American Journal of Political Science*, 51(1): 92–107.
- Carey, John M. and Simon Hix. 2013. "District magnitude and representation of the majority's preferences: a comment and reinterpretation." *Public Choice*, 154(1-2): 139–48.
- Downs, Anthony. 1957. *An economic Theory of Democracy*. New York: Harper.
- Eichenberger, Reiner and Michael Funk. 2009. "The Economics of Ethics and the Ethics of Economics: Values, Markets and the State." In ed. Geoffrey Brennan and Giuseppe Eusepi, 131–44: Elgar.
- Eichenberger, Reiner, David Stadelmann, and Marco Portmann. 2012. "A comparative analysis of the voting behavior of constituents and their representatives for public debts." *Constitutional Political Economy*, 23(3): 244–60.
- Eusepi, Giuseppe and Richard E. Wagner. 2012. "Indebted state versus intermediary state: who owes what to whom?" *Constitutional Political Economy*, 23(3): 199–212.
- Fiorina, Morris P. 1978. "Economic Retrospective Voting in American National Elections: A Micro-Analysis." *American Journal of Political Science*, 22(2): 426–43.

- Freier, Ronny and Sebastian Thomasius. 2012. "Voters Prefer More Qualified Mayors, but Does It Matter for Public Finances?: Evidence for Germany." DIW Berlin, German Institute for Economic Research 1262.
- Frey, Bruno S. 1994. "Direct Democracy: politico-economic Lessons from Swiss Experience." *American Economic Review*, 84(2): 338–42.
- Frey, Bruno S. 1997. "A Constitution for Knaves Crowds out Civic Virtues." *The Economic Journal*, 107(443): 1043–53.
- Gagliarducci, Stefano, Tommaso Nannicini, and Paolo Naticchioni. 2010. "Moonlighting politicians." *Journal of Public Economics*, 94(9-10): 688–99.
- Garrett, Thomas A. 1999. "A Test of Shirking under legislative and Citizen Vote: the Case of State Lottery Adoption." *Journal of Law and Economics*, 42(1): 189–208.
- Gerber, Elisabeth R. 1996. "Legislative Response to the Threat of Popular Initiatives." *American Journal of Political Science*, 40(1): 99–128.
- Gerber, Elisabeth R. 1999. *The populist paradox. Interest group influence and the promise of direct legislation*. Princeton, N.J: Princeton University Press.
- Gerber, Elisabeth R. and Jeffrey B. Lewis. 2004. "Beyond the Median: Voter Preferences, District Heterogeneity, and political Representation." *Journal of Political Economy*, 112(6): 1364–83.
- Goff, Brian L. and Kevin B. Grier. 1993. "On the (mis)measurement of legislator ideology and shirking." *Public Choice*, 76(1-2): 5–20.
- Gouveia, M. and N. A. Masia. 1998. "Does the median voter model explain the size of government?: Evidence from the states." *Public Choice*, 97(1-2): 159–77.
- Green, Donald P. and Ian Shapiro. 1994. *Pathologies of rational choice theory. A critique of applications in political science*. New Haven: Yale University Press.
- Grofman, Bernard. 2004. "Downs and Two-Party Convergence." *Annual Review of Political Science*, 7: 25–46.
- Grofman, Bernard, Robert G. Griffin, and Amihai Glazer. 1990. "Identical geography, different party: a natural experiment on the magnitude of party differences in the U.S. Senate, 1960-84." In *Developments in electoral geography*, ed. R. J. Johnston, Fred M. Shelley, and Peter J. Taylor, 207–17. London ;, New York: Routledge.
- Groseclose, T. 2001. "A model of candidate location when one candidate has a valence advantage." *American Journal of Political Science*, 45(4): 862–86.
- Hayo, Bernd and Florian Neumeier. 2012. "Leaders' Impact on Public Spending Priorities: The Case of the German Laender." *Kyklos*, 65(4): 480–511.
- Heckman, James J. and James M. Snyder, JR. 1997. "Linear Probability Models of the Demand for Attributes with an Empirical Application to Estimating the Preferences of Legislators." *RAND Journal of Economics*, 28: S142-S189.



- Hermann, Michael and Heiri Leuthold. 2007. "Zwischen Konsens und Polarisierung Volksabstimmungen und Parlamentsentscheide im direkten Vergleich." In *Direkte Demokratie: Bestandsaufnahmen und Wirkungen im internationalen Vergleich*, ed. Markus Freitag and Uwe Wagschal, 277–302: Lit Verlag, Münster.
- Hersch, Philip L. and Gerald S. McDougall. 1988. "Voting for 'Sin' in Kansas." *Public Choice*, 57(2): 127–39.
- Huder, Joshua, Jordan M. Ragusa, and Daniel a. Smith. 2011. "Shirking the Initiative? The Effects of Statewide Ballot Measures on Congressional Roll Call Behavior." *American Politics Research*, 39(3): 582–610.
- Hug, Simon. 2011. "Policy consequences of direct legislation theory, empirical models and evidence." *Quality & Quantity*, 45(3): 559–78.
- Jottier, Dimi, John Ashworth, and Bruno Heyndels. 2012. "Understanding Voters' Preferences: How the Electorate's Complexity Affects Prediction Accuracy and Wishful Thinking among Politicians with Respect to Election Outcomes." *Kyklos*, 65(3): 340–70.
- Kalt, Joseph P. and Mark A. Zupan. 1984. "Capture and Ideology in the Economic Theory of Politics." *American Economic Review*, 74(3): 279–300.
- Kau, James B., Donald Keenan, and Paul H. Rubin. 1982. "A General Equilibrium Model of Congressional Voting." *Quarterly Journal of Economics*, 97(2): 271–93.  
<http://www.jstor.org/stable/1880758>.
- Kau, James B. and Paul H. Rubin. 1979. "Self-Interest, Ideology, and Logrolling in Congressional Voting." *Journal of Law and Economics*, 22(2): 365–84.
- Kau, James B. and Paul H. Rubin. 1993. "Ideology, Voting, and Shirking." *Public Choice*, 76(1/2): 151–72. <http://www.jstor.org/stable/30025700>.
- Kenny, Lawrence W. and Babak Lotfinia. 2005. "Evidence on the importance of spatial voting models in presidential nominations and elections." *Public Choice*, 123(3-4): 439–62.
- Krehbiel, Keith. 1993. "Constituency characteristics and legislative preferences." *Public Choice*, 76(1): 21–37.
- Lott, John R., JR. and Michael L. Davis. 1992. "A Critical Review and an Extension of the Political Shirking Literature." *Public Choice*, 74(4): 461–84.
- Matusaka, John G. 2001. "Problems with a Methodology Used to Evaluate the Voter Initiative." *Journal of Politics*, 63(4): 1250–56.
- Matusaka, John G. 2010. "Popular Control of Public Policy: A Quantitative Approach." *Quarterly Journal of Political Science*, 5(2): 133–67.
- McKelvey, Richard D. 1986. "Covering, Dominance, and Institution-Free Properties of Social Choice." *American Journal of Political Science*, 30(2): 283–314.
- Meltzer, Allan H. and Scott F. Richard. 1981. "A Rational Theory of the Size of Government." *Journal of Political Economy*, 89(5): 914–27.

- Mueller, Dennis C. 2003. *Public Choice III*. Cambridge: Cambridge University Press.
- Osborne, Martin J. and Al Slivinski. 1995. "A Model of Political Competition with Citizen-Candidates." *Quarterly Journal of Economics*, 111(1995-01): 65–96.
- Padovano, Fabio. 2012. "Are we witnessing a paradigm shift in the analysis of political competition?" *Public Choice* (forthcoming).
- Padovano, Fabio and Roberto Ricciuti. 2009. "Political competition and economic performance: evidence from the Italian regions." *Public Choice*, 138(3-4): 263–77.
- Peltzman, Sam. 1984. "Constituent Interest and Congressional Voting." *Journal of Law and Economics*, 27(1): 181–210.
- Persson, Torsten and Guido Tabellini. 2000. *MIT Press Books*. Vol. 1, *Political Economics: Explaining Economic Policy*. Cambridge: MIT Press.
- Poole, Keith T. and Howard Rosenthal. 1985. "A Spatial Model for Legislative Roll Call Analysis." *American Journal of Political Science*, 29(2): 357–84.
- Poole, Keith T. and Howard Rosenthal. 1997. *Congress. A political-economic history of roll call voting*. New York: Oxford University Press.
- Poole, Keith T. and Howard Rosenthal. 2007. *Ideology & Congress*. 2nd ed. New Brunswick: Transaction Publishers.
- Portmann, Marco, David Stadelmann, and Reiner Eichenberger. 2012. "District magnitude and representation of the majority's preferences. Evidence from popular and parliamentary votes." *Public Choice*, 151(3-4): 585–610.
- Portmann, Marco, David Stadelmann, and Reiner Eichenberger. 2013. "District magnitude and representation of the majority's preferences—a reply and new perspectives." *Public Choice*, 154(1-2): 149–51.
- Raftery, Adrian E. 1995. "Bayesian Model Selection in social Research." *Sociological Methodology*, 25: 111–63.
- Raftery, Adrian E., Jennifer Hoeting, Chris Volinsky, Ian Painter, and Ka Yee Yeung. 2011. *BMA: Bayesian Model Averaging* "R package version 3.14.1, <http://CRAN.R-project.org/package=BMA>.
- Raftery, Adrian E., David Madigan, and Jennifer A. Hoeting. 1997. "Bayesian Model Averaging for Linear Regression Models." *Journal of the American Statistical Association*, 92(437): 179–91.
- Scervini, Francesco. 2012. "Empirics of the median voter: democracy, redistribution and the role of the middle class." *The Journal of Economic Inequality*, 10(4): 529–50.
- Schneider, Friedrich, Werner W. Pommerehne, and Bruno S. Frey. 1981. "Politico-Economic Interdependence in a direct Democracy: the case of Switzerland." In *Contemporary Political Economy*, ed. Douglas A. Hibbs and Heino Fassbender, 231–48. Amsterdam: North Holland.

- Snyder, James M., JR. 1992. "Artificial Extremism in Interest Group Ratings." *Legislative Studies Quarterly*, 17(3): 319–45.
- Snyder, James M., JR. and Tim Groseclose. 2000. "Estimating Party Influence in Congressional Roll-Call Voting." *American Journal of Political Science*, 44(2): 193–211.
- Stadelmann, David, Marco Portmann, and Reiner Eichenberger. 2012. "Evaluating the median voter model's explanatory power." *Economics Letters*, 114(3): 312–14.
- Stadelmann, David, Marco Portmann, and Reiner Eichenberger. 2013. "Quantifying parliamentary representation of constituents' preferences with quasi-experimental data." *Journal of Comparative Economics* (forthcoming).
- Svaleryd, Helena. 2009. "Women's representation and public spending." *European Journal of Political Economy*, 25(2): 186–98.
- Washington, Ebonya L. 2008. "Female Socialization: How Daughters Affect Their Legislator Fathers' Voting on Women's Issues." *American Economic Review*, 98(1): 311–32.
- Wittman, Donald. 1983. "Candidate Motivation: A Synthesis of Alternative Theories." *The American Political Science Review*, 77(1): 142–57. <http://www.jstor.org/stable/1956016>.
- Wright Gerald C., JR., Robert S. Erikson, and John P. McIver. 1987. "Public Opinion and Policy Liberalism in the American States." *American Journal of Political Science*, 31(4): 980–1001.
- Zakharov, Alexei V. 2008. "A model of candidate location with endogenous valence." *Public Choice*, 138(3-4): 347–66.

**Table A1: Data description and sources**

<i>Variable</i>	<i>Description and sources</i>	<i>Mean</i>	<i>SD</i>
MP=MedianVoter	Indicator variable: If roll call vote of member of the Council of States matches the majority decision of constituents in the respective referendum value is 1. Swiss Parliamentary Services.	0.688	0.464
Is women	Indicator variable: If member of the Council of States is female value is 1. Swiss Parliamentary Services.	0.201	0.401
Age	member of the Council of States's age in years. Swiss Parliamentary Services.	57.440	6.583
Pre 1968	Indicator variable: If member of the Council of States was over 18 in 1968 value is 1. Swiss Parliamentary Services.	0.409	0.492
Born outside constituency	Indicator variable: If representative's birth place is outside his/her district value is 1. Swiss Parliamentary Services.	0.326	0.469
Master/Doctor	Indicator variable: If member of parliament has master or doctoral degree value is 1. Swiss Parliamentary Services.	0.671	0.470
No Army	Indicator variable: If representative did not serve in the Swiss army value is 1. Swiss Parliamentary Services.	0.634	0.482
Army officier	Indicator variable: If member of the Council of States served as officer value is 1. Swiss Parliamentary Services.	0.288	0.453
Is married	Indicator variable: If representative is married value is 1. Swiss Parliamentary Services.	0.650	0.477
Has children	Indicator variable: If representative is has children value is 1. Swiss Parliamentary Services.	0.641	0.480
Time in office	member of the Council of States's years in service. Swiss Parliamentary Services.	9.321	6.027
Left party affiliation	Indicator variable: If member of the Council of States belongs to the SP or GPS value is 1. Swiss Parliamentary Services.	0.224	0.417
Right party affiliation	Indicator variable: If member of the Council of States belongs to the SVP value is 1. Swiss Parliamentary Services.	0.145	0.352

**Notes:** Unweighted descriptive statistics. Data sources indicated next to variable descriptions.

**Supplement S1 (not intended for publication): Referenda in Switzerland**

<i>Ref#</i>	<i>Original titel of referendum</i>	<i>Date</i>
530	Iniziativa popolare del 03.11.2005 «Contro il rumore die velivoli da combattimento nelle regioni turistiche» Volksinitiative «Gegen Kampfjetlärm in Tourismusgebieten» Initiative populaire du 03.11.2005 «Contre le bruit des avions de combat à réaction dans les zones touristiques»	24.02.08
531	Legge federale del 23.03.2007 sul miglioramento delle condizioni quadro fiscali per le attività e gli investimenti imprenditoriali (legge sulla riforma II dell'imposizione delle imprese) Bundesgesetz über die Verbesserung der steuerlichen Rahmenbedingungen für unternehmerische Tätigkeiten und Investitionen Loi fédérale du 23.03.2007 sur l'amélioration des conditions fiscales applicables aux activités entrepreneuriales et aux investissements (loi sur la réforme de l'imposition des entreprises II)	24.02.08
532	Iniziativa popolare del 18.11.2005 «Per naturalizzazioni democratiche» Volksinitiative «Für demokratische Einbürgerungen» Initiative populaire du 18.11.2005 «Pour des naturalisations démocratiques»	01.06.08
533	Iniziativa popolare dell'11.08.2004 «Sovranità del popolo senza propaganda di governo» Volksinitiative «Volkssouveränität statt Behördenpropaganda» Initiative populaire du 11.08.2004 «Souveraineté du peuple sans propagande gouvernementale»	01.06.08
534	Articolo costituzionale del 21.12.2007 «Per qualità ed economicità nell'assicurazione malattie» Verfassungsartikel «Für Qualität und Wirtschaftlichkeit in der Krankenversicherung» Article constitutionnel du 21.12.2007 «Qualité et efficacité économique dans l'assurance-maladie»	01.06.08
535	Iniziativa popolare del 01.03.2006 «Per l'imprescrittibilità die reati di pornografia infantile» Volksinitiative «für die Unverjährbarkeit pornografischer Straftaten an Kindern» Initiative populaire du 01.03.2006 «Pour l'imprescriptibilité des actes de pornographie enfantine»	30.11.08
536	Iniziativa popolare del 28.03.2006 «Per un'età di pensionamento flessibile» Volksinitiative «für ein flexibles AHV-Alter» Initiative populaire du 28.03.2006 «Pour un âge de l'AVS flexible»	30.11.08
537	Iniziativa popolare del 11.05.2006 «Diritto di ricorso delle associazioni: basta con la politica ostruzionista - Più crescita per la Svizzera!» Volksinitiative «Verbandsbeschwerderecht: Schluss mit der Verhinderungspolitik - Mehr Wachstum für die Schweiz!» Initiative populaire du 11.05.2006 «Droit de recours des organisations: Assez d'obstructionnisme - Plus de croissance pour la Suisse!»	30.11.08
538	Iniziativa popolare del 13.01.2006 «per una politica della canapa che sia ragionevole e che protegga efficacemente i giovani» Volksinitiative «für eine vernünftige Hanf-Politik mit wirksamem Jugendschutz» Initiative populaire du 13.01.2006 «Pour une politique raisonnable en matière de chanvre protégeant efficacement la jeunesse»	30.11.08
539	Modifica del 20.03.2008 della legge federale sugli stupefacenti e sulle sostanze psicotrope (legge sugli stupefacenti, LStup) Bundesgesetz über die Betäubungsmittel und psychotropen Stoffe Modification du 20.03.2008 de la loi fédérale sur les stupéfiants et les substances psychotropes (loi sur les stupéfiants, LStup)	30.11.08
540	Decreto federale del 13.06.2008 che approva il rinnovo dell'Accordo tra la Svizzera e la Comunità europea ed i suoi Stati membri sulla libera circolazione delle persone e approva e traspone nel diritto svizzero il Protocollo relativo all'estensione alla B Bundesbeschluss über die Genehmigung der Weiterführung des Freizügigkeitsabkommens zwischen der Schweiz und der Europäischen Gemeinschaft sowie über die Genehmigung des Protokolls über die Ausdehnung des Abkommens auf Bulgarien und Rumänien Arrêté fédéral du 13.06.2008 portant approbation de la reconduction de l'accord entre la Suisse et la Communauté européenne et ses Etats membres sur la libre circulation des personnes, ainsi qu'approbation et mise en oeuvre du protocole visant à étendre l	08.02.09
541	Articolo costituzionale del 03.10.2008 «Un futuro con la medicina complementare» Verfassungsartikel «Zukunft mit Komplementärmedizin» (Gegenentwurf zur Volksinitiative «Ja zur Komplementärmedizin») Article constitutionnel du 03.10.2008 «Pour la prise en compte des médecines complémentaires»	17.05.09
542	Decreto federale del 13.06.2008 che approva e traspone nel diritto svizzero lo scambio di note tra la Svizzera e la Comunità europea concernente il recepimento del regolamento (CE) n. 2252/2004 sui passaporti e i documenti di viaggio biometrici (Sviluppo Bundesbeschluss über die Genehmigung und Umsetzung des Notenaustauschs zwischen der Schweiz und der EG betreffend die Übernahme der Verordnung über biometrische Pässe und Reisedokumente Article constitutionnel du 03.10.2008 «Pour la prise en compte des médecines complémentaires»	17.05.09
543	Decreto federale del 13.06.2008 sul finanziamento aggiuntivo temporaneo dell'assicurazione invalidità mediante l'aumento delle aliquote dell'imposta sul valore aggiunto, modificato dal decreto federale del 12.06.2009 concernente la modifica di questo decr Bundesbeschluss über eine befristete Zusatzfinanzierung der Invalidenversicherung durch Anhebung der Mehrwertsteuersätze Arrêté fédéral du 13.06.2008 relatif au financement additionnel de l'AI par un relèvement temporaire des taux de la TVA, modifié par l'arrêté fédéral du 12.06.2009 portant modification de cet arrêté	27.09.09

544	Decreto federale del 19.12.2008 concernente la rinuncia all'introduzione dell'iniziativa popolare generica Bundesbeschluss über den Verzicht auf die Einführung der allgemeinen Volksinitiative Arrêté fédéral du 19.12.2008 portant suppression de l'initiative populaire générale	27.09.09
545	Decreto federale del 03.10.2008 concernente la creazione di un sistema di finanziamento speciale per compiti connessi al traffico aereo Bundesbeschluss zur Schaffung einer Spezialfinanzierung für Aufgaben im Luftverkehr Arrêté fédéral du 03.10.2008 sur la création d'un financement spécial en faveur de tâches dans le domaine du trafic aérien	29.11.09
546	Iniziativa popolare federale «Per il divieto di esportare materiale bellico» Volksinitiative «Für ein Verbot von Kriegsmaterial-Exporten» Initiative populaire fédérale «Pour l'interdiction d'exporter du matériel de guerre»	29.11.09
547	Iniziativa popolare dell'08.07.2008 «Contro l'edificazione di minareti» Volksinitiative «Gegen den Bau von Minaretten» Initiative populaire du 08.07.2008 «Contre la construction de minarets»	29.11.09
548	Decreto federale del 25.09.2009 su un articolo costituzionale concernente la ricerca sull'essere umano Verfassungsartikel über die Forschung am Menschen Arrêté fédéral du 25.09.2009 relatif à un article constitutionnel concernant la recherche sur l'être humain	07.03.10
549	Iniziativa popolare del 26.07.2007 «Contro il maltrattamento e per una migliore protezione giuridica degli animali (Iniziativa sull'avvocato degli animali)» Volksinitiative «Gegen Tierquälerei und für einen besseren Rechtsschutz der Tiere» Initiative populaire du 26.07.2007 «Contre les mauvais traitements envers les animaux et pour une meilleure protection juridique de ces derniers (Initiative pour l'institution d'un avocat de la protection des animaux)»	07.03.10
550	Modifica del 19.12.2008 della legge federale sulla previdenza professionale per la vecchiaia, i superstiti e l'invalidità (LPP) (Aliquota minima di conversione) Bundesgesetz über die berufliche Alters-, Hinterlassenen- und Invalidenvorsorge (BVG) (Mindestumwandlungssatz) Modification du 19.12.2008 de la loi fédérale sur la prévoyance professionnelle vieillesse, survivants et invalidité (LPP) (Taux de conversion minimal)	07.03.10
551	Modifica del 19.03.2010 della legge federale su l'assicurazione obbligatoria contro la disoccupazione e l'indennità per insolvenza (legge sull'assicurazione contro la disoccupazione, LADI) Bundesgesetzes über die obligatorische Arbeitslosenversicherung und die Insolvenzentschädigung (Arbeitslosenversicherungsgesetz, AVIG) Modification du 19.03.2010 de la loi fédérale sur l'assurance-chômage obligatoire et l'indemnité en cas d'insolvabilité (loi sur l'assurance-chômage, LACI)	26.09.10
552.1	Iniziativa popolare del 15.02.2008 «Per l'espulsione degli stranieri che commettono reati (Iniziativa espulsione)» Bundesbeschluss über die Volksinitiative «Für die Ausschaffung krimineller Ausländer (Ausschaffungsinitiative)» Arrêté fédéral relatif à l'initiative populaire «Pour le renvoi des étrangers criminels (Initiative sur le renvoi)» du 18 juin 2010	28.11.10
552.2	Decreto federale del 10.06.2010 concernente l'espulsione e l'allontanamento, nel rispetto della Costituzione federale, degli stranieri che commettono reati (controprogetto all'iniziativa popolare «Per l'espulsione degli stranieri che commettono reati [Iniziativa espulsione]») Bundesbeschluss über die Aus- und Wegweisung krimineller Ausländerinnen und Ausländer im Rahmen der Bundesverfassung (Gegenentwurf zur Volksinitiative «für die Ausschaffung krimineller Ausländer» [Ausschaffungsinitiative]) vom 10. Juni 2010 Arrêté fédéral concernant le contre-projet «Expulsion et renvoi des criminels étrangers dans le respect de la Constitution» (contre-projet à l'initiative populaire «Pour le renvoi des étrangers criminels (Initiative sur le renvoi)» du 10 juin 2010	28.11.10
553	Decreto federale concernente l'iniziativa popolare «Per imposte eque. Basta con gli abusi nella concorrenza fiscale (Iniziativa per imposte eque)» del 18 giugno 2010 Bundesbeschluss über die Volksinitiative «Für faire Steuern. Stopp dem Missbrauch beim Steuerwettbewerb (Steuergerechtigkeits-Initiative)» vom 18. Juni 2010 Initiative populaire «Pour des impôts équitables. Stop aux abus de la concurrence fiscale (Initiative pour des impôts équitables)».	28.11.10
554	Arrêté fédéral relatif à l'initiative populaire «Pour la protection face à la violence des armes» du 1er octobre 2010 Volksinitiative «Für den Schutz vor Waffengewalt» Initiative populaire «Pour la protection face à la violence des armes»	13.02.11
555	Decreto federale concernente l'iniziativa popolare «Basta con la costruzione sfrenata di abitazioni secondarie» Bundesbeschluss über die Volksinitiative «Schluss mit uferlosem Bau von Zweitwohnungen» Arrêté fédéral concernant l'Initiative populaire «pour en finir avec les constructions envahissantes de résidences secondaires»	11.03.12
556	Iniziativa popolare federale «per agevolare fiscalmente il risparmio per l'alloggio destinato all'acquisto di una proprietà abitativa ad uso proprio e per finanziare misure edilizie di risparmio energetico e di protezione dell'ambiente (Iniziativa sul risparmio per l'alloggio)» Eidgenössische Volksinitiative «für ein steuerlich begünstigtes Bausparen zum Erwerb von selbst genutztem Wohneigentum und zur Finanzierung von baulichen Energiespar- und	11.03.12

	Umweltschutzmassnahmen (Bauspar-Initiative)» vom 29. September 2008 Initiative populaire fédérale «pour un traitement fiscal privilégié de l'épargne-logement destinée à l'acquisition d'une habitation à usage personnel ou au financement de travaux visant à économiser l'énergie ou à préserver l'environnement (initiative sur l'épargne-logement)»	
557	Decreto federale concernente l'iniziativa popolare «6 settimane di vacanza per tutti» Bundesbeschluss über die Volksinitiative «6 Wochen Ferien für alle» Arrêté fédéral relatif à l'initiative populaire «6 semaines de vacances pour tous»	11.03.12
558	Decreto federale concernente il disciplinamento dei giochi in denaro a favore dell'utilità pubblica (controprogetto all'iniziativa «Per giochi in denaro al servizio del bene comune») Bundesbeschluss über die Regelung der Geldspiele zugunsten gemeinnütziger Zwecke (Gegenentwurf zur Volksinitiative «Für Geldspiele im Dienste des Gemeinwohls») vom 29. September 2011 Arrêté fédéral concernant la réglementation des jeux d'argent en faveur de l'utilité publique (Contre-projet à l'initiative «Pour des jeux d'argent au service du bien commun»)	11.03.12
559	Legge federale sul prezzo fisso dei libri (LPLib) Bundesgesetz über die Buchpreisbindung (BuPG) vom 18. März 2011 Loi fédérale sur la réglementation du prix du livre (LPL)	11.03.12
560	Iniziativa popolare federale «Accesso alla proprietà grazie al risparmio per l'alloggio» Volksinitiative «Eigene vier Wände dank Bausparen» Initiative populaire «Accéder à la propriété grâce à l'épargne-logement»	17.06.12
562	Modifica della legge federale sull'assicurazione malattie (LAMal) (Managed Care) Änderung des Bundesgesetzes über die Krankenversicherung (KVG) (Managed Care) Modification de la loi fédérale sur l'assurance-maladie (LAMal) (Réseaux de soins)	17.06.12