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# Transparency in Parliamentary Voting<sup>1</sup>

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## **Abstract**

We use a change in the voting procedures of one of the two chambers of the Swiss parliament to explore how transparency affects the voting behavior of its members. Until 2013, the Upper House (Council of States) had voted by a show of hands. Legislators' decisions could only be verified ex post through the time-consuming screening of online videos. In 2014, halfway through the legislative period, the chamber switched to electronic voting with online publication of individual decisions, significantly increasing transparency.

Data cover individual voting behavior during the 2011- 2015 legislative period. In a difference-in-difference framework, the Lower House (National Council), serves as a control group. Not only have the voting procedures of the Lower House remained unchanged since 2007 but also the legislative texts of the votes we analyze are the same in both chambers. This unique framework makes it possible to estimate the causal effects of transparency on legislators' choices.

Members of the Upper House are significantly less likely to deviate from their party line after the reform. While parties benefit from improved conformity, voters lose influence over their legislators. Two legislators representing the same canton are less likely to cast an aligned vote if their parties have distinct party lines.

## **Keywords**

Voting; Parliament; Transparency; Parties; Party discipline; Principal agent theory.

## **JEL Classification**

D72, D80, L88.

# 1 Introduction

Parliaments around the world differ in whether and how the voting decisions of their members are made transparent (Hug, 2010; Hug et al., 2015). While some record and publicly disclose all individual voting decisions (i.e., who voted yes or no on a certain proposal), others tend not to. This difference is interesting because transparency constitutes one of the key elements affecting accountability in principal-agent problems and specifically accountability of legislators towards their voters and parties.

We analyze how vote transparency influences legislators' voting behavior in parliament with a focus on the legislators' incentive to vote according to their party line. In a quasi-experimental approach we exploit an institutional change in the Swiss parliament's voting procedure. While the Lower House (National Council) has voted electronically since 1994, publishing all individual votes online since 2007, the Upper House (Council of States) traditionally voted by show of hands.<sup>1</sup> Video records of the show-of-hand votes allow to recover individual votes cast in the Upper House before 2014.<sup>2</sup> In spring 2014, the Upper House introduced an electronic voting system. Since then it automatically publishes individual voting decisions for several legally defined vote types online with free access to everyone. This change considerably increased transparency in the Upper House and reduced monitoring costs to track its members' decisions.

Elections to the Upper House are based on an open-list system, institutionally ensuring individual accountability towards voters. At the same time, parties nominate candidates and support their electoral campaigns, creating a strong party principal as well. We face a situation, which is prone to tensions between the demands of competing principals towards their legislator. Who benefits more from transparency depends on the relative change in monitoring costs of the two principals. We argue that the Swiss case provides a setting with initially high monitoring costs for both parties and voters. Transparency towards voters improved only little, since the media were slow in picking up the new information and disseminating it to the public. Parties, in contrast, had better knowledge on how to instantly retrieve relevant information from published vote records. Parties could thus be expected to gain more from the institutional change.

We collected data for the complete legislative period, resulting in a sample of almost 300 final passage votes<sup>3</sup> for each of the 200 members of the Lower House and the 46 members of the Upper House. We concentrate specifically on final passage votes because they are identical for both chambers and usually decided on the same day. The reform took place roughly halfway through the legislative period, and left all other aspects of parliamentary business unchanged. Therefore, we can compare deviations from party line before and after the reform between the two chambers. This

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<sup>1</sup> The Lower House (National Council) is the proportional representation of the population whereas the Council of States (Upper House) represents the Swiss cantons.

<sup>2</sup> Another stream of literature making use of these video records analyzes how well constituencies are represented by their respective councilors (Eichenberger et al., 2012; Stadelmann et al., 2012, 2014). Bütikofer (2014) describes party line deviation and its determinants.

<sup>3</sup> Final passage votes are the votes at the end of the legislative process deciding on acceptance or rejection of the entire bill.

institutional setting allows us to circumvent one of the most prevalent problems in party cohesion estimations: it is typically impossible to disentangle whether a voting decision is due to personal ideology or pressure from principals simply by studying voting outcomes, as the two forces can be observationally equivalent (Krehbiel, 1993, 2000; McCarty et al., 2001; Snyder and Groseclose, 2000). We can safely assume that the legislators' ideology remained the same during the legislative period, and vote visibility was the only aspect that changed.

Results show that legislators in the Upper House are less likely to deviate from their party's line when vote transparency increases. This is in line with the better monitoring by parties or the pending threat of monitoring. Studying aligned cantonal voting of representatives belonging to two different parties reveals more disagreement among legislators from the same canton after the reform if their parties have different party lines. Furthermore, legislators holding safe seats exhibit a larger decrease in party line deviation than legislators holding marginal seats. This adds to evidence pointing towards transparency benefiting parties rather than voters. Improved party discipline seems to hurt voter interests.

Our results prove to be highly robust when subjected to various econometric specifications and tests. Employing a placebo treatment on the preceding legislative period 2007-2011, during which no changes in vote transparency occurred, we find that election cycles cannot explain our results. Moreover, we find strong heterogeneous party effects. The disciplining effect is prevalent in the two largest parties at either end of the ideological spectrum, the Social Democrats (SP) and the Swiss People's Party (SVP).

We contribute to the literature on the effect of transparency on political representation (Holmström, 1979; Prat, 2005). We extend the standard analysis to a setting with two (potentially competing) principals. While transparency has been studied theoretically, few studies exist, which qualitatively or quantitatively assess the causal effect of vote transparency on legislative voting.<sup>4</sup> Most papers compare voting in published and unpublished roll call votes. For Switzerland, Hug (2010) shows that party cohesion is higher in automatically published votes than in unpublished ones or those published on request. However, published roll call votes often form a specific subsample of all votes (e.g., roll call votes on request). Hence, most authors emphasize the selection bias between published and unpublished votes (e.g., Carrubba et al. 2006; Yordanova and Mühlböck 2015; yet cf. Hix et al. (2014), who find that the selection bias is negligible).<sup>5</sup>

Our paper differs from previous studies in two important ways. First, we exploit an important institutional change. The reform during an ongoing legislative period allows us to identify the causal effect of greater vote transparency on legislative voting. While final passage votes are a specific subset of all votes, they occur according to an exogenous rule - in contrast to possibly endogenous requests of roll call votes. Second, we are able to analyze a change in transparency in only one chamber of a bicameral parliamentary system. The existence of a valid comparison group allows us to separate the effect of the reform from general time trends and bill-specific characteristics in

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<sup>4</sup> Stadelmann et al. (2014) analyze the effect of introducing video recordings in the Swiss Upper House in 2006 on aggregate voting results. They find no change in collective accountability to voters.

<sup>5</sup> Cf. Carrubba et al. (2008) for the theoretical rationale behind requests for roll call votes.

legislators' voting behavior.

Transparency is relevant for other political outcomes such as legislators' effort (Grossman and Hanlon, 2014). Moreover, transparency plays a role in decision-making in fields other than politics. A prominent example is the decision process and the communication thereof in monetary policy (Faust and Svensson, 2001; Gersbach and Hahn, 2004, 2008). Another is decision making in committees (Levy, 2007; Mattozzi and Nakaguma, Unpublished).

The remainder of the paper is structured as follows. Section 2 describes how party cohesion depends on the electoral system and vote transparency. In Section 3 we explain the main features of the Swiss Parliament, describe the reform of the Upper House's voting procedures and derive a testable hypothesis. In Section 4 we explain our identification strategy. Section 5 describes our data and in Section 6 we present the results. Section 7 concludes.

## 2 Legislative Voting in a Multiple Principal Framework

Citizens assign power to individual politicians to represent their interests in parliament. This connection establishes a principal-agent relationship between legislators and their constituencies. Voters wish to have their preferred policies implemented and expect legislators to honor their electoral promises (Besley, 2006). Yet, politicians face no legal obligations to keep these promises. This type of moral hazard constitutes the core of the agency problem.

As major players in the political process, parties help alleviate this problem by proposing policy platforms and monitoring their members to ensure they stick to the party line. In this way, party names serve as informative labels for voters, who can rely on substantive shortcuts when deciding whom to elect (e.g., Ashworth and De Mesquita, 2008; Snyder and Groseclose, 2000; Snyder and Ting, 2002; Tullock, 1967). To prevent dilution of their brand, it is in the parties' interests to call their members to order and ensure they vote along party lines. In doing so, parties act as intermediaries between voters and legislators, and thus strengthen their accountability to voters (Holcombe and Gwartney, 1989).<sup>6</sup> An additional advantage of unified parties is that they are more likely to push the legislative process in their preferred direction (Carey, 2007; Depauw, 2003).

Parties themselves, however, are part of the agency problem. From a legislator's perspective, parties play the role of a second principal demanding loyalty from their members. At the same time, voters may request their legislators to stand against their parties if the interest of the constituency is at stake.<sup>7</sup> The literature documents voters' preference for legislative individualism over purely obedient party members. The quality of their agents, i.e., the valence and expertise, matters (Besley, 2005). Voters expect *their* representatives to break party discipline if it is in their constituency's best interest. This argument is borne out by examples from Latin America: when given the choice

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<sup>6</sup> A theoretical stream of the literature models party discipline as equilibrium outcomes depending on factors, such as ideological heterogeneity and group size (e.g., Ashworth and De Mesquita, 2008).

<sup>7</sup> For a theoretical argument on why voters should also care about their representatives' individual voting behavior rather than focusing solely on the outcomes, see Snyder and Ting (2005).

between preference voting for individuals or selecting a party list when both options are available, an overwhelming share of voters opted for the former (Shugart et al., 2006).<sup>8</sup>

Both parties and voters have the means to influence legislators' votes. To ensure cohesive voting, parties adopt various "carrot-and-stick" approaches including the use of election-related rewards and punishments, as well as internal legislature processes (e.g. Carey, 2007; Krehbiel, 1993, 2000). For example, parties are responsible for selecting members and putting forward suitable candidates for election. During legislative periods, they have the power to assign positions on committees or within the party itself (Cox and McCubbins, 2007). They also control the resources needed to fund electoral campaigns or to support their members' political initiatives. Party principals are therefore crucial to an individual legislator's political career (Aldrich, 1995).

If voters do not see their desired policies implemented, they can punish their agents by not reelecting them. The question remains whether voters base their reelection decisions on legislative voting records. In their study on voting in the US Congress, Canes-Wrone et al. (2002) found that House members are punished by their constituencies if they support their party too strongly. Party support is measured by having an extremely conservative voting record if the legislator is a Republican, or an extremely liberal one if the legislator is a Democrat. The findings of Canes-Wrone et al. (2002) indicate decreasing vote shares and reelection probabilities of extreme politicians, regardless of whether they hold a safe or marginal seat.<sup>9</sup>

The individual legislator thus faces the demands of two potentially competing principals (Carey, 2009; Hix, 2002). Which of the two is relatively more important to the legislator depends on the institutional setup (Carey and Soberg, 1995). Democratic political systems throughout the world differ in terms of their institutional characteristics and are acknowledged to impact political outcomes (e.g., Persson and Tabellini, 2000). They are based on diverse voting rules and vary with respect to the national assembly's internal organization. Voters tend to be important principals in open-list electoral systems, which allow citizens to voice their preferences by selecting individual politicians. Parties gain more importance in closed-list systems and when the parties are responsible for drawing up electoral lists and ranking the candidates who appear on them (Galasso and Nannicini, 2015). The electoral system therefore dictates whether voters and parties have the capacity to act on their desire to punish or reward their agents. In open-list systems, as in Switzerland for example, voters can punish individual politicians much more easily than voters in closed-list systems.

The principals' ability to punish or reward their agents importantly hinges on the observability of the agents' actions. Today, transparency has become a buzz word in almost all walks of life, be it executive compensation, monetary policy or politics. In legislative voting, there is a general tendency towards greater transparency.<sup>10</sup> This trend is underpinned by the theoretical argument that,

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<sup>8</sup> Carey (2009) compiled evidence from studies conducted in Latin America on voters' demands to have legislators with a certain degree of individualism.

<sup>9</sup> Cf. Canes-Wrone et al. (2002) for a more complete account of the literature on the electoral link between roll calls and voting.

<sup>10</sup> Across countries variation in legislative transparency is high. Hug (2010) reviews transparency and reports that, out of 92 parliaments surveyed, 23 do not publish any votes, 20 publish all votes, 43 publish specific votes, and 28



in standard principal-agent models, additional information about the agent’s actions strengthens accountability and increases the benefits of the principal (Holmström, 1979).<sup>11</sup>

When agents face multiple principals with competing interests, it is less clear who benefits from increased transparency. In general, parties have the advantage of being political insiders and benefit from at least partial access to their members even without vote transparency. It is therefore often believed that vote transparency should benefit voters relatively more and hence, parties and their leaders should oppose the recording and publishing of individual votes (Carey, 2009; Hug et al., 2015).<sup>12</sup> This line of argument, however, neglects that also parties have incomplete information and vote transparency reduces their monitoring costs as well. Parties might also have stronger incentives to make use of this information than voters do. For voters, as outside actors, the costs of accessing the information on individual voting behavior might still be prohibitively high such that voters rely more heavily on media coverage of parliamentary processes.<sup>13,14</sup>

Whether voters or parties benefit more from vote transparency is an empirical question and depends on the relative monitoring costs of the two principals with and without transparency. In the next section we argue that the transparency reform in the Swiss Upper House presents an interesting case, where parties had only limited monitoring capacities before the reform, and increased vote transparency therefore strengthened the accountability of Members of Parliament (MPs) towards their parties.

### 3 Institutional Background and Main Hypothesis

#### 3.1 The Swiss Federal Parliament

Switzerland has a bicameral parliamentary system and elections take place every four years. Its two chambers are the Lower House and the Upper House. The Swiss political system lacks the typical government-opposition design. The Federal Council, or cabinet, is made up of seven members from various parties; they are (re)elected by the joint assembly of both chambers after the parliamentary elections (or whenever there is a vacancy), and typically serve for several legislative periods. Seats on the Federal Council are roughly proportional to the parties’ voting strength in parliament. Switzerland thus classifies as a mix between a parliamentary and presidential system (Lijphart,

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publish requested roll call votes.

<sup>11</sup>In contrast, Prat (2005, 2006), Fox (2007) and Fox and Van Weelden (2012) show that transparency of the agent’s decisions can be detrimental to the principal if the former then disregards private information to mimic “good” agents.

<sup>12</sup>Cf. Snyder and Ting (2005), who argue that both voters and legislators should favor transparency in certain cases.

<sup>13</sup>A large empirical literature documents the role of the media for voter information and political accountability towards voters (for reviews, cf. Prat and Strömberg, 2013; Strömberg, 2015).

<sup>14</sup>Jenkins and Stewart (2003) document a case – the open elections of the Speaker in the US House of Representatives in the 19th century – in which transparency was favored by the party leadership and led, at least initially, to greater party pressure and increased partisanship. Later, pressure from regional newspapers increased on House Representatives not considering regional aspects when electing the Speaker of the House.

1999).<sup>15</sup>

Election to the Lower House is based on proportional representation. Its 200 seats are allotted to the 26 cantons (which also make up the voting districts) according to their respective populations. Currently, there is one seat for every 37,500 citizens, but each canton has at least one seat even if its population is below that number. The largest canton, Zurich, had 34 seats in the Lower House during the period of our analysis, while six cantons are represented by a single member. Lower House members are usually elected by proportional vote through open cantonal party lists. In cantons with only one seat, the candidate with the majority vote wins. By institutional design, especially in larger cantons, the number of seats won by a party is, by and large, an accurate reflection of the parties' relative strength.

The Upper House has 46 members representing the cantons. 20 full cantons delegate two members each and the six half-cantons each delegate one. In contrast to the Lower House, members of the Upper House are typically elected by majority vote. Only the cantons of Jura and Neuchâtel use a proportional representation system. Cantons usually have two rounds of voting, whereby the number of votes each citizen has equals the number of seats available, i.e. one or two. In most cases, the first round takes place on the same day as the Lower House elections. Winning an absolute majority in this round guarantees a seat (as long as there are not more successful candidates than seats). If there are fewer successful candidates than seats, a second round takes place three to five weeks later and the remaining seat(s) are allocated to the candidate(s) winning the most votes (cf. Dardanelli (2005) or Linder and Lutz (2002) for a more detailed presentation). In the 2011 election, between 2 and 13 candidates were running in two-member cantons, and one to four in single-member half-cantons.

Table 1 summarizes some of the major characteristics and differences between the two chambers.

Switzerland's party landscape is dominated by four parties: the Social Democrats (SP), the Christian Democrats (CVP), the Free Democrats (FDP), and the Swiss People's Party (SVP). They make up 93.5% and 79% of all seats in the Upper House and Lower House, respectively. Three smaller parties - the Greens (GPS), the Green Liberals (GLP), and the Conservative Democrats (BDP) - are represented in both chambers as well. Additionally, several smaller parties have seats in the Lower House but not in the Upper House. This is of little surprise given that majoritarian systems pose important barriers to the election of small parties (Cox, 1997). Few members are independent and thus without party affiliation. All legislators are members of one of the seven party groups, which are derived from the seven largest parties. Compared to other countries, the role of Swiss parties is relatively weak and their financial resources limited (Kriesi and Trechsel, 2008). Likewise, party leaders are also less important figures.

In the Lower House, legislators sit in blocks with their own party. Though same-party members also sit relatively close together in the Upper House, members have individual seat choice according to seniority. The individual seats are fixed for the entire legislative period. Exceptions are the

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<sup>15</sup>Kriesi and Trechsel (2008) provide an excellent introduction to the Swiss political system to which we refer the interested reader for further information.

Table 1: COMPARISON OF CHAMBERS

	Lower House	Upper House
No. of seats	200	46
Distribution of seats	1 seat per 37,500 inhabitants, min. 1 seat per canton	2 seats per canton, 1 seat per half canton
Election procedure	mostly proportional vote	mostly majority vote
Parties / groups	14 parties 7 party groups	7 parties 7 party groups
Party composition	79% share of 4 big parties	93.5% share of 4 big parties
Debates	Regulated floor time (5-20 min)	Unlimited floor time
Transparency	Individual votes recorded and partly published since 1994, full online publication since 2007	Video records since 2006, individual votes recorded and partly published since 2014

chamber presidents, vice presidents and vote counters, who, during their time in office, occupy designated seats.

When a new piece of legislation enters the parliamentary deliberation process, legislators vote on detailed amendments, and on the entire piece of legislation at the end of a round of deliberation (“total vote”). In case the two chambers have accepted a proposal in separate deliberations, a final passage vote takes place. If both chambers agree in the final passage vote, the bill is accepted, otherwise it is rejected. Final passage votes are the focus of our research, since the legislative text is identical for both chambers and voting takes place on the same day. Both chambers have equal legislative power, and bills only become federal legislation if passed by both (Art. 81, ParlA). Legislation is adopted by the majority of the members voting yes or no in both chambers, respectively.

Bills can be classified as either government bills or parliamentary initiatives. The former are initiated by the federal government (Federal Council), whereas the latter are proposed by individual legislators, parties or organs of parliament. Popular initiatives proposing constitutional amendments are a special case because they can be put forward by any eligible Swiss citizen, provided the collections of 100,000 signatures within 18 months. All constitutional changes are subject to mandatory popular votes. Most non-constitutional legislation can be challenged in a popular vote (facultative referendum) if either 50,000 signatures or eight cantons demand it within 100 days.

### 3.2 Transparency Reform in the Upper House

While the Lower House has been voting electronically since 1994 (publishing all individual votes online since 2007), the Upper House voted by a show of hands until the end of 2013. The president would ask in turn which members accepted, rejected or abstained. Two assigned members of the house acted as vote counters. Name lists with individual voting decisions were only published

following a request by at least ten members. Despite this hypothetical possibility, roll call votes rarely occurred. During the 2007-2011 legislative period, there were no roll call votes and in the previous period (2003-2007) only a single one took place (tellingly, on a proposal to introduce electronic voting).

In the years 2002, 2003 and 2005, the Upper House resisted several attempts to introduce electronic voting and to increase vote transparency (Staatspolitische Kommission des Ständerates, 2012). In 2011, a parliamentary initiative was submitted by legislator This Jenny from the Swiss People's Party (SVP), demanding (once again) the introduction of electronic voting and the (partial) publication of individual voting records. Although the majority of the responsible parliamentary commission recommended to reject the initiative, the proposal was narrowly accepted by the Upper House in June 2012 with 22 votes in favor, 21 votes against and one abstention. The parliamentary commission was then asked to draft a bill. However, in the final passage vote held at the end of November 2012, it was rejected with 25 votes against and 20 in favor.

A few days later, Politnetz, an independent organization analyzing legislative behavior, which had started to film the votes in the Upper House, detected a counting error. In the official result of a bill on import restrictions for snakeskin, the bill was rejected with 19 to 18 votes, with the chamber president casting the decisive vote. In contrast, Politnetz' video records showed a result of 19 to 17 in favor of the bill, excluding the president's vote. This alleged counting error received huge media attention. As a result, the vote on the snakeskin bill was repeated, and the Upper House decided to revisit its decision on the electronic voting bill - an incident highly unusual in Switzerland.

In March 2013, the transparency bill was debated again and accepted in the final vote (March 22) by 28 votes to 14.<sup>16</sup> On the accepting side were all members of the SP, GLP, and BDP, and between 50 and 60% of the CVP, FDP and SVP. Approval was therefore spread over the complete political spectrum. The final version called for the introduction of an electronic voting system and partial vote transparency. It stipulates the automatic online publication of name lists in PDF format after a subset of votes: final passage votes (final approval/rejection of bill), total votes (ensemble votes before passing bill to the other chamber), debt brakes (legislation involving high public expenditure), emergency votes (immediate implementation), and decisions for which at least ten legislators request publication of results. Partial publication according to vote type was a compromise, since the publication of all voting results seemed politically infeasible at this time.<sup>17</sup> The bill was enacted in early March 2014 after the installation of the electronic voting equipment.

Figure 1 shows the number of newspaper articles on vote transparency in the Upper House, which appeared in national and major local newspapers between March 2012 and May 2014. The line represents the number of articles per day, while the bars aggregate the articles per month. Media attention matches the various stages in the reform process. The focus on counting errors at the end of 2012 is highly visible.

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<sup>16</sup>The bill only had to pass the Upper House and not the Lower House, as it concerned the former alone.

<sup>17</sup>This statement was made independently by two members of the Upper House during interviews with one author of this paper. See Section 3.3 for a description of the interviews.

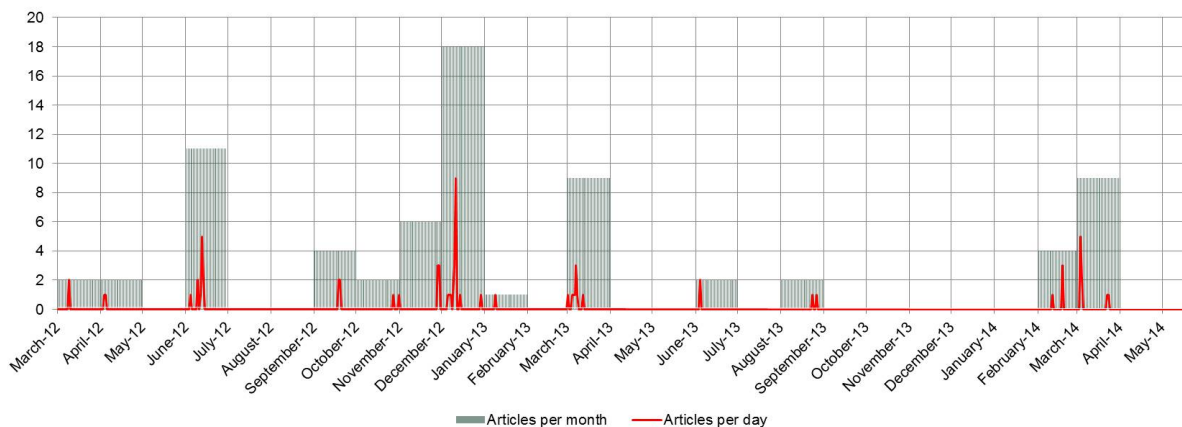
Even before the introduction of electronic voting in March 2014, voting in the Upper House was not secret. All parliamentary debates including votes are public and video records have been available on the Parliament’s website since 2006. Anyone interested in the voting behavior of an individual legislator could either attend the debates in person<sup>18</sup> or watch the videos online. However, this is both very time-consuming and laborious. Given that the camera moves quickly through the room during the show of hands and that the resolution is low, finding out how an individual legislator voted is an arduous and long-drawn-out process. The publication of name lists for the final passage votes therefore constitutes a substantial increase in vote transparency, as well as an improvement in traceability.

Technically, the electronic voting system comprises three buttons for “yes”, “no”, and “abstain” highlighted in different colors and fitted to each legislator’s seat. During a vote, a mark appears on a central board immediately after one of the buttons has been pressed. Legislators can revise their decision within a set time frame of several seconds. Just like the show-of-hands method, the electronic voting system also makes it possible to observe the sequence in which the votes are cast. Thus, the internal visibility of individual voting behavior is relatively unaffected by the reform.

### 3.3 The Importance of the Party Line

We use the theoretical arguments outlined in Section 2 to derive a testable hypothesis for the Swiss case. In order to corroborate our line of argument, we conducted semi-structured interviews with the party secretaries of the four largest parties and with four members and former members of the

FIG. 1: NEWSPAPER COVERAGE ON VOTE TRANSPARENCY IN THE UPPER HOUSE



NOTE: Daily and monthly numbers of newspaper articles on vote transparency in the Upper House in major Swiss newspapers.

<sup>18</sup>There is a restricted number of places for visitors during parliamentary debates and votes.

Upper House.<sup>19</sup>

Members of the Swiss Upper House are accountable towards both their constituents as well as their party. Due to an open-vote system with multiple voting rounds, Swiss voters have a certain leeway to elect individual candidates rather than parties alone (Carey & Soberg, 1995). For the Upper House, only the names of the candidates needs to be written on the ballot sheet, the nominating party appears nowhere. As a consequence, parties are less important actors than individual candidates, as borne out by the marked differences in vote shares between the two chambers. Aggregate party seat shares in percent by party and chamber after the 2011 elections are shown in Figure 2. With the exception of the SP, the shares differ remarkably between the chambers. The political right (SVP) enjoys the highest popular support in the Lower House, but fails to win an equivalent representation in the Upper House. In contrast, the centrist parties CVP and FDP are more strongly represented in the Upper House. These differences are not simply due to the differences between proportional and majoritarian voting systems: in 2011 the strongest party in the Lower House did not win a seat in the Upper House in seven cantons, even though they had a candidate in the race.<sup>20</sup> These facts provide tentative support for the argument that individual legislators are important drivers in the elections to the Upper House. Individual accountability towards voters is a consequence, mirrored in more frequent deviations from the party line in the Upper House than in the Lower House before the reform (cf. Section 4.2).

Nevertheless, parties adopt a strong principal role as well. For most elections, cantonal parties nominate candidates for the Upper House. Only in rare cases, do independent candidates stand for office. While the procedures differ across cantons and parties, the latter decide on who runs for office during a party meeting/convention a few months ahead of the election. A minimum of one seat and a maximum of two seats in the Upper House limits the number of parties nominating candidates. Given that Swiss parties are too small to win the election without the support of non-partisan voters, parties select candidates with personal and political traits appealing to the wider electorate.

Adding to the parties principal role is the use of disciplining measures. Bailer and Bütikofer (2015) document allocations to unpopular committees as punishment for party members from the Lower House deviating from party lines. A former member of the Upper House supported this view in one of the interviews, “Following the party line is one element in securing seats in commissions.” While direct sanctions are uncommon, more subtle ways of reducing the visibility deviators exist: their names might be excluded from press statements and they might not be considered for public appearances.

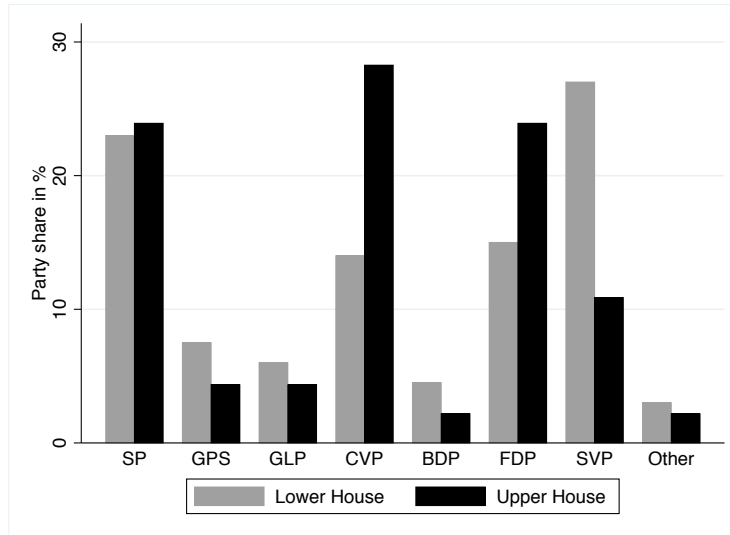
To what extent the publication of individual voting decisions after the introduction of the electronic voting system in 2014 affected the accountability of legislators towards these two principals, depends on relative monitoring costs before and after the reform. As monitoring was very cum-

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<sup>19</sup> All interview questions and additional information are documented in Appendix C.

<sup>20</sup> These cantons were the cantons of Zürich, Bern, Zug, Solothurn, Basel-Landschaft, St.Gallen and Aargau. In the cantons of Uri, Nidwalden, Glarus and Graubünden, the strongest party there did not put forward a candidate for the Upper House.

FIG. 2: PARTY SHARES IN % BY CHAMBER



NOTE: Share of seats by party and chamber after the 2011 election. Lower House stands for the National Council and Upper House for the Council of States. Source: Swiss Statistical Office, National Council Election Statistics 2011.

bersome prior to the reform, it can be assumed that most voters did not systematically watch the videos and analyze the voting decisions of their representatives. Also, with the exception of the above-mentioned counting mistake on the snake skin bill in 2012, the media hardly covered individual voting decisions in the Upper House.

Parties have an advantage over voters in terms of monitoring capacity. With only 46 members in total, and at most 13 legislators per party, in theory relatively low monitoring costs of parties could be expected, even without individual voting records. However, final voting sessions in both chambers take place simultaneously making monitoring more difficult. With the exception of the SP, all party leaders were members of the Lower House during our sample period. The interviews with the party secretaries revealed that monitoring by watching video recordings would have been too cumbersome on a regular basis. The party secretaries also mentioned the lack of resources to keep track of voting behavior during floor votes. Moreover, the seating order in the Upper House (seat choice according to seniority - in contrast to e.g. strict seating in party blocks) was mentioned as an impediment for quick party monitoring of individual decisions. None of the parties actively observed their members for reasons mentioned above. Legislators confirmed the lack of monitoring during voting sessions.<sup>21</sup> One even reported the (unsuccessful) attempt of his party to institutionalize monitoring by a designated member of the Upper House. This sort of “surveillance”

<sup>21</sup>This is in contrast to the interviews by Carey (2009), where legislators in various Latin American countries indicated that party leaders are able to monitor their members well even without electronic voting or roll call votes. Potentially, this is a consequence of the weaker role that party leaders play in Switzerland.

was at odds with the culture of the Upper House.<sup>22</sup>

If parties had a relative advantage over voters in monitoring without vote transparency, they should oppose vote transparency (Carey, 2009). This stands in contrast with our evidence: two Swiss party secretaries explicitly mentioned that their party would have preferred an even higher degree of transparency, extending published individual decisions to all votes in the Upper House instead of a subset of votes. Moreover, it was the commission of the Lower House – the other chamber – prompting the Lower House to extend transparency to all votes in 2016 (Curia Vista, 2016). These statements hint at high monitoring cost through tracking video records for parties, and indicate that vote transparency is in the parties’ interest.

Since the reform, both parties and voters have access to printed protocols on individual voting decisions of all legislators. However, to find voting records online, one has to be familiar with the parliamentary website. Beginning with the main homepage [parlament.ch](http://parlament.ch), the shortest way to access the PDF is a six-step process.<sup>23</sup> While gaining expertise in downloading and processing voting records might be beneficial for party professionals, it is unlikely that large numbers of voters would be willing to incur the cost of such actions. Voters depend on the media to play an active role in the dissemination of information about individual voting records. Politnetz, an organization focusing on online data journalism, accumulates voting records from final passage votes and converts them into interactive, colorful graphics which it then posts online. Tellingly, until the end of 2013, Politnetz distributed only information on votes in the Lower House. Since the introduction of electronic records in the Upper House, these votes appear on the website as well. While these graphics can be accessed by politically interested citizens, most voters still depend on the mass media to get informed. Coverage depending on individual vote records remains, however, scarce. Infrequent articles in regional newspapers are the exception. A famous annual ranking of politicians on the left-right spectrum published by a leading country-wide newspaper only started covering the Upper House at the very end of the 2011-2015 legislative period, while the Lower House was analyzed since 1996.<sup>24</sup>

In sum, voting until the end of 2013 was characterized by costly transparency both towards voters and parties. Voters adopted a strong principal role borne out by the fact that individual characteristics of candidates were often more relevant than the party label during elections and deviations from the party line were rather common. Recorded electronic voting increased the observability of individual decisions in final passage votes for actors both within and outside of

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<sup>22</sup> During the debates preceding the reform, the opponents of the reform voiced concerns that exactly this political culture that allowed the Upper House to focus on finding a consensus and follow voters’ interests instead of party politics would be destroyed by vote transparency and pressure from party leaders would increase if individual votes were disclosed (Amtliches Bulletin, 2012, pp. 516–523, 976–980, 114–1116, 2013, pp. 71–78). Supporters said that voters had the right to know how their representatives’ vote in parliament. Interestingly, these arguments closely resemble the discussion in US Congress prior to the start of vote recording in the first half of the 19<sup>th</sup> century (Jenkins and Steward, 2003).

<sup>23</sup> The parliament’s website was relaunched with an entirely new design and structure in 2016. This paragraph refers to the website’s old version operational during our sample period.

<sup>24</sup> Searching for newspaper articles covering individual legislators’ votes, we found only four articles on the Upper House in contrast to 19 on the Lower House in 2014 and 2015. We document the search in Appendix D.



parliamentary proceedings. Though a certain degree of transparency existed before the publication of electronic voting records and parties have access to insider information, the monitoring costs incurred by parties markedly decreased while the media coverage of MPs' voting did not change after the reform. The literature agrees that voting cohesion is in the parties' best interest, and this principal deploys an array of instruments to discipline its members. If individual voting decisions become more observable for parties, we expect an increase in party cohesion as legislators will deviate less often from the party line:

**Hypothesis** (Parties as main beneficiaries of vote transparency). *When individual vote transparency increases, so too does the legislators' accountability to their parties. Legislators deviate less often from the party line.*

Below we describe the empirical framework, which explains how we test our hypothesis. Ideally, we would also like to directly test whether accountability towards voters increased or decreased. It is argued in the literature that voters demand politicians to stand up against the party line if it is in the constituencies' interest. Deviation from the party line is even used as a direct measure for voting in line with constituency interests (e.g., Snyder and Strömberg, 2010). However, whether increased party discipline hurts voters' interests, or is beneficial for constituencies is ambiguous.<sup>25</sup> To investigate whether a decrease in deviations from the party line goes against voters' interests, the result section also provides evidence on lame ducks (for which parties are less important), on legislators with marginal seats, and on aligned cantonal voting.

## 4 Estimation Strategy

Our goal is to estimate the relationship between vote transparency measured as the introduction of recorded voting and the probability of deviating from the party line. Comparisons of pre- and post-recorded voting might suffer from the fact that bills could systematically differ over time. The ideal experiment would be to have two identical chambers, both of which would vote electronically. While in one chamber votes would always be published, the second one would initially not publish the records, but switch to published voting afterwards. Comparing differences between both chambers with and without vote transparency would identify the effect in question.

Though our empirical framework deviates from the ideal world in two ways, we argue that we can nevertheless identify a causal effect. The Upper House is our treatment group and the Lower House is the control group. The Lower House is a good control group for several reasons. As we restrict our analysis to final passage votes only, this guarantees that both chambers of parliament vote on exactly the same measure and the same legislative text. Furthermore, all votes in both chambers take place simultaneously - usually the last day of the session. In the period we studied,

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<sup>25</sup>If, for example, without vote transparency a politician voted according to her own ideology, which was in conflict with the party line as well as with constituency interests, stricter adherence to the party line due to vote transparency can be both in the party's and in the voters' interest.

there was only one exception to this rule, with one chamber voting on the following day. It is highly unlikely that additional information or discussions influence the voting behavior of the chamber which votes second.

The first deviation from the perfect experiment is that the chambers differ in terms of size, party representation and election procedures, which are known to affect party unity. Since these differences are time-invariant, they most likely only affect the level difference in party line deviation between the chambers.

The second deviation comes from the fact that the Upper House not only changed its guidelines on the publication of voting records but also its vote-casting mechanism (from a show of hands to an electronic system). Arguably, this change potentially affects the internal visibility of voting behavior. Under the show-of-hands system, legislators sitting in the front row had a restricted view of how the other councilors were voting, while everyone else could clearly monitor proceedings. In contrast, the electronic voting system means that all individual votes are immediately and universally visible on a large, electronic board. We check whether the change in internal visibility also played a role by using the seating arrangements in the chamber. As we show in the results section, the change in voting procedure to electronic voting per se seems to have a negligible effect.

#### 4.1 Empirical specification

Previous research on party discipline is typically based on aggregate measures like the Rice Index (Rice, 1928) or the Agreement Index, which also takes into account abstentions (Hix et al., 2005). In contrast, our analysis makes use of individual legislator voting data. This helps us overcome problems related to the definition of party discipline, and makes it possible to control for individual characteristics that potentially influence voting behavior.

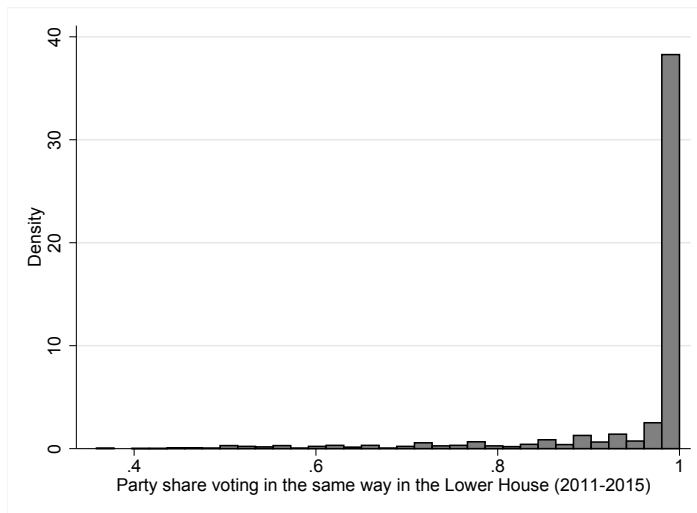
$Partyline_{ip}$  is defined as whatever the majority of party members from party  $p$  votes for in vote  $i$ . The party line can be *Yes*, *No* or *Abstain*. This definition is similar to the one applied in most of the related literature, in which it is defined according to the majority of party members (e.g. Bütikofer, 2014). For robustness, we show that using party lines with more conservative cutoffs (50, 67, 80, 90% majorities) does not affect our results. An alternative way to define party line is to take the vote cast by the party leader, as used by Levitt (1996). We employ this definition as a robustness check. In Switzerland, though, party leaders play a less important role than their counterparts in most other countries.

We determine the party line for each vote and each party according to voting outcomes in the Lower House. There are several reasons why we adopt this approach. First, such a definition is unaffected by the transparency reform. Second, all votes from the Lower House are electronically recorded and therefore accurate. Third, the relatively large number of party members ranging from nine to 54 allows for a meaningful definition of party majority. During the interviews described in Section 3.2, the party secretaries from all four large parties acknowledged extensive prior consultations, as well as the distribution of supporting materials and guidelines before votes in the Lower House. Bailer and Bütikofer (2015) document that the biggest parties issue official voting

recommendations to its members for roughly 54 to 85% of all votes. However, the recommendation is not made public.

Our definition of party line - whatever the majority of party members votes for - is a very conservative measure, since an average of 95.5% of party members select the same voting option. Figure 3 depicts the histogram of all party majorities, confirming that most party lines are backed by a solid majority.

FIG. 3: PARTY SHARES DEFINING PARTY LINES



NOTE: Share of party members voting in the same way per party in the Lower Council (12/2011-11/2015). The party majority defines the party line.

Our dependent variable  $Deviate_{ij}$  takes on value 1 if legislator  $j$  deviates from his party's  $p$  line in vote  $i$ .<sup>26</sup> The case in which the party line is *Yes* and the member votes *No*, for example, clearly constitutes a vote against his own party. The classification of abstention is less straightforward. Again, suppose the party line is *Yes*. While abstaining is at odds with the party line, it is less confrontational than voting no (Carey, 2007). Also, in Switzerland the relative measure to pass legislation is a majority of all yes and no votes. Thus, voting no is more likely than abstention to swing the vote in the direction that the party does not want. If the party line is either yes or no and the legislator abstains, we therefore do not classify it as deviating from the party line. We provide evidence that treating abstention as a deviation does not change our results qualitatively.

Formally, let  $Vote_{ij} = \{Yes, No, Abstain\}$  be the vote of legislator  $j$ . Then

$$Deviate_{ij} = \begin{cases} 0 & \text{if } Vote_{ij} = Partyline_{ij} \vee (Vote_{ij} = abstain \wedge Partyline_{ij} \neq abstain) \\ 1 & \text{else} \end{cases}$$

We define the group variable  $UH_{ij}$ , which takes on value 1 if the legislator is a member of the

<sup>26</sup>To reduce notation, we shall omit the  $p$  subscript here, as each  $j$  in vote  $i$  uniquely identifies a party membership.

Upper House and thus in the treatment group. It takes on value 0 for the control group, the Lower House. The variable  $Reform_{ij}$  is 1 for the treatment period with electronic, published voting, and 0 for the pre-treatment period with unpublished voting in the Upper House. The effect of interest is the average treatment effect on the treated (ATET), i.e. the expected change in deviation from the party line when transparency switches from 0 to 1.

## 4.2 Identification

The ATET is identified by coefficient  $\beta_1$  in the following estimation equation (e.g., Imbens and Wooldridge, 2009; Lechner, 2010):

$$Deviate_{ij} = \alpha + \beta_1 UH_{ij} \times Reform_{ij} + \beta_2 Reform_{ij} + \xi u_j + \epsilon_{ij} \quad (1)$$

We control for legislator fixed effects  $u_j$  taking into account all time-invariant individual characteristics, such as party, canton, gender, tenure or age. It also controls for time-constant membership in the Upper House and Lower House during the legislative period. It is therefore unnecessary to control for the baseline term  $UH_{ij}$ .<sup>27</sup>

One of the main identifying assumptions for DiD is the common trend assumption: in the absence of treatment, the difference in deviation from the party line between the treated group (Upper House) and the control group (Lower House) would have been exactly the same as before the treatment.

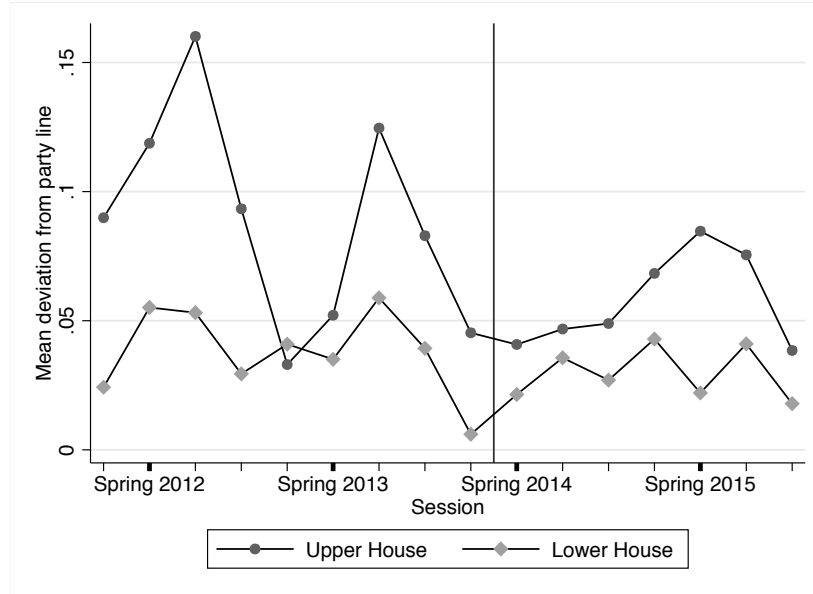
**Assumption 1** (Common trend). *If electronic voting had not been introduced in the Upper House, the difference in party line deviation between both chambers would have remained the same.*

Figure 4 depicts the mean deviation from the party line by chamber and for each voting session (four per year). The comparison includes the seven largest parties that are represented in both chambers. The picture shows that, first, mean deviations in both chambers displayed a parallel movement prior to the introduction of electronic voting (session Spring 2014, marked as a solid vertical line) with the exception of the winter session 2012. The collapse in the difference between the chambers coincides with the timing of the highest level of media attention due to counting errors that occurred during debates held prior to the introduction of electronic voting (cf. Section 3). This session might thus be viewed as “treated” even though it belongs to the pre-reform period.<sup>28</sup> Except for this special case, the graph supports the validity of the common trend assumption. Second, the difference between chambers before and after the reform seems to narrow considerably. This points to a closing cleavage in party line deviation between the chambers.

<sup>27</sup> Only one legislator switched from the Lower House to the Upper House half a year after the beginning of the 2011-2015 legislative period. Controlling for Upper House membership and individual fixed effect would only reflect this legislator’s behavior. For robustness, we run our baseline regressions excluding this legislator. The results remain significant (cf. Table B2 in Appendix B.1).

<sup>28</sup> We run the main regression either dropping the winter session 2012 or coding it as treated. The significance of the main result remains unaffected (cf. Table B3 in Appendix B.1).

FIG. 4: MEAN DEVIATION FROM PARTY LINE BY CHAMBER



NOTE: Mean deviation from party line per session and chamber over time (12/2011-11/2015). Each tick on the x-axis marks one of the four yearly voting session. The thick ticks mark the spring session.

As explained above, the reform to electronic and published voting was brought about by media pressure to resume the transparency bill after revealed counting mistakes. Though the decision was taken by a vote of the members of the Upper House, they were forced to deliberate upon the electronic voting system for reasons unrelated to individual voting decisions. The reason was purely procedural and thus exogenous to transparency, in that the public demanded correctly determined voting outcomes.

The timing of the reform, roughly halfway through the legislative period 12/2011 to 11/2015, facilitates the identification of our main effect. We have a sufficient number of observations before and after the change in voting procedures. A further assumption concerns the relationship between electronic voting in the Upper House and voting behavior in the Lower House. It closely resembles the stable unit of treatment value assumption (Rubin, 1977).

**Assumption 2** (Stable preferences in the Lower House). *Legislators in the Lower House are not affected by the change in the Upper House's voting procedures.*

The influence of voters and parties (as principals) in the Lower House is assumed not to change with increased vote transparency in the Upper House. In theory, with lower monitoring costs in the Upper House, the principals could shift resources to step up vote monitoring in the Lower House. However, this is unlikely to be the case since the Lower House has recorded electronically and published all votes since 1994, and that voting procedures have remained unchanged since 2007.

In a similar vein, we require an assumption about the type of bills voted upon.

**Assumption 3** (Stable bill characteristics). *Changes in transparency do not affect the characteristics of bills reaching the final passage vote.*

With respect to this assumption two aspects are relevant. First, with the introduction of electronic voting, the legislative process has become more transparent, also through the publication of some votes preceding the final passage decision. This could lead to different types of votes reaching the final stage. Second, in anticipation of transparent voting, bills initiated after the reform might be formulated differently. We provide evidence for the validity of this assumption in a robustness check.

For an analysis of vote transparency, we require a final assumption.

**Assumption 4** (Ideology). *Changes in transparency do not affect the legislators' ideological positions.*

Our analysis is based on votes from a single legislative period (2011-2015). It is unlikely that major ideological shifts would have occurred within this relatively short period of time. Thanks to our DiD setting, this assumption allows us to circumvent the problem that by observing votes it is virtually impossible to say whether it was the result of perfect agent and principal alignment, or that the legislator was pressured by his principal (Krehbiel, 1993, 2000; McCarty et al., 2001; Snyder and Groseclose, 2000).<sup>29</sup> We only observe a discontinuous change in transparency under preferences that can be assumed to be fixed.

If our hypothesis were true and transparency enhanced the monitoring capacity of parties, we should expect less deviation from the party line, i.e.,  $\beta_1 < 0$ . However, our setting only identifies the net effect of counteracting forces from competing principals. Whether voters benefit or lose from increased transparency cannot be assessed by just looking at  $\beta_1$ . In the results section we provide further evidence on the effect of the transparency reform on voters.

## 5 Data

Our analysis is based on the legislative period starting in December 2011 and ending in November 2015. In total, our data set encompasses 298 final passage votes with around 68,000 individual legislator decisions.

Aggregate voting results for both chambers are retrieved from the parliamentary homepage, Curia Vista. For the Lower House, and, since 2014 for the Upper House, individual voting data are available in PDF format on the parliamentary website. Until summer 2014, the data for the Lower House were taken from smartmonitor, a project that collects all individual votes in a database. For the remaining ones, we hand-collected the data from the parliamentary homepage.

Before 2014 individual voting data in the Upper House were available via video recordings made by the Swiss Broadcasting Corporation (SRG SSR). All videos can be watched online via links on

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<sup>29</sup>In Appendix E we provide an illustrative example clarifying the need for Assumption 4.

the parliamentary homepage, which also contains an archive of the verbatim minutes (Amtliches Bulletin). We hand-collected individual voting decisions by watching the videos of the relevant final passage votes. For the period prior to electronic voting, around 86.2% of the legislators' votes are directly visible. Several factors contribute to non-visible decisions: a camera that is too slow to capture all legislators, vote counters not actively raising their hands but simply adding their votes to the result<sup>30</sup>, or legislators sitting in the far corners of the chamber. However, once we know the aggregate results, we are able to infer another 10.8% of individual votes, such that only 3.1% of decisions remain unknown.

Inferring individual votes is straightforward if decisions are unanimous and we observe all abstentions. In general, if a legislator is observed for two out of three options (Yes, No, Abstain), his/her decision can be inferred. In some cases all unobserved legislators can be assigned to one response if, for example, we know from the aggregate that all yes and no votes are correctly observed. The remaining missing decisions must, therefore, be abstentions.

Comparing the observed voting decisions (excluding those which are inferred) with the official results reveals seven counting errors. In these cases, we correct the official aggregate voting results. Our procedure therefore relies on the assumption that official aggregate results are reported correctly on average and counting errors occur randomly.

Our data is a panel with repeated observations for the same legislators by vote. The panel is unbalanced for a number of reasons. In the case of voluntary or forced departures, new politicians replace the outgoing legislators. In the Upper House and the Lower House there were three and 26 changes, respectively. The causes are (frequency in brackets): election to the Federal Council (1), change of chambers (1), death (3), and resignation (24). Absences during sessions are a further cause of the unbalanced panel. Moreover, with the exception of tie-breaks, chamber presidents typically do not vote in final passage votes during their one year in office. This is why we exclude their voting records during that time.

The rich empirical setting allows us to use various bill-related control variables. We collected contextual information about each bill and final passage vote. More complex bills can have more than one final passage vote. We retrieved information on the type of bill (*Government bill*, *Parliamentary initiative*, *Popular initiative*, *Counter proposal*), type of legislation (*Law*, *Enactment*), and which of the two chambers debated the bill first, referred to as *First council*. By collecting information on the date and time of the final passage vote, we know which chamber was the *First voter*, i.e., which chamber was first to take the final passage vote. When information on the time was unavailable for the Upper House, it was inferred from the time stamps shown on the videos.

Data sources for all variables are documented in Appendix A.

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<sup>30</sup>Vote counters are elected members of the Council of State. They first count the votes of all members voting by show of hands. Afterwards they add their own votes to the result. But they typically do not actively show their hands such that their votes are not explicitly visible on video.

## 6 Results

All regressions are based on observations from members of the seven parties represented in both chambers. Observations from small parties are dropped because they cannot be compared across chambers. We always control for legislator fixed effects and cluster standard errors at legislator level.<sup>31</sup> We first report the baseline results on party line deviation, and show that our findings are robust. Next, we focus on party-level effects. Finally, we provide evidence for the effect of the reform on voters.

### 6.1 Party line deviation

#### 6.1.1 Main Results

Baseline results on party line deviation are reported in Table 2. In column (1) we find a negative and significant effect of electronic voting on the probability of a legislator deviating from the party line. After the reform, legislators in the Upper House are 2 percentage points less likely to vote against their party line as compared to legislators in the Lower House.

The effect is sizable in economic terms. The initial share of deviations in the Upper House amounted to 10%. Electronic voting thus led to a drop in party line deviation in an order of magnitude of one fifth. Given the chamber’s size of 46, it means that on average about one member less is deviating from the party line than before the reform.

The *Reform* coefficient has a negative and significant sign as well, suggesting a drop in deviations from party line in the Lower House by 1.2 percentage points in the second half of the legislative period. This decline may, e.g., reflect differences in the type of bills that were debated before and after the reform.

The results are highly robust to various checks. Overall linear session-time trends are included in column (2), but have little effect on the results. The reform coefficient, i.e., the difference in deviations from the party line before and after the reform for the Lower House, becomes insignificant when trends are accounted for, but the effect of the reform in Upper House remains stable.

The sample contains 97% of pre-reform observations in the Upper House. 86% rely on video observations while the rest has been inferred from the aggregate voting results. Observability is crucial when evaluating the effects of vote transparency. Legislators sitting in the corners of the chamber, as well as vote counters are potentially less affected by the increase in transparency due to their reduced visibility on videos. We thus rerun the regression only with votes that have been observed on video (column (3)). The coefficient gets slightly smaller in absolute terms.

Five legislators with more than 25 missing observations were dropped in column (4) to avoid a systematically unbalanced panel. These were either vote counters, vice presidents, as well as one member sitting in the very corner. The size of the effect decreases to -0.018, but remains

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<sup>31</sup>We rerun the main regressions with differently specified standard errors for robustness. Results are mostly robust when using two-way (legislator-vote) clustered standard errors. Result tables are reported in Appendix B.2.



Table 2: PROBABILITY OF PARTY LINE DEVIATION

VARIABLES	(1) Baseline	(2) Timetrend	(3) Observed	(4) Missing
UH * Reform	-0.020*** (0.006)	-0.020*** (0.006)	-0.019*** (0.006)	-0.018*** (0.006)
Reform	-0.012*** (0.002)	-0.005 (0.003)	-0.012*** (0.002)	-0.012*** (0.002)
Constant	0.052*** (0.001)	0.057*** (0.002)	0.051*** (0.001)	0.050*** (0.001)
Observations	68,104	68,104	67,336	67,174
Number of MPs	261	261	261	256
R-squared	0.002	0.002	0.002	0.002

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Errors are clustered at legislator level.

statistically significant.

### 6.1.2 Alternative Definitions of Party Line

In keeping with the literature, we defined the party line as whatever the majority of party members has voted for. On the one hand, this definition is intuitive, as the party majority should be a good measure of party ideology. Moreover, descriptives showed that parties tend to vote relatively cohesively, with an average of 95.5% party members voting for the same alternative. On the other hand, party lines with narrow majorities can potentially signal some form of party disagreement. We therefore run alternative specifications in which we define the party line according to majority cutoffs of  $c\%$  with  $c \in \{90, 80, 67, 50\}$ . As a consequence, we exclude votes with party majorities below the cutoff. Results are reported in columns (1) to (4) in Table 3. We find that the size of the estimated effect increases in absolute terms the more loosely the party line is defined, but the negative effect is robust throughout the various cutoffs.

Following Levitt (1996), we also run a regression specifying the party line as whatever the party leader has chosen. The coefficient becomes insignificant. This is of little surprise, as Swiss party leaders are less dominant political figures compared to their counterparts in other countries. On certain decisions even party leaders deviate from party lines.

In column (6) we show that defining abstention as deviation from party line (in case abstain was not the party line) does not change our coefficient of interest.

In a last approach to support the validity of our definition of party line, we compare our inferred party lines with official party recommendations for popular initiatives.<sup>32</sup> Prior to referendum votes on popular initiatives, parties and interest groups officially issue voting recommendations to the

<sup>32</sup>The popular initiative is a direct democratic instrument which allows any eligible citizen to propose changes to the federal constitution upon collecting 100,000 signatures within 18 months. Parliament is legally obliged to debate the initiative and a potential compromise, the counter proposal.

Table 3: ALTERNATIVE DEFINITIONS OF PARTY LINE

VARIABLES	(1) 90%	(2) 80%	(3) 67%	(4) 50%	(5) Party leader	(6) Abstention
UH * Reform	-0.013*** (0.004)	-0.016*** (0.005)	-0.020*** (0.005)	-0.020*** (0.006)	-0.012 (0.008)	-0.020*** (0.007)
Reform	0.001** (0.001)	-0.000 (0.001)	-0.006*** (0.001)	-0.011*** (0.002)	-0.012*** (0.003)	-0.012*** (0.003)
Constant	0.010*** (0.000)	0.018*** (0.001)	0.031*** (0.001)	0.047*** (0.001)	0.073*** (0.001)	0.073*** (0.001)
Observations	55,813	60,818	64,430	67,509	68,054	68,104
Number of MPs	261	261	261	261	261	261
R-squared	0.001	0.001	0.001	0.002	0.001	0.001

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Standard errors in parentheses, clustered at legislator level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Party line in (1)-(4) is defined as what 90, 80, 67, or 50% of party members vote for. In (5) the party line is defined according to how the party leader voted. In (6) abstention is defined as deviation from party line if the party line was yes or no.

electorate. It is reasonable to argue that such recommendations reflect the party line. For all 31 popular initiatives debated and concluded during the 2011-2015 term, we find that the voting recommendation coincides with our measure of party line. The decision of the party majority is a good representation of the party platform.

### 6.1.3 Bill-level Characteristics

Next, we deal with particular characteristics of the bills voted upon. In column (1) in Table 4 we restrict the votes to bills drafted before 2013. One concern is that electronic voting not only affects voting in the final votes, but on preceding votes as well. In this case, bills drafted after the reform would systematically differ from older ones. In our favor, even after the reform, individual voting decisions are not published for detailed votes, which are cast at the beginning of the legislative process. This reduces the likelihood of differences between old and more recent bills. In the restricted sample, the coefficient drops to -0.016. It is statistically significant only at the 10 percent level, most likely because we lose 39% of all post-reform observations.

In the remaining specifications of Table 4 we control for a number of bill-level variables, which possibly have an impact on parallel trends. The main effect remains highly robust to the inclusion of controls. Some of the variables significantly affect the probability of party line deviation. In column (2) we control for the type of bill and choose government bills as the reference category. Parliamentary initiatives, cantonal initiatives, and popular initiatives have lower deviations from party line on average. Counter proposals, which are the parliament's response to popular initiatives, do not have a significant coefficient. In column (3) we control for enactments and take decrees and laws as a reference category. Party line deviation is higher for enactments than in the other two vote categories. In column (4) we include a dummy controlling for whether the Upper House was

the first chamber to debate a bill. We find no significant effect. However, in column (5) we find that deviation from party line is lower whenever the Upper House votes first on the final passage vote (recall that final passage votes in both chambers mostly take place on the same day). All bill-level variables are controlled for simultaneously in specification (6). All significant variables retain their significance. Additionally, counter proposals have a significantly negative coefficient as well, suggesting less deviation in votes of counter proposals compared to government bills.

Table 4: CONTROLS AT BILL LEVEL

VARIABLES	(1) Old bills	(2) Bill type	(3) Enactment	(4) First council	(5) First voter	(6) All
UH * Reform	-0.016* (0.009)	-0.020*** (0.006)	-0.020*** (0.006)	-0.020*** (0.006)	-0.020*** (0.006)	-0.020*** (0.006)
Reform	-0.012*** (0.003)	-0.013*** (0.002)	-0.012*** (0.002)	-0.012*** (0.002)	-0.014*** (0.002)	-0.015*** (0.002)
Parl. initiative		-0.015*** (0.003)				-0.011*** (0.002)
Cantonal initiative		-0.038*** (0.007)				-0.031*** (0.007)
Popular initiative		-0.013*** (0.003)				-0.024*** (0.005)
Counter proposal		-0.005 (0.006)				-0.019*** (0.006)
Enactment			0.014*** (0.003)			0.018*** (0.004)
First council				0.000 (0.002)		-0.002 (0.002)
First voter					-0.022*** (0.004)	-0.027*** (0.005)
Constant	0.052*** (0.001)	0.056*** (0.002)	0.045*** (0.001)	0.051*** (0.001)	0.074*** (0.004)	0.077*** (0.005)
Observations	56,448	68,104	68,104	68,104	68,104	68,104
Number of MPs	261	261	261	261	261	261
R-squared	0.001	0.003	0.003	0.002	0.002	0.005

NOTE: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Legislator fixed effect regressions. Standard errors in parentheses, clustered at legislator level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation).

#### 6.1.4 Visibility of Voting Procedure

As mentioned earlier, seating arrangements in the chamber affects internal vote visibility, which in turn could have an impact on the probability of deviation. The councilors are spread relatively evenly across three rows. Comparing the mean deviation from the party line prior to the reform reveals that councilors sitting in the front row are most likely to deviate (15.3%), whereas the last row deviates least (5.8%). The observability of the voting decisions of councilors sitting in the front rows does not seem to prevent them from voting against their parties. Since the reform, the means by row decrease, but the ranking is preserved. This evidence points to an absence of change in internal vote visibility. It is much more likely that party effects play a role. For example, all SVP

members sit in the front, while CVP and FDP councilors sit further in the back.

### 6.1.5 Electoral Cycles

The literature contends that impending elections have an impact on party discipline (e.g., Levitt, 1996; Lindstädt, Slapin and Vander Wielen, 2011). As parties seek to present a united front to prospective voters and offer a strong party platform during the campaign trail, party cohesion increases in election years. Traber et al. (2014) provide supportive empirical evidence from the Swiss Lower House. Their finding is in accordance with the negative coefficient for the post reform period in most of our regressions. If the electoral cycle was identical for both chambers, it would not pose a problem to our research design, which is based on DiD estimation. However, if the cycle differed according to chamber, e.g. because of different election rules, the estimated effect of electronic voting could be due in part to the electoral cycle.

To address the issue of election cycles, we conduct placebo regressions with all final passage votes taken during the preceding legislative period (12/2007-11/2011). Throughout the term, neither chamber implemented changes to their voting procedures that affected transparency. Again, we apply the same procedure for inferring unobserved votes from video recordings in the Upper House, as explained in the data section. We define the variable *Placebo reform* in 03/2010, which corresponds to the timing of the real reform that occurred during the subsequent legislative period. Table 5 shows the results. The placebo reform has no significant effect on the probability of party line deviation in column (1) (the coefficient is even positive). In column (2), we restrict the sample to six parties, since the BDP did not yet exist at the beginning of this legislative period. The result does not change.

Additionally, we run a triple difference regression using the difference between the two legislative periods as the third difference. The results are shown in Table 6. The coefficients are negative and the suggested effect is larger in absolute terms than before.

The results thus prove robust even when election cycles are taken into account: the placebo regression is insignificant, and taking the triple difference still shows that the transparency reform has had a significant effect.

Table 5: ELECTION CYCLES: PLACEBO LEGISLATURE 2007-2011

VARIABLES	(1) Placebo 2007/11	(2) Without BDP
UH * Placebo reform	0.008 (0.010)	0.008 (0.010)
Placebo reform	-0.002 (0.002)	-0.001 (0.002)
Constant	0.045*** (0.001)	0.045*** (0.001)
Observations	65,237	63,920
Number of MPs	257	256
R-squared	0.000	0.000

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Standard errors in parentheses, clustered at legislator level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Observations based on final passage votes 2007-2011. The placebo reform is set to 03/2010 and corresponds to the timing of the actual reform in the sixth ordinary session of the legislative period. The BDP is dropped in (2).

Table 6: ELECTION CYCLES: TRIPLE DIFFERENCE

VARIABLES	(1) DiDiD	(2) Without BDP
UH * Reform * 49th legislature	-0.040*** (0.016)	-0.041*** (0.016)
UH * Reform	0.019 (0.013)	0.020 (0.013)
UH * 49th legislature	0.039*** (0.009)	0.040*** (0.009)
Reform * 49th legislature	-0.008** (0.003)	-0.010*** (0.003)
Reform	-0.004* (0.003)	-0.003 (0.002)
49th legislature	0.006* (0.004)	0.008** (0.004)
Constant	0.042*** (0.002)	0.042*** (0.002)
Observations	133,341	129,152
Number of MPs	348	340
R-squared	0.002	0.002

NOTE: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Difference - in - difference - in - difference. Legislator fixed effect regressions. Standard errors in parentheses, clustered at legislator level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Observations based on final passage votes 2007-2015. The reform variable corresponds to the timing of the actual reform in the sixth ordinary session of the legislative period 2011-2015 and to the placebo reform in the sixth ordinary session of the legislative period 2007-2011.

## 6.2 What Drives the Effect?

The results and robustness checks indicate that on average party discipline in final passage votes improved since the recording of individual decisions. However, the effect potentially differs across parties.

Table 7 shows the results of our baseline regression for each of the parties separately. The coefficients are insignificant among the center parties CVP (column (4)) and BDP (column (7)). The remaining five parties have the expected negative treatment effect. It is largest among the SP and the SVP, the two dominant parties at either end of the political spectrum with the largest share of deviators before the reform. Deviation from the party line decreases by 4.5 and 8.8 percentage points, respectively, with recorded voting. For the other three parties GPS, GLP and FDP, the effect is similar to the average effect and varies between -2.1 and -2.3 percentage points.

Table 8 provides an overview of party lines by party. In total, the party line is “Yes” in almost 85% of all votes, reflecting that legislation is usually accepted at the final passage vote. Only very rarely is abstention the party line. Given that the SP and the SVP drive the overall negative effect of recorded voting, we take a closer look at these parties. Comparing shares of party lines for the SP with the overall average reveals that the SP is an “average” party in this regard.

The SVP is an exception: it has an almost equally divided number of votes with a supporting and an opposing party line, respectively. It is thus the party most likely to reject legislation at the final stage. Evaluating the individual voting decisions of SVP members in the Upper House reveals that roughly 95% of all deviations from the party line were yes votes. This means that SVP members in the Upper House voted yes even though their party line was to reject the bill. Given that SVP legislators in the Upper House have more frequently voted in accordance with their party line since the introduction of vote recording, they are more likely to oppose legislators from the other parties.<sup>33</sup>

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<sup>33</sup>We also checked for changes in aggregate outcomes at vote level induced by fewer deviations from party line. The only significant change regards a decrease in unanimous voting (cf. Table B1 in Appendix B.1).

Table 7: RESULTS BY PARTY

VARIABLES	(1) SP	(2) GPS	(3) GLP	(4) CVP	(5) FDP	(6) SVP	(7) BDP
UH * reform	-0.045*** (0.006)	-0.022*** (0.005)	-0.023*** (0.005)	0.001 (0.006)	-0.021* (0.012)	-0.088*** (0.014)	0.014 (0.008)
Reform	-0.008** (0.003)	-0.004 (0.005)	-0.001 (0.001)	-0.003 (0.003)	-0.002 (0.004)	-0.032*** (0.005)	0.002 (0.008)
Constant	0.038*** (0.001)	0.034*** (0.002)	0.010*** (0.000)	0.030*** (0.001)	0.043*** (0.002)	0.108*** (0.002)	0.017*** (0.003)
Observations	16,218	4,736	4,091	11,833	11,725	16,629	2,872
Number of MPs	60	19	14	42	48	66	12
R-squared	0.005	0.000	0.002	-0.000	0.001	0.005	-0.000

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Standard errors in parentheses, clustered at legislator level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). The effects are estimated for party subsamples.

Table 8: Party lines by parties in %

Party	BDP	CVP	FDP	GPS	SP	SVP	GLP	Total
Yes	96.84	95.79	92.63	80.00	84.21	49.47	92.98	84.56
No	2.46	3.16	7.37	16.14	12.63	45.26	6.32	13.33
Abstain	0.70	1.05	0	3.86	3.16	5.26	0.70	2.11

NOTE: Share of party lines “Yes”, “No” and “Abstain” by party and vote. Based on all 298 final passage votes in the 2011-2015 legislative period.



## 6.3 The Effect of Transparency on Voters

The analysis provides evidence for more united party voting, but says little about the effect on voters.<sup>34</sup> Ideally, we would like to directly test whether transparency affects the way voters' interests are represented. While a party line is easy to measure, the constituencies' interests are difficult to capture.<sup>35</sup> We propose three sets of evidence to analyze how the link between voters and legislators was affected by the reform. First, we distinguish between legislators running for reelection and those retiring who are not accountable to their principals anymore. Second, we consider the marginality of the legislators' seats in the 2011 election. Last, we exploit that legislators from the same canton represent the same voters but may be members of different parties.

### 6.3.1 Lame Ducks

Accountability towards voters strongly depends on the availability of elections as a punishing/rewarding device. We therefore test for differential reform effects among those who want to get reelected and those who do not. *Running* is 1 if a member of parliament was candidate in the 2015 election. It takes on value 0 if a legislator retired from his representative function.

In column (1) of Table 9 we repeat the baseline regression with the subset of observations from legislators who were members of the parliament at the end of the 2011-2015 legislative period. I.e., we drop everybody who ceased to be member of the parliament and thus never made a decision on whether or not to be a candidate in the 2015 election. The estimated coefficients (-0.020 and -0.012) are unchanged when compared to the full sample. In columns (2) and (3) we run the regressions separately for retiring legislators and candidates in 2015. While there is no significant effect among the retiring ones, legislators aiming at continuing their political careers reduce deviations from party line by 2.9 percentage points. In column (4) we interact the variable *Running* with the baseline model to test whether the difference between the subsamples is indeed significant. The coefficient  $UH * Reform * Running$  is significantly negative. It indicates that the negative effect of the reform on deviations from party line is larger in absolute terms by 3.4 percentage points for candidates than for retiring members of parliament.

The results fit nicely with evidence on “lame duck” behavior (e.g., Besley and Case, 1995; List and Sturm, 2006). Legislators in their last term are unaffected by institutional changes since the accountability link to their principals has lost bite. Lame ducks neither feel more accountable to their party nor their voters. In contrast, politicians wishing for another term in office are susceptible to changed incentives in the new institutional setting. Both principals are relevant: voters because of re-election constraints, and parties due their gate-keeping role for the access to legislative resources and commission seats during the next legislative period. While the reduction

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<sup>34</sup>Snyder and Strömberg (2010) use deviations from the party line as a direct measure for voting more in line with constituency interests since constituency and party interests sometimes diverge. However, as outlined in Section 3.3 we think that there exist circumstances in which stronger adherence to the party line could be in the interest of voters. Hence, our results so far do not provide evidence on the effect of the reform on voters.

<sup>35</sup>One avenue in this direction is the analysis of referendums. E.g., Stadelmann et al. (2014) compare the votes of legislators with the ones of their cantonal constituents.

Table 9: LEGISLATORS RETIRING OR STANDING FOR REELECTION

VARIABLES	(1) Baseline	(2) Retiring	(3) Candidate in 2015	(4) Interaction
UH * Reform	-0.020*** (0.006)	0.006 (0.012)	-0.029*** (0.007)	0.006 (0.011)
Reform	-0.012*** (0.002)	-0.013** (0.006)	-0.012*** (0.002)	-0.013** (0.006)
UH * Reform * Running				-0.034** (0.013)
Reform * Running				0.002 (0.007)
Constant	0.051*** (0.001)	0.056*** (0.002)	0.050*** (0.001)	0.051*** (0.001)
Observations	64,205	9,626	54,579	64,205
Number of MPs	235	36	199	235
R-squared	0.002	0.000	0.002	0.002

NOTE: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Legislator fixed effect regressions. Standard errors in parentheses, clustered at individual level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation).

in deviations from the party line among legislators running for reelection is in the party's interest, we still cannot directly evaluate how constituency interests are affected. In order to do so, we extend the analysis in the next subsection and differentiate between legislators who face different reelection constraints depending on the marginality of their seat.

### 6.3.2 Election Margin

Representatives who will be reelected with certainty are less accountable to voters than those representatives who face close elections (e.g., List and Sturm, 2006). If adherence to the party line entails costs to voters, we should expect a smaller effect of the transparency reform for legislators facing a larger degree of political competition. If, on the other hand, party discipline was in the interest of voters, legislators holding a marginal seat would be expected to exhibit a larger decrease in party line deviation.

We use the election results in the 2011 elections as a proxy measure for (expected) electoral support. If no candidate accumulates an absolute majority of votes in the first election round to the Upper House, a second round is called for. The only exemptions are the cantons with proportional elections (Jura and Neuchâtel). Whether a legislator was elected in the first or the second round thus reflects the marginality of a seat. Let the variable *Firstround* take on value 1 if a legislator was elected in the first round, and 0 else.

Since the concept of two-round voting is only applicable to the Upper House but not to the Lower House, we cannot run our DiD regression. Instead, we focus on observations from the Upper House and control for the reform indicator as well as legislator fixed effects. Results are in Table 10. We begin by running a baseline regression for the pooled sample in column (1). The reform

Table 10: LEGISLATORS ELECTED IN FIRST OR SECOND ROUND

VARIABLES	(1) Baseline	(2) First round	(3) Second round	(4) Interaction	(5) Candidates in 2015	(6) Without proportional elections
Reform	-0.032*** (0.006)	-0.040*** (0.009)	-0.022** (0.008)	-0.022*** (0.008)	-0.024** (0.009)	-0.024** (0.009)
Reform * Firstround				-0.018 (0.011)	-0.027** (0.013)	-0.031** (0.014)
Constant	0.096*** (0.003)	0.110*** (0.004)	0.077*** (0.004)	0.096*** (0.003)	0.104*** (0.003)	0.107*** (0.003)
Observations	12,463	7,174	5,289	12,463	9,078	8,049
Number of MPs	47	28	19	47	34	30
R-squared	0.003	0.005	0.002	0.004	0.006	0.006

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effects regressions. Standard errors in parentheses, clustered at individual level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Only observations from the Upper House in the legislative period 2011-2015.

coefficient is significantly negative. Its size -0.032 is slightly more negative than the DiD coefficient of -0.020 because the control group is missing.

In column (2) and (3) the regression is run separately for the subgroups of legislators elected in the first and second round. In both cases the coefficients are significantly negative, but more so for those elected in the first round (-0.040 vs. -0.022). Running an interacted model in column (4) shows, however, that the difference between the subgroups is insignificant (the coefficient of *Reform \* Firstround* is insignificant). Only when concentrating on legislators who stood for reelection in 2015 and dropping all politicians retiring in column (5), does the difference become significant. Legislators elected with a larger margin reduce deviations from party line by 2.7 percentage points more than legislators holding more marginal seats. In column (6) we also drop legislators from cantons with proportional elections who by definition only hold one election round. The result remains significant and the coefficient slightly increases in absolute terms.

The results confirm that the disciplining effect of increased transparency on aligned party voting is very unlikely in the interest of voters, since those legislators who have the strongest incentives to vote according to the interests of their constituency - legislators who were elected with a narrow margin and who were standing for reelection in 2015 - exhibit the least reduction in party line deviation. In the next subsection we study aligned cantonal voting and provide additional evidence that voters' interests are less represented after the reform.

### 6.3.3 Aligned Cantonal Voting

Of all cantons, 20 are represented by two legislators. 17 out of 20 cantons have legislators from two distinct parties. In these cases, two legislators from the same canton are accountable to the same voters but answer to different parties. Poole and Rosenthal (1984) formulate a similar idea for the US Senate.

Let  $Same\ decision_{ci}$  indicate that two legislators from the same canton  $c$  with different parties take the same decision on vote  $i$ . I.e., both vote yes, no or abstain. If decisions differ, the variable is zero. Define  $Different\ party\ line_{ci}$  to take on value 1 if the party lines of such two legislators differ. It takes on value 0 if party lines correspond.

The idea is intuitive. If party lines for legislators from the same canton overlap, in most cases, requests from both party and voter principals are identical.<sup>36</sup> The two legislators may be expected to vote in the same way. Transparency should not affect voting in the case of identical party lines. If, however, the party lines differ, the problem of competing principals arises for one of the two legislators. This legislator has to weigh the interests of voters and party, and will hurt one of the principals when casting a vote. Public voting may impact the decision which principal’s interest will get a larger weight.

Similarly to the main estimations, we are interested in the effect of the reform on aligned cantonal voting. The analysis is restricted to voting in the Upper House only. We explore how alignment reacted to the increase in transparency when party lines in the same canton differ (treatment group, 18% of votes), and compare it to alignment when party lines coincide (control group, 82% of votes). Canton fixed effects  $u_c$  are controlled for. The estimation equation is the following:

$$Same\ decision_{ci} = \alpha + \beta_1 Different\ party\ line_{ci} \times Reform_{ci} + \beta_2 Different\ party\ line_{ci} + \beta_3 Reform_{ci} + \xi u_c + \epsilon_{ci} \quad (2)$$

Figure 5 visualizes the development of united cantonal voting for the subgroups of identical and different party lines aggregated by year since 2008.<sup>37</sup> If party lines correspond, i.e., parties are aligned in their demands to their members, legislators from the same canton vote alike in 95% of the votes in the 2011-2015 period. In 99% of the aligned cases both legislators simply follow their party line. Only in 1% both deviate from it.

In contrast, when party principals have conflicting views, representatives from the same canton are decidedly less likely to vote alike (56% of the cases on average). Both means evolve parallel until 2012, providing some evidence for the validity of a common trend assumption. In 2013, the mean in the treatment group decreases from 71% to 59%. In 2014, the year of the reform, a marked dip to 31% is visible. Afterwards alignment returns to a higher level of 54%. If party lines differ, but both legislators vote aligned, one of them is deviating from the party line in 97% of votes.<sup>38</sup> A reduction in aligned cantonal voting thus relates to a reduction in deviations from party line as shown in the main results section.

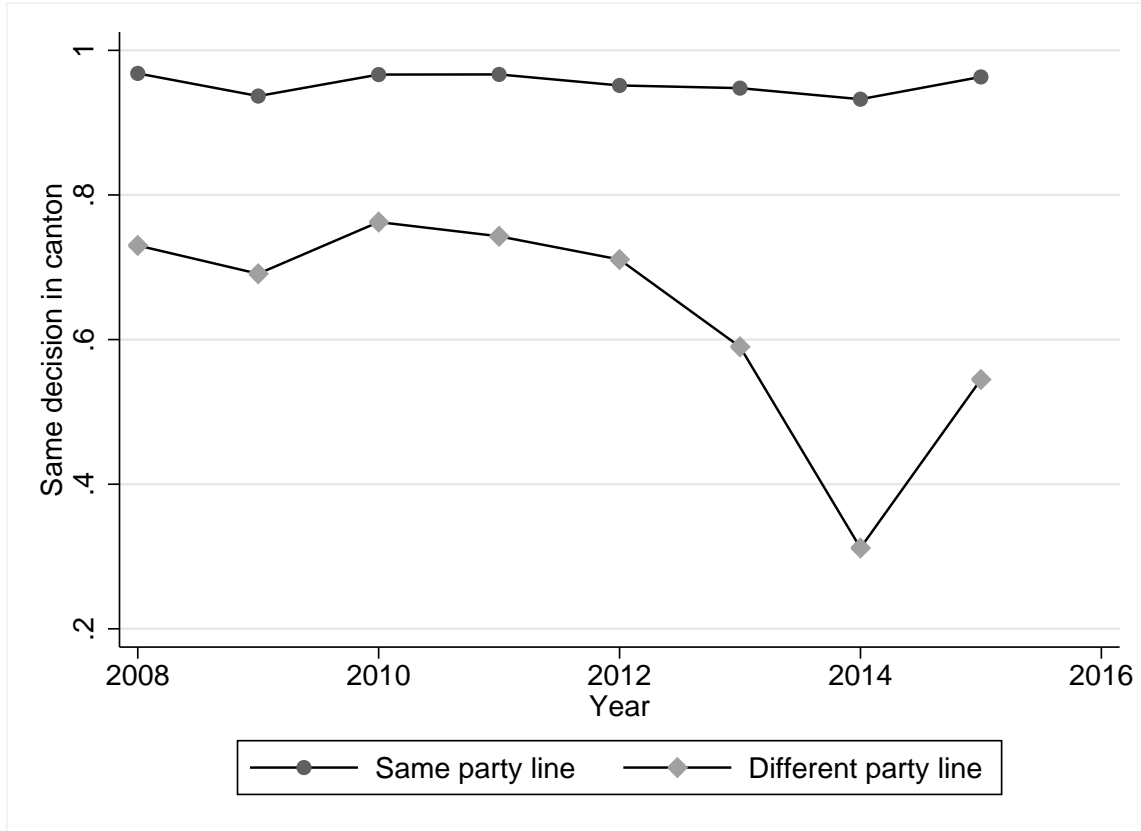
We run DiD regressions and report results in Table 11. Canton fixed effects are controlled for

<sup>36</sup>Theoretically, the party lines of both parties could differ from constituency interests. Since voters elected representatives from the specific parties, party lines and voter interests are positively (however not perfectly) correlated and identical party lines are congruent with voter interests in a majority of cases.

<sup>37</sup>The votes from the winter sessions 2007 and 2011 are added to 2008 and 2012 respectively. The reasons are few votes in 2007, and the winter session 2011 belongs to the legislative period 2011-2015.

<sup>38</sup>When party lines differ it is possible that legislators are aligned and none of them deviates if, e.g., both abstain and the party lines were yes and no respectively. However, empirically these cases are negligible.

FIG. 5: ALIGNED CANTONAL VOTING



NOTE: The y-axis shows the share of decision for which legislators from the same cantons vote in an aligned way, aggregated by year. The circles represent votes for which the legislators' two parties had the same party line, the diamonds stand for cases when these party lines differed.

and standard errors are clustered at canton level. In column (2) observations, for which one of the party lines was “abstain” or a legislator abstained, are dropped.

The regression results confirm the impression from the graphical analysis. We find a significantly negative effect of the reform on aligned cantonal voting. After the reform, legislators representing the same canton are 24.3 percentage points less likely to cast the same vote when their parties are divided over the bill. The result is robust throughout all specifications, though the effect size decreases in absolute terms to 19.3 percentage points in the more restrictive specification (2).

The result provides further evidence that the increase in transparency is costly for voters. When legislators have to choose between representing party or voter interests they decide more often to vote in line with the party principal after the reform.

Table 11: ALIGNED PARTY VOTING

	(1)	(2)
Different party line x Reform	-0.243*** (0.040)	-0.193*** (0.044)
Different party line	-0.295*** (0.040)	-0.368*** (0.046)
Reform	-0.004 (0.006)	-0.005 (0.006)
Constant	0.952*** (0.007)	0.954*** (0.006)
Observations	4,444	4,305
Number of cantons	17	17

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Canton fixed effects regressions. Standard errors in parentheses, clustered at canton level. Based on two-member cantons represented by two different parties. One observation per canton and vote. Dependent variable is 1 if both representatives from the same cantons cast the same decision in a vote, and 0 else. *Different party line* takes on value 1 if legislators from the same canton have differing party lines, and 0 else. In (2) observations, for which one of the party lines was “abstain” or a legislator abstained, are dropped.

## 7 Concluding Remarks

In parliamentary elections both voters and parties play an important role as principals to whom legislators are accountable. Previous literature finds that transparency should benefit voters relatively more than parties, since the latter have access to insider information even in a nontransparent setting. However, this is not necessarily true when party control is relatively weak, as we demonstrate using a reform in Switzerland's Upper House.

In our setting we find that parties benefit more from increased transparency and recorded votes than voters. More disciplined party voting strengthens the party label. Constituencies, on the other hand, seem to lose influence on individual decisions due to the reform. Their representatives are less aligned in their voting decisions depriving the cantons of a strong, united voice.

The results can be rationalized in several ways. The idea suggests itself that parties are more capable of effectively monitoring their members and identifying deviators. Parties either make use of the published results, or legislators perceive the threat of being monitored and adapt their behavior to their parties' wishes. Alternatively, it is the legislators' perception that not only parties but also the public request them to be loyal party followers. They might fear negatively framed media coverage naming and shaming them as deviators.

As a final alternative, voters might still be unaware of the new source of information about their legislators, or find it too cumbersome to access. Our results should consequently be interpreted as the immediate, short-term impact of increased transparency on legislative voting.

## Appendix

### A Data sources

Table A1: OVERVIEW OF VARIABLES AND DATA SOURCES

Variable	Source(s)	Description
Voting results Upper House	Videos through Amtliches Bulletin	yes, no, abstain, absent, excused
Voting results Lower House	smartmonitor until summer 2014, thereafter Amtliches Bulletin	yes, no, abstain, absent, excused
Aggregate voting results	Amtliches Bulletin	Official aggregate yes, no, abstain, absent, excused for Upper House and Lower House
Bill-related information	Amtliches Bulletin, Curia Vista	type of bill, type of legislation. first council, voting day and time, initiative/counter proposal

NOTE: This table provides an overview of the variables used with a short variable description, and the source from which it was retrieved.



## B Tables

### B.1 Robustness Tests Mentioned in Paper

Table B1: AGGREGATE OUTCOMES

VARIABLES	(1) % Yes	(2) % Yes	(3) Rice	(4) Agreement	(5) Unanimous
UH * Reform	-0.013 (0.021)	-0.030 (0.022)	-0.024 (0.043)	-0.043 (0.034)	-0.121* (0.074)
UH	0.126*** (0.015)	0.135*** (0.015)	0.250*** (0.029)	0.201*** (0.023)	0.419*** (0.049)
Reform	0.000 (0.017)	0.023 (0.017)	-0.000 (0.034)	0.033 (0.026)	-0.034 (0.046)
Constant	0.812*** (0.012)	0.770*** (0.012)	0.626*** (0.024)	0.656*** (0.018)	0.210*** (0.032)
Observations	596	596	596	596	596
Adjusted R-squared	0.172	0.164	0.174	0.165	0.151

NOTE: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Linear regressions. Robust standard errors in parentheses. Observations are at vote level. Dependent variables: (1) yes votes divided by sum of yes and no votes, (2) yes votes divided sum of all votes including abstentions, (3) Rice Index:  $\frac{|Yes-No|}{Yes+No}$ , (4) Agreement Index:  $\frac{1}{Yes+No+Abstain}(\max\{Yes, No, Abstain\} - \frac{1}{2}[(Yes + No + Abstain) - \max\{Yes, No, Abstain\}])$ , (5) indicator is 1 if vote was taken unanimously without no votes, 0 else.

Table B2: WITHOUT LEGISLATOR SWITCHING CHAMBERS

VARIABLES	(1) Baseline	(2) Timetrend	(3) Observed	(4) Missing
UH * reform	-0.020*** (0.006)	-0.020*** (0.006)	-0.019*** (0.006)	-0.018*** (0.006)
Reform	-0.012*** (0.002)	-0.005 (0.003)	-0.012*** (0.002)	-0.012*** (0.002)
Timetrend		-0.003*** (0.001)		
Constant	0.052*** (0.001)	0.057*** (0.002)	0.051*** (0.001)	0.050*** (0.001)
Observations	67,808	67,808	67,048	66,878
Number of MPs	260	260	260	255
R-squared	0.002	0.002	0.002	0.002

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Standard errors in parentheses are clustered at legislator level. One legislator who switched chambers is dropped from the regressions.

Table B3: SPECIAL ATTENTION DURING WINTER SESSION 2012

VARIABLES	(1)	(2)
	Without Winter 2012	Winter 2012 treated
UH * reform	-0.025*** (0.007)	-0.029*** (0.007)
Reform	-0.012*** (0.002)	-0.012*** (0.002)
Constant	0.053*** (0.001)	0.053*** (0.001)
Observations	65,145	68,104
Number of MPs	261	261
R-squared	0.002	0.002

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Standard errors in parentheses are clustered at legislator level. The Winter Session 2012 had special media attention due to counting errors. In (1) all observations from the Winter Session 2012 are dropped. In column (2) observations from the Upper House during the Winter Session 2012 are coded as treated, motivated by increased transparency caused by media during that time.

## B.2 Two-way Clustering and Legislator Fixed Effects

In this subsection we rerun the main article regressions from Tables 2-7 controlling for individual legislator fixed effects and two-way clustering error terms at legislator and vote level.

Table B4: PROBABILITY OF PARTY LINE DEVIATION

VARIABLES	(1) Baseline	(2) Timetrend	(3) Observed	(4) Missing
UH * reform	-0.020* (0.011)	-0.020* (0.011)	-0.019* (0.011)	-0.018* (0.011)
Reform	-0.012** (0.006)	-0.005 (0.011)	-0.012** (0.006)	-0.012** (0.006)
Timetrend		-0.003 (0.005)		
Observations	68,104	68,104	67,336	67,174
Number of MPs	261	261	261	256
R-squared	-0.002	-0.002	-0.002	-0.002

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Standard errors in parentheses are two-way clustered at legislator and vote level.

Table B5: ALTERNATIVE DEFINITIONS OF PARTY LINE

VARIABLES	(1) 90%	(2) 80%	(3) 67%	(4) 50%	(5) Party leader	(6) Abstention
UH * reform	-0.013 (0.008)	-0.016* (0.009)	-0.020** (0.009)	-0.020* (0.010)	-0.012 (0.011)	-0.020 (0.012)
Reform	0.001 (0.001)	-0.000 (0.002)	-0.006* (0.003)	-0.011** (0.005)	-0.012 (0.010)	-0.012* (0.007)
Observations	55,813	60,818	64,430	67,509	68,054	68,104
Number of MPs	261	261	261	261	261	261
R-squared	-0.004	-0.004	-0.003	-0.002	-0.003	-0.003

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Standard errors in parentheses are two-way clustered at legislator and vote level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Party line in (1)-(4) is defined as what 90, 80, 67, or 50% of party members vote for. In (5) the party line is defined according to how the party leader voted. In (6) abstention is defined as deviation from party line if the party line was yes or no.

Table B6: CONTROLS AT BILL LEVEL

VARIABLES	(1) Old bills	(2) Bill type	(3) Enactment	(4) First council	(5) First voter	(6) All
UH * reform	-0.016 (0.014)	-0.020* (0.011)	-0.020* (0.011)	-0.020* (0.011)	-0.020* (0.011)	-0.020* (0.011)
Reform	-0.012* (0.007)	-0.013** (0.006)	-0.012** (0.006)	-0.012** (0.006)	-0.014** (0.005)	-0.015*** (0.006)
Parl. initiative		-0.015* (0.008)				-0.011 (0.009)
Cantonal initiative		-0.038*** (0.007)				-0.031*** (0.008)
Popular initiative		-0.013 (0.009)				-0.024** (0.011)
Counter proposal		-0.005 (0.012)				-0.019 (0.013)
Enactment			0.014** (0.006)			0.018** (0.008)
First council				0.000 (0.006)		-0.002 (0.006)
First voter					-0.022 (0.018)	-0.027 (0.020)
Observations	56,448	68,104	68,104	68,104	68,104	68,104
Number of MPs	261	261	261	261	261	261
R-squared	-0.003	-0.001	-0.001	-0.002	-0.002	0.001

NOTE: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Legislator fixed effect regressions. Standard errors in parentheses are two-way clustered at legislator and vote level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation).

Table B7: ELECTION CYCLES: PLACEBO LEGISLATURE 2007-2011

VARIABLES	(1) Placebo 2007/11	(2) Without BDP
UH * placebo reform	0.008 (0.013)	0.008 (0.013)
Placebo reform	-0.002 (0.006)	-0.001 (0.006)
Observations	65,237	63,920
Number of MPs	257	256
R-squared	-0.004	-0.004

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Legislator fixed effect regressions. Standard errors in parentheses are two-way clustered at legislator and vote level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Observations based on final passage votes 2007-2011. The placebo reform corresponds to the timing of the actual reform in the third session of the legislative period. The BDP is dropped in (2).

Table B8: ELECTION CYCLES: TRIPLE DIFFERENCE

VARIABLES	(1) DiDiD	(2) Without BDP
UH * reform * 49th legislature	-0.040** (0.019)	-0.041** (0.020)
UH * reform	0.019 (0.015)	0.020 (0.015)
UH * 49th legislature	0.039*** (0.012)	0.040*** (0.012)
Reform * 49th legislature	-0.008 (0.008)	-0.010 (0.008)
Reform	-0.004 (0.006)	-0.003 (0.006)
49th legislature	0.006 (0.007)	0.008 (0.007)
Observations	133,341	129,152
Number of MPs	348	340
R-squared	-0.001	-0.001

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Difference - in - difference - in - difference. Legislator fixed effect regressions. Standard errors in parentheses are two-way clustered at legislator and vote level. Dependent variable is 1 if the legislator deviated from the party line (abstention is not defined as deviation). Observations based on final passage votes 2007-2015. The reform variable corresponds to the timing of the actual reform in the sixth ordinary session of the legislative period 2011-2015 and to the placebo reform in the sixth ordinary session of the legislative period 2007-2011.



## C Interview Questionnaires

We conducted interviews with party secretaries as well as current and past MPs. In the following, we provide some background information on the questionnaires structured by topic.

### Interviews with Party Secretaries

Party secretaries are among the most knowledgeable people behind the scenes. Their tasks include the organization of daily parliamentary work, the provision of information to the MPs. In some cases the division of labor within the party secretariat is such that the secretary to the party group in parliament is closer to parliamentary decision making. We conducted interviews with the person closest to decision-making in parliament (which is either the party general secretary (2 cases) or the secretary of the party group (2 cases)) of all four major parties. The interviews took place between August 24 and August 26 by phone. All four were extremely cooperative and open to questions. The following table summarizes the interview questions structured by topic.

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Topic	Question
Context	What is the relationship between the representatives of both chambers?
Prior Consultation	Is there any prior consultation, both within each chambers' party group as well as within the two chambers?
Party Monitoring	Was there any monitoring mechanism prior to the reform in the Upper House? Does the party know how MPs vote, particularly for final passage votes? Is there any indication whether MPs think they are monitored? Does the party secretariat use pdf lists of votes? (not sorted according to party membership, but according to cantons, making it harder to trace MPs' votes)
Deviation from Party Line	Are there any disciplinary measures for deviators? (Does monitoring have consequences for MPs?)
Transparency Effect	Does the Party Secretary think that electronic voting changed MPs' voting behavior?

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## Interviews with Members of the Upper House

We conducted four interviews with past and present members of the Upper House. Three interviews took place in September 2015, and one was conducted in August 2016. All interviews were held in person. The next Table provides an overview of the interview questions.

### 1. Decision-Making and Voting

#### (a) Decision-Making in the Upper House and the Lower House

- To what extent are opinions pre-determined prior to each session?
- What are the most important factors for opinion-forming processes?
- Every MP has different duties (canton, party)
  - How are decisions made if the principals have different opinions?
  - Whom do they feel most obliged to? Why?
  - Do the votes change during the course of one term?

#### (b) Voting: Types and Transparency

- Contrary to elections, votes for current issues are taken publicly. How do you assess the consequences of these different degrees of transparency?
- Current issues have always been public. However, were there any changes in recent years due to technology?
- Specifically concerning electronic voting (depending on answer): Electronic voting has been discussed for months now. Did it influence voting behavior even before the introduction of electronic voting?
- Unanimity: Contrary to the Lower House, final votes are often conducted unanimously.
  - Why? (peer pressure, one vote against is unimportant etc.)
  - Did this phenomenon change after the introduction of electronic voting?
- Do you personally now have more opportunities to observe other MPs' votes?

### 2. What is the Party Line?

- To what extent do you see yourself as a representative of your party?
- Does the party give (binding) voting recommendations?
- Are there issues without a clear party-opinion?
- Is there monitoring by others? Or by the party?
- Are there any consequences for deviating from the party line?
- Are you aware of any instances when a MP experienced advantages or disadvantages because of his voting behavior?

### 3. Communication and Information Exchange between Lower and Upper House

- Why is it that important for the Lower/Upper House to deal with a bill as the First Council?
- To what extent do the debates in both houses influence each other?
- Lower House's external view on the Upper House: Did something change? How does the Lower House look at the voting results of the Upper House?
- Did something change in the Lower House since the introduction of electronic systems in the Upper House?

## D Newspaper Search

We looked for newspaper articles directly referring the voting behavior of Swiss politicians in the Swiss Lower House and Upper House in 2014 and 2015. The number of articles should give an overview of media coverage of politicians' voting behavior after the introduction of electronic voting in the Upper House in 2014.

The following keywords were used and combined in the newspaper database factiva: Electronic Voting, E-Voting, Voting, Ständerat, Nationalrat, parlament.ch, politnetz.ch, smartmonitor.ch, Voting Behavior, Politicians, Canton Interest, Party Line, Deviating. The websites parlament.ch, politnetz.ch and smartmonitor.ch were included as they serve as a publicly accessible source of each politicians' votes.

The inquiry first focused on four big national newspapers: NZZ, Tages-Anzeiger, Blick, and 20 Minuten. Next, the inquiry was extended to regional newspapers such as St. Galler Tagblatt, Luzerner Zeitung, Berner Zeitung, Aargauer Zeitung, Südostschweiz, and Der Bund.

## E Example Ideological Voting

In a one-dimensional policy space, the literature points to the problem that some observed votes can be rationalized by either party pressure or autonomous legislator voting. Borrowing an example from McCarty et al. (2001), suppose two parties L (left) and R (right) have no ideological overlap. If politicians vote honestly on a right-leaning bill without party pressure, the bill might get rejected with all leftists and some moderate rightists opposing it. Under party pressure all rightists would accept the bill. However, the voting outcome also could be generated by seemingly ideological voting with a cutpoint<sup>39</sup> located between the moderates of each party.

A graphical representation of both votes can be found in Table E1. The vertical lines represent the cutpoints. Example 1 shows that legislators 1-4 would ideally reject the bill. However, the vote in Example 2 could be rationalized as either ideological voting (party ideology and individual ideology overlap) or legislator 4 being pressured to vote according to party line. Finding changes in the cutpoint therefore does not allow to conclude that party pressure has changed (Krehbiel, 2000).

Table E1: Examples of ideological and party voting

	Example 1						Example 2					
Legislator	1	2	3	4	5	6	1	2	3	4	5	6
Party	L	L	L	R	R	R	L	L	L	R	R	R
Vote	N	N	N	N	Y	Y	N	N	N	Y	Y	Y

NOTE: Legislators from parties L (left) and right (R) vote on right bill. The cutpoint in Example 2 can be rationalized by perfect ideological party voting. Alternatively, it can be explained by party pressure making the moderate legislator 4 switch from rejecting the bill to accepting it.

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<sup>39</sup>Cutpoints separate “yes” from “nay” voters on one-dimensional votes.

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